

Childhood obesity and mindfulness

Abstract

Obesity, a largely intractable health condition with incalculable health, financial, emotional, physical, and social costs and ramifications remains an immense challenge to mitigate effectively, especially if this condition has evolved unabated since early childhood. Moreover, multiple intervention approaches designed to prevent or mitigate childhood obesity, and its predictable and well established negative health impacts, while studied intently and widely applied to aid efforts to foster the attainment of a healthy weight status across the lifespan, have generally failed to eliminate this growing global epidemic and its detrimental consequences for the individual, as well as society. Alternately, interventions that can limit the onset of obesity, or help to reduce this where present, including efforts to contain depression, anxiety, stress, and emotional and/or externally stimulated eating behaviors, would appear highly desirable and of high personal and social significance. Studied for many years in various spheres, mindfulness based strategies are being and have been discussed for some time in this regard. This mini review discusses some of these ideas and related observations regarding, and whether more emphasis on ensuring mindfulness based actions are possible and should not be ignored in efforts to effectively attenuate selected correlates of the global obesity burden. Extracted from current literature, it is concluded that this is a field of significant promise, but one requiring not only more long-term research, but possible novel ecologically oriented integrated mindful and collaborative thoughtful family, school, community, and policy intervention efforts, along with dedicated sustainable collaborative goals and supportive efforts.

Keywords: childhood obesity, family, intervention, mindfulness, schools, social ecological model, stress

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Ray Marks

Department of Health and Behavior Studies, Columbia University, Teachers College, USA

Correspondence: Ray Marks, Department of Health and Behavior Studies, Teachers College, Box 114, 525W 120th Street, New York, NY 10027, USA, Tel 1-212-678-3445, Fax 1-212-678-8259, Email rm226@columbia.edu

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Overview

The declining health status of the American nation is generally deemed attributable in part to the poor eating and exercising practices of its citizens from the earliest years.¹ In particular, it is safe to say that contrary to prior decades a high proportion of children as young as 2 years of age, as well as older children and adolescents attending school in 2022 may already be deemed to be overweight, and this recent rise in childhood overweight incidence rates, meaning high numbers of children are found to exceed their ideal weight by 20 percent or more, even in genetically stable populations,² may not only increase over time, but predictably may persist into adulthood with dire repercussions, especially for the child who may already suffer from poor physical and/or mental health challenges, such as asthma and autism.³ In addition to its adverse impact on physical and mental health, even if the child is originally healthy, an adverse impact on academic outcomes as well as social and possible economic health correlates are increasingly predicted to emerge.^{4,5} Conversely, healthy youth may not only become healthy adults more readily, but may well achieve more protection in later life as they are likely to attend school more frequently than those children who feel ill or depressed or are bullied due to their weight status, as well as being more health literate. They may also be more alert and ready to learn.

Unfortunately, even though it is generally accepted that 'good' overall health can enable most adults to lead productive lives and to contribute to the prosperity and overall social stability of a country, designing effective health interventions to combat the current epidemic of the worldwide childhood onset of obesity that is not deemed due to genetic factors is not a simplistic task. Moreover, this recently emergent health issue, largely due to environmental influences, has not been truly addressed at the primary prevention level to any degree, nor has any uniformly mode of addressing the problem met with any measureable degree of success despite almost 20 years of endeavor.²

One reason for this lack of programming to mitigate childhood obesity, may be that health and especially weight status is not only a product of individual behavioral factors, health practices and coping skills, but it is the sum of collective conditions including the external environment, the home environment, the cultural environment, and the health care system among other factors. Another may be the idea that being overweight is not unhealthy, and/or is a sign of prosperity, or a problem that will recede over time, or an idea based on political influences past and present, or that the 'obesity epidemic' is a mere sociological construct developed without much consideration by medical researchers.⁶ There is also a large profitable industry that has benefited from the rise in childhood obesity and that may be reluctant to see this health issue eliminated.

In this regard, and as the childhood years are potentially a highly critical period during which suboptimal eating behaviors and food preferences that may persist into later life may evolve, and there is no lack of data showing youth and adults who are overweight are at higher risk for all forms of chronic illness, as well as COVID-19 mortality, timely early intervention to allay this health crisis is not a debatable issue in this authors view, but a moral imperative. At the same time, given that the Social Ecological Model deemed to explain childhood obesity origins implicates multiple contributory factors, it would appear that multipronged strategies that can offer a practical window of opportunity for developing and fostering healthy eating practices, among other behaviors in the pediatric population, might carry forth more favorably than not into adulthood. Alternately, research shows a high tendency for childhood obesity to track across time into adulthood where interventions to counter this state are more likely to be resisted. Evidence that there is an unprecedented high rate of youth obesity, and later life overweight and obesity rates, implies that the window of opportunity has not been uniformly targeted. As outlined by Kappes et al.,⁷ obesity in childhood and adolescence will however remain a great global health challenge if neglected, and is not only a health condition where stress exposure during childhood and

adolescence is strongly associated with a higher obesity risk, among other factors, but where being overweight can produce multiple stressors, including physiological, social, and future economic stresses, and a low self esteem^{8,9} that collectively represent a growing public health crisis.⁵

Hence as per Pinhas-Hamiel et al.,¹⁰ who studied adults with type 2 diabetes that may emerge as result of an acquired obesity state over time, the application of cognitive behavioral therapy, acceptance and commitment therapy, along with mindfulness interventions appeared to offer some possible alternate obesity control interventions, other than diet and exercise alone,¹¹ especially if the intervention[s] helps to mitigate any associated depression and/or anxiety states and long-term weight control challenges. In addition to possibly employing a brief mindfulness intervention to supplement standard behavioral intervention approaches among adolescents categorized as being obese.¹² Loukes et al.¹³ note an approach known as dispositional mindfulness may be associated with better glucose regulation, in part because it may help to lower the likelihood of obesity, while providing a greater sense of control, a self-perception that was found correlated with higher levels of mindfulness.

Mindfulness, a psychological strategy that has been used to address thoughts about the eating-associated environmental as well as psychological stimuli that may foster negative eating practices or binge eating,^{4,14-16} among other cognitive attributes, may also have an impact on an attribute termed disinhibited eating behaviors,¹⁷ for example those that are responsive to emotions and/or external stimuli.^{18,19} According to Dalen et al.,²⁰ meditation-based mindful eating programs represent a unique and novel scientific approach to the current youth obesity epidemic given that they address key psychological variables affecting weight. This review specifically focuses on how mindfulness approaches, through their probable impact on self-regulation, depression, anxiety, and stress levels across all ages^{21,22} has been deemed worthy of study and exploration.

An effective approach towards reducing the risk of excess weight and suffering in at risk, as well as overweight children, is sorely needed, especially among those who might already have a variety of co-morbid health conditions including cardiovascular disease, type 2 diabetes, inflammation, asthma, sleep disturbances, gall bladder disease, and some types of cancer, even among young adults, and possibly school children. At the same time, as well as the problems of being overweight, these co-morbidities are often related to mental health correlates, and overall stress exposure, and disordered eating. As such, it is possible, that even though attempts have been made to develop many forms of childhood obesity prevention, those that include mindful parenting, eating, and stress reduction strategies may prove especially helpful in efforts to both offset, as well as intervene upon obesity and overweight in the early childhood years.

This idea, although not novel, does appear especially worthwhile and possibly reasonably practical to pursue given that along with these multiple unquestionable negative health conditions that may be associated with obesity, many may be worsened by the presence of multiple cognitive and environmental factors in their own right. In addition, evidence suggests mindfulness can help to directly counter obesity or overweight conditions, in a manner that is not inherently time consuming, and one requiring multiple resources, along with complicated and concerted long-term behavior changes and weight control recommendations and adherence strategies. In the absence of any cure for this condition with its predictable serious social and psychological ramifications, affecting virtually all ages and socioeconomic groups, and with only limited success in response to a

variety of evidence based mainstream approaches, more emphasis on prevention or adjunctive strategies that can potentially be employed readily to control or mitigate one or more obesity correlates or consequences outlined below.

- a. Premature disability
- b. Depression
- c. Anxiety
- d. Body dissatisfaction
- e. Dementia in later life
- f. Social stigma and isolation
- g. Comorbid health conditions especially cardiovascular disease
- h. Chronic pain
- i. COVID-19 disease
- j. Various addictions
- k. Bullying
- l. Physical activity challenges
- m. Lower quality of life
- n. Sleep apnea
- o. Weight based teasing²³⁻²⁵

Objective

This brief was designed to examine the strength of the case for the idea that more careful or mindful parental behaviors, thoughts, actions, and attention, plus more concerted mindful efforts by schools, community players, politicians, marketers, and social media influencers to protect young children from the dangers of acquiring obesity can be expected to theoretically advance childhood obesity preventive opportunities and future incidence and prevalence rates.

Methods

To achieve the aims of this review, PUBMED, CINAHL, PSYCHInfo, and GOOGLE SCHOLAR believed to house salient topical peer reviewed articles were specifically employed. Sought were articles that were categorized using the key terms: childhood obesity and mindfulness. No limitations were placed on document type or year of publication and while some articles may have been overlooked, an effort to select the most salient published articles on this topic was made. The ultimate goal was to broaden awareness of any potentially useful link between efforts to be more mindful on behalf of children in their early years, where they are passive recipients of foods and surrounding cultural practices. After an extensive search, all pertinent data were downloaded and carefully scanned and if relevant are presented in this overview solely in a narrative form, given the low number of well controlled studies or studies in general on this topic.

The term mindfulness adopted here refers to any proactive approach that can be possibly taken or undertaken alone or in combination to ensure young children have ample opportunities to develop healthy eating and activity practices and can either avoid harmful actions, or function in a safe social environment as the norm. The social ecological model that implicates at least five major influences on health behaviors such as eating, including family, schools, and political influences was considered as the appropriate model that explains both the contributory causes of the childhood obesity epidemic as well as its application in mitigation efforts.

Results

In addition to the aforementioned points concerning childhood obesity reiterated in numerous articles for more than 20 years, 63 articles were found to be listed in total on PUBMED and many were duplicated on the additional sites examined when including the years 1980-May 2022 and when using the key words, childhood obesity and mindfulness, including those that focused on treatment as well as prevention as related to childhood obesity. Of these, most do not focus on targets other than the child, the family, or school, many are proposals or feasibility studies, even though most completed studies show some aspect of mindfulness to be of more merit than not especially where high levels of psychological stress of parents and / or the children prevails.

Other related research has shown there are many mindfulness approaches, and that among these, a mindfulness based curriculum that focuses on identifying stimuli both internal and external that can provoke excess eating of unhealthy foods, and is one that empowers the youth to choose foods of benefit to their physical and psychological wellbeing can be recommended for the older child.⁴ However, it seems unlikely that the infant or young child can actively follow this course of action to any meaningful conclusion, and even if they can, are still dependent on the foods provided for them, including those in the external environment. Their level of physical activity and attachment to social media may also have a strong influence on childhood weight if foods and eating are the only attributes of concern.

Yet, change for the better is possible according to Vuk²⁵ who focused on developing an anti obesity measure among children, wherein a 12 week mindfulness program with two follow-up sessions conducted three and six months after the final intervention week for children between the ages of seven and twelve years and their parent(s) was discussed. Additional goals for this program beyond overall health, were the desire for the children to achieve their target weight and for parent(s) to continue to model healthful behaviors through mindfulness measures, an approach that might work well even for very young children. While no outcomes were assessed, some support for this approach has been documented by others.^{19,26}

In addition, Pinhas-Hamiel and Hamiel¹⁰ who reported on cognitive behavioral therapy as well as mindfulness, observed greater decreases in depression, insulin resistance, and body mass indices at one year in girls randomized to mindfulness compared with the cognitive behavioral therapy groups. However, the cohort studied was clearly more advanced in age than infants or preschoolers, who are currently at high risk for overweight. In their study, and to advance the health status and prevent obesity among at-risk 2- to 5-year-old children, Jastreboff et al.,²⁶ who engaged low-income obese stressed parents in a novel 8-week mindfulness-based group parent found that when compared with a control group, the active intervention group improved to a greater degree as far as parental involvement and decreased the parental emotional eating rating were concerned. At the same time, the children's body mass indices among the control group showed significant increases over the treatment period that did not occur in the mindfulness-based parent oriented stress intervention group and this approach does seem very promising and noteworthy.

A further clinical study conducted by Lopez et al.,²⁷ in a pediatric hospital for older children 10-14 years of age and who tended to be overweight as well as anxious also appeared to demonstrate a favorable mindfulness impact. To this end, participants were assigned to receive an 8-week conventional nutritional intervention or an 8-week mindfulness-based standard intervention plus conventional intervention. Measured at baseline and at the end of the intervention

the researchers found a significantly reduced set of anxiety, body fat, and inflammatory marker measures in the mindfulness based group. This finding indicates that efforts directed towards reducing the anxiety levels of both parents and their young children through mindfulness approaches possibly yield a strong set of favorable health impacts that may prevent the child from becoming overweight as well as anxious.

Additional findings

Loukes et al.,¹³ report dispositional mindfulness (defined as the ability to attend non judgmentally to one's own physical and mental processes) may well be associated with obesity, as well as the presence of central adiposity and obesity. As such, this group proposed that low dispositional mindfulness might be salient risk factor for obesity and adiposity, but may have to be developed as soon as a child can grasp how to cope with stress, how to keep their bodies healthy, and how to say no.

Gourveia et al.,²⁹ who explored whether the association between mindful parenting and children/adolescents' disordered eating behaviors (i.e., emotional eating and overeating) may be mediated by parenting stress and parental child-feeding practices concluded that mindful parenting was negatively associated with children's emotional eating. This was apparently mediated by parental stress levels and pointed to the importance of efforts to consider the less frequent use of food as a reward or less frequent use of food as a sole reward. Moreover, mindful parenting associated with less frequent pressuring of the child to eat and monitoring their own level of parental stress may prove helpful. Research shows that stressful parenting can indeed produce higher levels of emotional eating among youth, as well as more overeating among early-stage obese adolescents. However, even though the researchers concluded that an intervention to reduce stress and advance mindful parenting may hence help children/adolescents to engage less often in disordered eating behaviors, while fostering the adoption of more adaptive child-feeding practices and behaviors, the type of foods that are put forth and selected for the child must remain of high concern, as must the role of harmful social media influences on the child as well as the parent. Torres et al.,³⁰ did however find that parental mindfulness can serve as a possible effective novel intervention target for purposes of fostering child obesity prevention. That is, this group observed greater maternal mindfulness was associated with a lower child body mass index, although the extent of the issues that underpinned the mindfulness actions was not clear.

Similarly, a school based program that incorporates mindfulness attributes and has shown fair acceptability by students has pointed to the potential of school-based mindful eating programs as a means of addressing the early onset of obesity in high-risk youth.³¹ Krebs et al.,³² similarly anticipate that a mindfulness-based intervention could be effective in engaging children and reducing childhood obesity risk in urban school youth. Using a two-group quasi-experimental study design where the experimental (E) group (n = 26) participated in a nine-session pilot sessions of 90 min duration offered weekly as part of an afterschool programming and children who attending during the school day comprised the control (C) group (n = 25) it appeared the mindfulness approach was able to engage the youth but the impact of this was not observed in this pilot project. Daly et al.,³³ did however imply that a satiety-focused mindful eating intervention was associated with a significantly lowered body mass index compared to control group participants, whose weight increased (p<0.001). This initial as well as observed sustained body mass decline in the mindfulness intervention group was taken to imply a positive impact on health behaviors post intervention.

In a pilot randomized controlled trial conducted by Shoemaker et al.,³⁴ that targeted 12-17 year old adolescents at-risk for excess weight gain/ having a parental obesity history, and where the adolescents received either a mindfulness-based or a health education intervention that involved six weekly one-hour sessions, although deemed feasible and acceptable, the fact that the adolescents in the mindfulness group found to have lower food reward sensitivity at six-months, was not associated with any differential body mass index or adiposity change. The study duration as well as its power may have been inadequate according to the researchers. Similarly Kumar et al.,³⁵ who conducted a pilot randomized clinical trial to evaluate the feasibility and acceptability of a family-based mindful eating intervention on adolescents with obesity, versus standard dietary counseling demonstrated an increase in awareness at 24 weeks ($p = 0.01$) and a decrease in distraction during eating at 12 weeks ($p = 0.04$) among the mindfulness group, when compared with the control group. The study however was not designed to establish the degree of benefit on weight control over any extended period.

In addition, a study by Savage et al.,³⁶ has suggested that using a multiphase optimization strategy, parent-child dyads that focused on a combination of intervention components delivered over 4 weeks: home supply, parent shared decision making, child mindfulness and child attention control strategies can be implemented readily in the home and have been deemed acceptable. That is, preliminary results showed that among parents who received the parent shared decision making intervention, 86.4% reported the structured-based candy routine they set with their child was easy to follow, while most children reported child mindfulness (95%) and attention control (89.5%) strategies were easy to play. Children recalled 4.1 ± 1.8 of the six mindfulness strategies and 2.7 ± 1.6 of the five attention control strategies at follow-up. As well, eating in the absence of hunger tended to be lower for children who received the parent shared decision making and child mindfulness intervention components. In

another family-based mindfulness intervention developed by Burton et al.,³⁷ to address pediatric overweight and obesity, while improving healthy lifestyle behaviors through cooking classes, the researchers incorporated aspects of mindfulness to enhance internal recognition of hunger and other stimuli that appears to have merit to foster weight control in the at risk pediatric population.

In sum, as documented by Stanszus³⁸ and supported by de Lara et al.,³⁹ in a systematic review of the scientific research on mindfulness-based eating programs aimed at combating mindless externally stimulated eating behaviors, and fostering habits of attending to internal hunger and satiety stimuli, among other childhood obesity determinants, these consistently tend to show significant beneficial improvements in most of the cases regarding eating habits, food portion sizes, stress reduction, or the reduction of food cravings in minors, even when no other interventions are apparent. Indeed, mindfulness programs applied to improve eating behaviors do appear to be an effective alternative to preventing binge eating or moderating this, as well as emotional eating, and eating in response to external cues.¹⁵ However, most studies either focus on children older than seven, or obese adolescents, and adults, hence whether the same applications will work in averting childhood obesity is uncertain at best. However, further studies are clearly indicated especially if they can draw conclusions as to whether eating behavior changes seen in short term studies are sustainable and efficacious in the real world and whether such approaches can influence transitions from early childhood to adolescent in terms of eating practices, weight management and weight gain and losses.³⁸

In short, a number of diverse perspectives can be seen to have been examined in the context of both mindfulness and its application in efforts to apply this idea to minimize childhood obesity rates and its onset. Benefits may hypothetically accrue as per Figure 1 below, but require careful study.

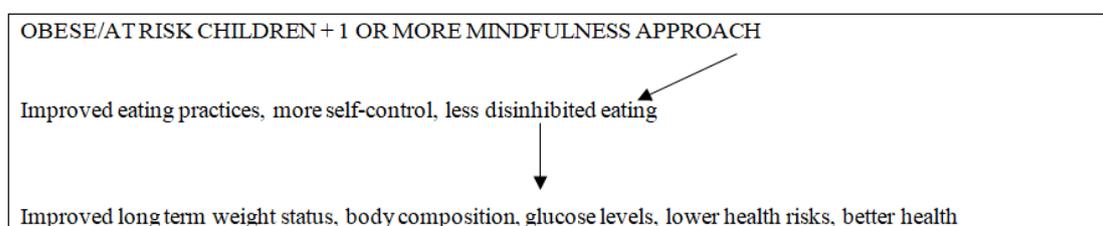


Figure 1 Schematic representation of possible benefits of mindfulness approaches on those youth at high risk for obesity due in part to poor food choices and food associated behaviors.

Summary and discussion

Obesity is not just a state of being overweight for one's height, but a metabolic disorder, largely attributable to the accumulation of excess dietary calories and their transformation into visceral fat along with the release of high concentrations of free fatty acids into various vital body organs, as well as muscles. Representing an enormous global challenge of increasing proportion, childhood obesity, which is on the rise, may predictably and progressively induce hyperglycemic states that leads to type 2 diabetes, cardiovascular diseases, possible obesity exacerbation, and emotional and social health challenges even among very young children, and is very challenging to reverse especially in the face of persistent intakes of energy dense foods and an adoption of a sedentary lifestyle.

In this regard, the development of childhood overweight is a condition that all who value youth should try to avert, and is one that requires efforts to address those complex set of sociological

and behavioral factors found to interact readily to place a vulnerable child at risk of overweight. This multifaceted system, which has been conceptualized using an Ecological Systems Theory paradigm highlights the particular importance of considering the context(s), or ecological niche, in which a person is located in order to understand the emergence of a particular characteristic. In the case of a child, the ecological niche includes the family and the school, which are in turn embedded in larger social contexts including the community and society at large.⁴⁰

As one component or explanation for why these issues exist and persist may be the lack of attention given to healthy food production, plus the role of deficient mindfulness given to the food prepared and delivered, plus non mindful eating rather than engaging in mindful eating. A more recent concept in this regard is the possible value of encouraging intuitive eating as far as this can modulate eating habits, food intake, and food choices, while fostering weight control, but

mindfulness of this need may not be sufficient if forces beyond the individual sphere are not desirable of eliminating this epidemic, such as in the spheres of policy development, school based efforts, and family oriented situations and practices.^{22,41,42} In this mini review, a summary of the current evidence together with available details of interventions undertaken in this regard appear very promising, even if only truly examined at the intrapersonal or family and school level, and mostly in pilot study contexts.

Indeed, while commonly attributed in part to excess eating and poorly devised diets, plus an energy imbalance due to the adoption of excess sedentary oriented behaviors, unlike traditional epidemics, current evidence strongly implies the obesity epidemic may be influenced by multiple factors including stress, and food security. Thus the problem of childhood obesity, can clearly not be defeated readily without concerted efforts from infancy through adulthood if possible and across multiple players and organizations and spheres of influence to harness every mindful effort towards fostering a more sound food environment and set of intake behaviors for youth as well as reducing their exposure to unhealthy options and media messages.

That is, even when many barriers to accessing healthy foods prevail, and even if not, recognizing there are many competing marketing messages that influence food preferences and encourage alternate cheaper 'tastier and time-saving' choices is essential.

In this regard, parental or care giver mindfulness, pediatrician and school based efforts to carefully guide the child towards being a healthy child, along with the support of businesses, policy makers, and even marketers and social media groups will surely yield measurable changes in the currently dire obesogenic era. Although very few articles truly prevail on this potentially important approach to preventing the onset of excess body fat in young children who are not yet able to make sound choices, mindfulness cannot be ignored in our view, and is a topic that appears to have considerable promise and merit, even if this is only deemed adjunctive.

Accordingly, a concerted effort by multiple players at many different levels of influence to harness their collective energies towards a common goal of fostering optimal child health for all may be expected to help quite significantly in efforts towards attenuating childhood obesity, and its immense collective burden, which remains an enormous global health challenge. The additional mindfulness of

a child's care givers, school personnel, pediatricians, food marketers, and industrial and political supportive thoughts and mindful practices that do not engender known obesogenic attributes, are especially indicated. Moreover, this approach is not just theoretical, but appears consistent with the plausible role played by stress exposure during childhood and adolescence, as well as caregiver stress, in heightening the risk for obesity as proposed by Kappes et al.,⁷ among other factors, and can include parental stress.

At the same time, alone or in combination with exercise and other strategies, it does appear that mindfulness applications in their various forms are likely to either help initiate or offset excess weight, and/or promote desirable weight loss goals, and food choices, as well as ameliorating inflammation and diabetes extent, especially in cases where losing weight may have previously been a 'losing' battle. A mindful care giving approach in the home, which extends to the school, may also help the child to adopt more adaptive and weight-adapted feeding practices and others that are health promoting and not injurious.⁴³ Taken as a whole, and for the case of the vulnerable infant and young child, even if research is lacking, there appears to be great potential for the role of mindfulness and its demonstrated positive impact on a child's food intake, stress level, and types of foods consumed, and thus indirectly, the overall health of the child across time.⁴⁴

However, since it is unlikely stand alone interventions by caregivers can reduce the present crisis, to any meaningful degree, listed below are some of the multiple realms of influence wherein mindfulness and careful thought by multiple players and that align with empirical evidence could conceivably be quite helpful in advancing those universal efforts to eradicate behavioral developed excess weight gain among vulnerable children (Figure 2).

Concluding remarks

An up to date review of progress made as of 2022 in the realm of childhood obesity and its rapid rise in the global community in recent years has shown: Obesity remains a well established negative health concern in all spheres of the globe and in all age and health status groups, and is a widespread health condition increasing in prevalence and lethality among children worldwide due to its multifaceted impact on their physical, mental, emotional, and social health dimensions.

Mindful POLITICAL approaches
Legal ordinances
Agricultural subsidies for growing healthy foods
Feasible pricing policies healthy foods
Clear food labeling and warnings
Provide financial incentives to healthy food providers
Penalties to purveyors of health damaging foods/beverages
CAREGIVER/FAMILY support
Foster personalized family counseling, educational and nutrition based programs
Cooking classes, culinary coaching, literacy and behavioral skills trainings
Programs to enhance caregiver mindfulness eg, boost awareness media influences ^{29,43}
OTHER
Reward corporate mindfulness ⁴⁵
Foster mindful e-health, m-health, pediatric discussions, guidance, and initiatives ⁴⁶
Foster school based mindfulness efforts re- eating and exercise, high standard lunches

Figure 2 Selected targets that could conceivably collaborate mindfully on behalf of at risk young children to reduce childhood obesity risk and with favorable cost effective results.

At the same time, while very few tangible counter efforts prevail, it appears a dedicated effort on the part of caregivers to combat childhood obesity, which is supported by mindful school and community based efforts, as well as political and legal imperatives not only warrants more attention, but could prove cost effective, while saving lives.

It is further concluded that raising the idea that we are all responsible for one another—framing our endeavors mindfully as either a human rights issue, an equity, or economic issue may open the way forwards from the earliest points in time. As such, a society that arguably does everything possible to protect vulnerable children from this potentially preventable epidemic is clearly highly desirable.

However, as the ‘obesogenic’ environment currently ensues unabated, and social media influencers clearly foster marketing of energy dense foods, even if one can trace obesity to the nature of sociopolitical factors that have been entrenched over time, it appears that only a concerted mindful oriented effort by multiple players to avert this current epidemic will be likely to make any impact at all in this health realm.

Future research that is more wide ranging and is conducted in light of the many potentially remediable social ecological childhood obesity determinants—and examining where and how being more mindful in multiple spheres may hence prove highly advantageous and is strongly encouraged.

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Conflicts of interest

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