

A practical approach to obesity prevention: Healthy home habits

Sharon Fruh, PhD, RN, FNP-BC, FAANP (Professor and Associate Dean)¹, Susan Williams, PhD, RN (Assistant Professor)², Katey Hayes, MS (Graduate Research Assistant)³, Caitlyn Hauff, PhD (Assistant Professor)⁴, Geoffrey M. Hudson, PhD, CSCS (Assistant Professor)⁴, Scott Sittig, PhD (Assistant Professor)⁵, Rebecca J. Graves, PhD, NP-C, RN (Associate Professor and Director)⁶, Heather Hall, PhD, RN (Professor and Dean)², & Jennifer Barinas, MA (Doctoral Student)⁷

ABSTRACT

Families have the potential to foster a healthy home environment aimed at reducing the risk of overweight and obesity. Establishing habits associated with reduced risk of obesity and overweight early in childhood can have lasting effects into adulthood. Nurse practitioners can encourage families to participate in healthy habits by addressing areas of growth for obesity prevention within the home. A review of the most recent literature, approximately over the past decade, was used to provide a consolidated source of reference for healthy home habits for the nurse practitioner. The search included terms such as “obesity,” “overweight,” “healthy habits,” “physical activity,” “obesogenic behaviors,” “family meals,” “screen time,” “depression,” “sugary beverages,” and “portion sizes.” The information was synthesized into three content areas: nutrition and consumption, patterns of activity, and stress within the home. Establishing healthy habits early in life can protect against the development of overweight and obesity. Nurse practitioners can serve a vital role in the prevention of pediatric, adolescent, and adult obesity. Equipped with the unique role of assisting those from a diverse patient base, nurse practitioners can inform patients how to improve healthy habits to decrease the likelihood of obesity or overweight. Encouraging behavior change related to the healthy habits associated with the prevention of overweight and obesity can have a long-term impact on the health of an entire family.

Keywords: Adult obesity; childhood obesity; family meals; fast food; healthy habits, healthy home habits; obesity prevention; physical activity; screen time; sleep.

Journal of the American Association of Nurse Practitioners 00 (2020) 1–11, © 2021 American Association of Nurse Practitioners

DOI# 10.1097/JXX.0000000000000556

Obesity is quickly becoming a global epidemic (Chooi et al., 2019), with approximately two thirds of adults in the United States diagnosed with either overweight or obesity (Hales et al., 2017). Overweight and obesity are associated with a range of health complications: cardiovascular disease (CVD), type 2

diabetes, hypertension, respiratory problems, and depression (Jastreboff et al., 2019). Although obesity in the adult population is troubling, the rates of obesity in children and adolescents are even more concerning due to the potential health consequences faced earlier in life (Biro & Wien, 2010). Currently, data indicate that the prevalence of obesity in adolescents (ages 12–19), school-aged children (ages 6–11), and pre-school children (ages 2–5) are at 20.6%, 18.4%, and 13.9%, respectively (Hales et al., 2017). Research has found that children with overweight or obesity are more likely to face overweight or obesity as adults (Biro & Wien, 2010). For this reason, it is critical that obesity prevention efforts include youth and their families.

Despite widespread knowledge of the negative health effects associated with obesity, there are few feasible and sustainable solutions to addressing obesity in the literature; however, family-centered interventions have shown promise (Berge & Everts, 2011). Although there are a variety

¹Research, Evaluation, and Development, College of Nursing, University of South Alabama, Mobile, Alabama ²College of Nursing, University of South Alabama, Mobile, Alabama ³Department of Psychology, University of South Alabama, Mobile, Alabama ⁴Department of Health, Kinesiology, and Sport, University of South Alabama, Mobile, Alabama ⁵Department of Information Systems and Technology, University of South Alabama, Mobile, Alabama ⁶Special Projects and Evaluation, College of Nursing, University of South Alabama, Mobile, Alabama ⁷Combined-Integrated Clinical & Counseling Psychology Program, University of South Alabama, Mobile, Alabama

Correspondence: Sharon Fruh, PhD, RN, FNP-BC, FAANP, College of Nursing, University of South Alabama, 5721 USA Drive North, Mobile, AL 36688. Tel: (251) 445-9467; E-mail: sfruh@southalabama.edu

Received: 17 March 2020; **revised:** 19 October 2020; **accepted:** 6 November 2020

of biopsychosocial factors that contribute to obesity (genetics, food desserts, stress, etc.), health behavior change can be a useful strategy for obesity prevention and intervention in the family context and home environment. As such, nurse practitioners (NPs) can play an important role in addressing the obesity crisis by educating and guiding families on how to make health-promoting changes in their households. The purpose of this article is to discuss recent literature related to healthy and unhealthy habits that NPs can discuss with their patients to begin the conversation related to obesity prevention.

Healthy home habits and obesity prevention in practice

There is a large body of research that suggests that increasing and maintaining healthy habits within the home can be a promising method for obesity prevention (Christofaro, et al., 2016; Hart et al., 2020; Malden et al., 2020; Pinho et al., 2017). Obesogenic behaviors often begin at an early age and can have a lasting impact on adult weight status and health (Faienza et al., 2020). When families engage in healthy home habits, positive consequences result for both adults and children within the home. These habits include adequate nutrition, reduced sugar, reduced fast food intake, recommended activity levels, and limited exposure to unhealthy stressors (i.e., positive family functioning; Haines et al., 2016; Mehdizadeh et al., 2020).

Nurse practitioners can play an essential role in facilitating healthy home habits by incorporating obesity management practices. Thompson et al. (2020) recommend health care providers first complete an assessment of family health habits and areas in need of improvement. Next, the NP must also assess the readiness of the individual and the family to learn; their motivation to change; what and how they need to learn; and prior experience with implementing new healthy habits. Ultimately, NPs can help the individual or family members establish realistic goals that can decrease the risk of obesity once they understand the importance of healthy home habits (Thompson et al., 2020).

Using a behavioral model or theoretical framework can provide NPs guidance in their real-world approach to obesity prevention efforts (Al-Lami et al., 2020). Patients who see an NP in a clinical setting are likely already aware of the benefits of eating nutritious foods daily, engaging in physical activity regularly, and reducing stress in the home. However, implementing and sustaining behavior change is often difficult and involves developing a “new normal” lifestyle. When working with patients and families, we suggest using the Fogg Behavior Model for incorporating behavior change through the use of persuasive technology. The Fogg Behavior Model suggests that there are three conditions that must be met for behavior change to occur: motivation, ability, and

prompts. The patient or family must first be motivated to change, develop the skills or ability to make behavioral changes, and be willing to receive reminders (prompts) to perform the new healthy behaviors (Fogg, 2020; Fogg & Euchner, 2019; Toledo et al., 2018). Nurse practitioners can provide education on how to implement healthy behaviors, provide recommendations for addressing barriers, and use brief motivational interviewing techniques to help facilitate behavior change (Östlund et al., 2015). Of course, the NP must also be willing, interested, and committed and have the time to incorporate a regular structured visit for the patient and their family to manage the progress of their healthy home habits.

Obesity intervention and prevention efforts that focus on assisting patients and their families with developing healthier home habits that have the potential to not only create positive health behavior change among adults but also model, teach, and reinforce healthy habits for youth. The following sections will detail three main areas of concern for addressing obesity prevention within the family and home environment: Nutrition and consumption, patterns of activity, and stress within the home. Taking the first steps to discuss the topic of weight with a patient can be difficult for even the most experienced NP. Therefore, a comprehensive guide on weight discussions with patients is now available from the Centers for Disease Control and Prevention (CDC) (see **Table 1** for a link to this resource).

Within each section, the authors will provide recommendations for NPs to include in their discussions with patients.

Nutrition and consumption Home food environment

Parents serve a vital role in what a child consumes within the home, particularly snack consumption (Blaine et al., 2017; van Grieken et al., 2019). Therefore, the foods that are available in the home environment become the foods that children learn to prefer (Loth et al., 2020). Various contextual factors may affect the types of food that are available in the home, such as culture and socioeconomic class. However, on the individual level, parental knowledge of nutrition can positively or negatively affect the choices of food they provide for their children. Children often look to parents as role models, which can also influence the foods they eat as they move into adolescence and then into adulthood (Yee et al., 2017). A study by Bleiweiss-Sande et al. (2020) examined diet quality and weight status in low-income children ages 8–12 years old. These researchers found that a higher intake of processed foods was not related to weight status but was related to lower dietary quality. Although this may seem intuitive to those who have higher incomes and current knowledge of proper nutrition, there are many factors to

Table 1. Resources for nutrition and consumption

Location of Resource	Title of Resource
American Heart Association	Daily Tips to Help Your Family Eat Better: https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/daily-tips-to-help-your-family-eat-better
Appetite to Play	Ways to Communicate with Families about Healthy Eating. https://www.appetitetoplay.com/healthy-eating/tips-ideas/ways-communicate-families-about-health-eating
Centers for Disease Control and Prevention	Dietary Interviews Procedure Manual. National Health and Nutrition Examination Survey (NHANES). https://wwwn.cdc.gov/nchs/data/nhanes/2019-2020/manuals/2019-MEC-In-Person-Dietary-Interviewers-Manual-508.pdf ; Know your Limit for Added Sugars: https://www.cdc.gov/nutrition/data-statistics/know-your-limit-for-added-sugars.html
Eating Well	How to stock your pantry: http://www.eatingwell.com/article/37009/how-to-stock-your-pantry/ ; Healthy Snacks: http://www.eatingwell.com/article/290446/top-10-healthy-snacks-for-kids/
Parents News Now	The Healthiest Fast-Food Kids Meals: https://www.parents.com/health/parents-news-now/the-healthiest-fast-food-kids-meals-may-surprise-you/
U. S. Department of Agriculture - ChooseMyPlate	Welcome to MyPlate Kitchen – Recipes, Cookbooks, Budget Friendly SNAP Recipes. https://www.choosemyplate.gov/myplatekitchen

consider when a low-income family is purchasing food to economically feed their family (Robson et al., 2020).

During a routine visit, NPs can play a critical role by educating families on the importance of strategically stocking their home with healthy food, collaboratively identifying feasible changes, and providing resources, such as a list of affordable nutrient-rich foods (Drewnowski, 2013). To promote healthy eating habits, identifying attainable changes requires setting goals that take into account the patient's circumstance and context. For example, if a patient often brings home fast food for their family due to financial and time constraints, it may be more practical for the NP to educate the patient on how to make healthier choices from the menu and provide them with a simplified interpretive nutrition guide, which is an evidence-based method for improving food choices (Wright & Bragge, 2018). Family members will eat what is available. Therefore, ensuring that healthier foods are in the home is an essential step in obesity prevention (Table 1).

Family meals

Researchers found that among children, the frequency of family meals was positively associated with healthy nutritional intake and inversely associated with sodas and high-fat consumption (Fulkerson et al., 2014). Furthermore, Magriplis et al. (2019) and Mak et al. (2012) identified that when school-aged children participate in family meals, especially without television, there were healthier dietary patterns. These patterns included a lowered intake of processed foods, sugary beverages, and fast foods, along with higher consumption of fruits, vegetables, and whole grains. Other researchers identify that adolescents who participate in family meals report a

more nutritious dietary intake (Overcash et al., 2020). Frequent family meals play an essential role in the dietary and behavioral well-being of children and youth. Therefore, it is recommended that NPs encourage patients and families to set goals related to increasing family meals.

The importance of breakfast

Skipping breakfast has been shown to lead to increased weight gain, abdominal obesity, sugar intake, and higher body mass index (BMI) in children (Keszyüs et al., 2015; Ramsay et al., 2018; Traub et al., 2018). Furthermore, children who eat breakfast have been shown to consume fewer calories throughout the day compared with those who did not eat breakfast (CDC, 2019a; Ramsay et al., 2018). In some cases, skipping breakfast leads to increased screen time, which contributes to increased intake of nonhealthy snacks and soft drinks and is associated with childhood obesity (de la Hunty et al., 2013; Keszyüs et al., 2015; Ramsay et al., 2018; Rosiek et al., 2015).

It is essential that we help children create healthy habits around eating a nutritious breakfast because children who skip breakfast are likely to continue this habit into adulthood (Bian & Markman, 2020; Pedersen et al., 2013). The persistence of this behavior throughout adolescence and adulthood has been associated with increased risk of obesity and subsequent health complications (i.e., type 2 diabetes and CVD (Ballon et al., 2019; Ofori-Asenso et al., 2019)). Research studies show that skipping breakfast as an adult is associated with increased BMI and increased waist circumference, and it inhibits the ability to lose weight (Megson et al., 2017; Watanabe et al., 2014; Xiao et al., 2019). It is important for NPs to assess breakfast habits and communicate the importance of healthy habits.

Avoiding sugary beverages

Added sugars found in beverages have been linked to weight gain, overweight, and obesity in adults and children (CDC, 2019b; Malik et al., 2013). Sugary beverages include soft drinks, energy drinks, flavored waters, and fruit drinks. The World Health Organization (WHO, 2015) suggests that children and adults should limit their sugar intake to less than 10% of their total energy intake. For children, this represents consuming 4–6 ounces per day for those between the ages of 1–6 and 8–12 ounces per day for those between the ages of 7–18. Both the WHO (2015) and the U.S. Health and Human Services Dietary Guidelines Advisory Committee (2015) suggest that limiting sugar to less than 5% of energy intake can aid in the risk reduction of developing diseases, particularly, overweight and obesity (Liu et al., 2020; WHO, 2015). However, young children have been shown to consume almost 50% of their added sugars from sugary drinks daily (Harris et al., 2020).

Avoidance of fast food

Fast food is sometimes preferred due to its low cost and easy access. Yet, fast food consumption is consistently linked to an increased risk of obesity in children and adults (An, 2016; Newman et al., 2014). Results from the 2003–2010 Centers for Disease Control National Health and Nutrition Examination Survey indicate that 32.2% of adults reported consuming fast food, and 26% reported consuming food at a full-service restaurant (CDC, 2017). Ultimately, fast food and full-service restaurant food intake resulted in a substantial increase in calories and fat, which could potentially be linked to increased risk for weight gain and the complications associated with weight gain, such as obesity or diabetes. In another study with the WHO, Global School-based Student Health Survey (WHO, n.d.) researchers collected data for 7 days related to fast food consumption in 26 different countries from low income, middle, upper middle, and high income. These researchers found that when controlling for sex, age, food security, alcohol, smoking, physical activity, obesity, soft drinks, as well as fruit and vegetable consumption, fast food consumption was high (53%). Sadly, suicide attempts were higher in those who consumed fast food more so than those who did not consume fast food (11.8–8.3%; Jacob et al., 2020). A Canadian study found that in young adults ages 16–30 years, consumption of fast food varied from 0 to 16 fast food meals in a week (mean = 2.1). Of interest, these researchers used smart phone software to examine the number of fast food places that were within a short distance of the young adults home (500, 1,000, and 1,500 m), and not surprising, they found that those who had more fast food places nearby spent more time in those locations eating fast food (Liu et al., 2020).

Patterns of activity

Physical activity

Physical inactivity is one of the primary underpinnings for the development of obesity's comorbid conditions.

Physical activity not only reduces a person's risk of numerous diseases but also some of the health benefits of exercise can even be observed immediately after a single session (Colberg et al., 2016; Katzmarzyk et al., 2019; King et al., 2020; Piercy et al., 2018; U.S. Department of Health and Human Services, 2018). Benefits include improved weight status, improved cardiometabolic health, and lower risk of hypertension and anxiety. Not only does physical activity provide benefits for the heart and muscles but also it reduces numerous types of cancer (i.e., colon and breast cancer; McTiernan et al., 2019).

An emphasis on physical activity for children and adolescents should focus on promoting positive lifestyle choices and habits. In addition to keeping children active for their acute cardiometabolic health, another goal should be to promote long-term physical activity habits instead of simply developing sports skills (Farooq et al., 2020). This focus will lead to greater inclusion and more success in promoting physical activity in the future (Table 2).

Sedentary behavior

Not only does a sedentary lifestyle promote obesity and development of comorbid conditions because of the lack of physical activity, but even the accumulation of prolonged sedentary activities (e.g., sitting) has been shown to increase a person's risk profile. This is a very significant problem in the modern workplace and with the overabundance of sedentary forms of entertainment and leisure. Although prolonged sitting is often associated with excessive screen time, the obesity-related impacts go well beyond the screen and even the scale. Specifically, longer periods of sedentary behavior are associated with an increased risk of all-cause mortality, CVD, CVD mortality, type 2 diabetes, and certain cancers such as colon, endometrial, and lung (Matthews et al., 2015; U.S. Department of Health and Human Services, 2018).

Sedentary time in children and adolescents is typically associated with either screen time or sitting for long periods at school. Both fronts need to be addressed to effectively interrupt sedentary behaviors in these settings: If children are using an electronic device, then set a timer for how long they may use the device, and have a plan to incorporate some physical activity when their screen time is over. It may be helpful to encourage children and adolescents to include activity during breaks at school (Carlson et al., 2015).

Screen time

Large amounts of time spent viewing screens such as watching television, playing video games, or using a mobile phone is a recognized risk factor for obesity (Adams et al., 2018; Domoff et al., 2020; Haines et al., 2016). In a systematic review examining variables correlated with high screen time use among infants and toddlers,

Table 2. Resources for activity

Location of Resource	Title of Resource
American Academy of Pediatrics	Healthychildren.org—Energy Out: Daily Physical Activity Recommendations: https://www.healthychildren.org/English/healthy-living/fitness/Pages/Energy-Out-Daily-Physical-Activity-Recommendations.aspx
American Heart Association	Recommendations for Physical Activity in Adults and Kids: https://www.heart.org/en/healthy-living/fitness/fitness-basics/aha-recs-for-physical-activity-in-adults
Centers for Disease Control and Prevention	Physical Activity Basics: https://www.cdc.gov/physicalactivity/basics/index.htm
Centers for Disease Control and Prevention	Healthy Schools—Youth Physical Activity Guidelines: https://www.cdc.gov/healthyschools/physicalactivity/guidelines.htm
Parents	10 Ways to Exercise as a Family: https://www.parents.com/fun/sports/exercise/10-ways-to-exercise-as-a-family/
U.S. Department of Health and Human Services	Physical Activity Guidelines for Americans, 2nd ed.: https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

researchers found that high screen time exposure has been significantly positively related to a child having a higher-than-normal range BMI (Duch et al., 2013). Excessive screen time has been associated with a range of adverse physical and behavioral health correlates, including high BMI, sleep deprivation, poor academic performance (Crowe et al., 2020; Duch et al., 2013), externalizing and internalizing behavior, and inattention problems (Tamana et al., 2019).

The American Academy of Pediatrics (AAP, 2018) recommends caregivers of children ages 2–5 years to limit screen time to one hour per day of high-quality programs, and children of years 6 and older be limited to two hours of screen time per day. However, screen time exposure averaged 3.6 hours per weekday in a nationally representative sample of 8,950 preschool-aged children (Tandon et al., 2011). The AAP Council on Communication and Media (2018) also suggests that caregivers develop a media-use plan that includes screen time rules such as restricting screen time for children younger than 18 months to only video chatting and viewing high-quality programs and also limiting screen time to periods excluding mealtimes and before sleep. Parental restriction of child television viewing may lead to less screen use among children; however, Lampard et al. (2013) found that approximately one third of parents have no rules for television viewing for preschool children. Moreover, parents' knowledge and beliefs about the health consequences of screen time were not related to restricting child screen time (Maddison et al., 2014; Militello et al., 2016). However, parental monitoring and limiting of child screen time were inversely associated with child screen viewing. Parental screen viewing time was also positively associated with child viewing time (Tang et al., 2018). Therefore, identifying barriers to monitoring screen time

and teaching parents of preschool children to limit screen time may be necessary to emphasize.

Sleep

According to the American Academy of Pediatrics (2019), infants aged 4–12 months should sleep 12–16 hours in 24 hours, including naps. Children aged 1 to 2 should obtain 11–14 hours of sleep within 24 hours, including naps. Children aged 3–5 years of age should obtain 10–13 hours of sleep in 24 hours, including naps. Children aged 6–12 years of age should obtain 9–12 hours of sleep. Adolescents aged 13 to 18 years should sleep 8–10 hours per night. Getting inadequate sleep relates to other health habits within the home. For example, Garmy et al. (2018) found that children in Southern Sweden, ages 10 and 11 years who slept less than recommended amounts were more likely to have overweight and report more television and computer screen time. Furthermore, researchers also found that poor quality of sleep and diet occurs in families with low income. This information is essential to note because individuals with low income also have lower levels of physical activity and are more likely to consume fast food, both of which contribute to higher rates of obesity (Yu et al., 2020).

Inconsistencies in sleep between the weekday and weekend, as well as extended sleep patterns during weekends, was associated with lower intake of healthy foods (i.e., vegetables) and higher intake of obesogenic foods (i.e., processed and fried foods; Jansen et al., 2019). It is not uncommon for school-age children to use televisions and other screen-based media as sleep aids, but these devices may have adverse effects on sleep, such as increased time to fall asleep and shorter sleep duration (Garmy et al., 2018). Good sleep habits may be especially important to establish at a young age. Longitudinal

studies have found that children's sleep behaviors at 4 years persisted 2 years later (Koulouglioti et al., 2014).

Regular amounts of sleep, as well as a daily routine for bedtime, are paramount for the overall health of children, adolescents, and adults (Caldwell et al., 2020; Illingworth, 2020; Schoeppe et al., 2016). Identifying the practices of sleep habits among children and the perceptions parents may have that their child meets the recommended child sleep duration may be necessary. Exploring ways in which caregivers may reduce screen time before bed or regulate bed and wake-times throughout the week is essential for increasing healthy sleep habits among children (Ramsey Buchanan et al., 2016).

Stress within the home

Healthy, happy home environment

When investigating the terms healthy happy home, it is difficult to find one piece of literature that describes all the features that create such a place. However, the following is a list of common words that individuals use to describe a healthy, happy home: warmth (Guttentag et al., 2014), love and acceptance (Orri et al., 2019), comfort, quiet, organized (nonchaotic; Vernon-Feagans et al., 2016), personalized, loving, peaceful, and relaxing (not stressful; East et al., 2019). In a study, Guttentag et al. (2014) found that in homes where the environment had higher maternal warmth that children showed more engagement, better language skills, and enhanced social engagement. Haines et al. (2013) conducted a randomized clinical trial where several interventions were conducted with families related to four regular routines, including family meals, adequate sleep, limiting television, and prohibiting TV in a child's bedroom. Over 6 months, the intervention participants had increased sleep (0.75 hour/day), decreased TV on weekend days (−1.06 hours), and reduced body mass index (−0.40; Haines et al., 2013).

Although physical health, nutrition, and exercise are paramount in a healthy, happy home, the effect of the home environment can be just as crucial for shaping the brain and development in children and maintaining a daily peaceful life for adults (Vernon-Feagans et al., 2016). The National Academies Press (2019)—*Fostering Healthy Mental and Emotional Development in Children and Youth*—discusses the importance of addressing mental, emotional, and behavioral health. Providing parental education opportunities so that they understand the keys to helping their family to feel comfortable, loved, secure, and able to grow in a safe environment may potentially change the trajectory of a child, adolescent, and a young adult's life. Simple strategies such as talking to parents about how to promote a healthy home with ideas for bonding and creating an uplifting, loving home can be encouraged. Teaching children and parents about mindfulness, the importance of meaningful verbal communication, and practical, gentle discipline and the

significance of tobacco, alcohol, and drug-free homes may decrease the unfavorable living conditions, which may include violence, lack of regular housing, or unemployment (National Academies Press, 2019).

When considering the current obesity epidemic in the United States and multiple countries across the globe, research indicates that it is crucial to have a healthy lifestyle that includes the whole family. Suggestions, including bringing lunches from home to work or school and being physically active can help to decrease the trajectory of an increasing BMI. Also, reducing alcohol intake in the house, limiting eating outside of the home, and decreasing work stress may influence weight. This concept used by the researcher was called "health identity" (Sharman et al., 2019).

Decreasing stress

There has been growing evidence documenting the link between family-related stressors and obesity. Stressors inside and outside of the home include financial strain, job-related dissatisfaction or discrimination, marital discourse, adversity among children and parents, and neighborhood and environmental stressors such as the location of residence and community safety factors (Cuevas et al., 2020). When considering children diagnosed with obesity, it is essential to examine not only the child but also the childhood home experiences. In a study of 9- to 11-year old children, Ronan et al. (2020) found that childhood obesity is associated with compromised executive function. After controlling for age, sex, race, parental income, and birth weight, researchers found that children with obesity have changes in their prefrontal cortex, which could affect making healthy choices.

Furthermore, adolescents (aged, 12–17 years) who have obesity and overweight report households in which parents experienced more significant mental and physical health issues and financial strain. The home environment plays a vital role in shaping children's eating and physical activity behaviors (Gauthier & Krajccek, 2013). Lakerveld and Mackenbach (2017) reflect on the upstream and downstream determinates of obesogenic behaviors. For example, the neighborhood a family lives in may determine which type of physical activity they participate in and the type of food that is available to purchase. Therefore, many factors should be considered before making recommendations to patients or caregivers based on where they live, the amount of income available, the level of education, and the relationship of trust formed with the NP as a provider (Lakerveld & Mackenbach, 2017). Indeed, Parks et al. (2016) found that multiple parent stressors were related to increased child fast food consumption. Within the home environment, socioeconomic factors play a role in promoting or abating healthy habits.

Of course, home habits do not occur without influence from larger macro environments (e.g., culture, school

Table 3. Resources for decreasing stress in the home

Location of Resource	Title of Resource
American Academy of Pediatrics	Healthychildren.org—Helping Children Handle Stress: https://www.healthychildren.org/English/healthy-living/emotional-wellness/Pages/Helping-Children-Handle-Stress.aspx
American Heart Association	Learn to Manage Your Stress: https://www.heart.org/en/healthy-living/healthy-lifestyle/stress-management
Centers for Disease Control and Prevention	Violence Prevention and Coping with Stress: https://www.cdc.gov/violenceprevention/suicide/copingwith-stresstips.html
National Institute of Mental Health	5 Things You Should Know About Stress: https://www.nimh.nih.gov/health/publications/stress/index.shtml
Parents	Coping with Child Stress: https://www.parents.com/kids/education/tests/coping-with-child-stress/
U. S. Department of Health and Human Services	MyHealthfinder—Manage Stress: https://health.gov/myhealthfinder/topics/health-conditions/heart-health/manage-stress#panel-4

programs, and community accessibility of recreational facilities) (Gubbels, 2020). Despite these environmental, financial, and educational influences, parents may be able to serve as a protective factor for stress that occurs within the home. For instance, one researcher found that family closeness was negatively associated with overweight in children (Fiese & Bost, 2016). Decreasing stress in the home can be challenging; however, efforts to do so may have a significant impact on child overweight and obesity status (Doom et al., 2020). An NP might consider encouraging family closeness by suggesting family discussions, family walks, or family meals. No household will be the same; therefore, clinicians must consider their patient's situation when providing suggestions about the healthy habits a family should adopt (Table 3).

Addressing potential challenges in practice

It is important to acknowledge that in the context of the real-world demands of clinical settings, in some cases, it may be challenging for NPs to assess health habits and incorporate new interventions. Making such changes to clinical practice may require scheduling extended appointments, scheduling more regular follow-up appointments, or using a brief behavior change tool, such as the 5 As of obesity management, which provides an efficient, easy-to-remember guideline for assessing weight management behaviors and setting goals (Bernard-Genest et al., 2020). Furthermore, it may be helpful for treatment teams to gather informational resources to share with their patients to further reinforce the health home habits discussed during their appointment (Hyer & Edwards, 2020; Mueller, 2020). For patients with access, persuasive technology, such as evidence-based mhealth phone apps, can be used to provide ongoing support and reminders for tracking daily nutrition, maintaining regular

physical activity, and practicing stress reduction techniques.

Conclusion

As the obesity epidemic continues to increase in the United States among children, adolescents, and adults, NPs must act and engage in necessary prevention and intervention discussions with patients to decrease the risk of obesity and concurring obesity-related diseases. Nurse practitioners can be at the forefront of this charge because they continue to treat clients in a variety of different settings. As our lifestyles continue to evolve, we must encourage healthy home habits and environments to create sustainable, positive, lifestyle behaviors. This review highlighted several key areas that will assist with obesity prevention. Nurse practitioners can use these recommendations to guide them in professional practice and work toward helping families create a healthier, happier future.

Authors' contributions: S. Fruh: conceptual idea, reviewed literature, developed and outlined manuscript, and completed revisions. S. Williams: reviewed literature, contributed to specific sections of the development of the manuscript, created tables, and completed revisions. K. Hayes: reviewed literature, manuscript development, and revisions. C. Hauff: reviewed literature, contributed to manuscript development, and revisions. G. M. Hudson: reviewed literature, contributed to the development of the manuscript, and revisions. S. Sittig, R. J. Graves, H. Hall, and J. Barinas: reviewed literature, contributed to specific sections of the development of the manuscript, and revisions.

Competing interests: The authors report no conflicts of interest.

References

- Adams, A. K., Tomayko, E. J., Cronin, K. A., Prince, R. J., Kyungmann, K., Carmichael, L., & Parker, T. (2018). Predictors of overweight and obesity in American Indian families with young children. *Journal of Nutrition Education and Behavior*, 51, 190–198. <https://doi.org/10.1016/j.jneb.2018.07.011>.
- Al-Lami, N., Sear, K., Dai, W., & Chen, J.-L. (2020). Obesity applications in smartphones: Development and use of an evaluation tool. *Journal of Pediatric Health Care*, 34, 377–382. <https://doi.org/10.1016/j.pedhc.2020.03.001>.
- American Academy of Pediatrics. (2018). *Children and media tips from the American Academy of Pediatrics*. <https://www.aap.org/en-us/about-the-aap/aap-press-room/news-features-and-safety-tips/Pages/Children-and-Media-Tips.aspx>.
- American Academy of Pediatrics. (2019). *Childhood sleep guidelines*. <https://www.aap.org/en-us/about-the-aap/aap-press-room/Pages/American-Academy-of-Pediatrics-Supports-Childhood-Sleep-Guidelines.aspx>.
- American Academy of Pediatrics Council on Communications and Media. (2018). Media use in school-aged children and adolescents. *Pediatrics*, 138, e20162592. <https://doi.org/10.1542/peds.2016-2592>.
- An, R. (2016). Fast-food and full-service restaurant consumption and daily energy and nutrient intakes in US adults. *European Journal of Clinical Nutrition*, 70, 97–103. <https://doi.org/10.1038/ejcn.2015.104>.
- Ballon, A., Neuenschwander, M., & Schlesinger, S. (2019). Breakfast skipping is associated with increased risk of type 2 diabetes among adults: A systematic review and meta-analysis of prospective cohort studies. *The Journal of Nutrition*, 149, 106–113. <https://doi.org/10.1093/jn/nxy194>.
- Berge, J. M., & Everts, J. C. (2011). Family-based interventions targeting childhood obesity: A meta-analysis. *Childhood Obesity*, 7, 110–121. <https://doi.org/10.1089/chi.2011.07.02.1004.berge>.
- Bernard-Genest, J., Chu, L., Dettmer, E., Walsh, C. M., McPherson, A. C., Strub, J., Steinberg, A., Steinegger, C., & Hamilton, J. K. (2020). Talking about weight with families—Helping health care professionals start the conversation: A nonrandomized controlled trial. *Clinical Pediatrics*, 59, 910–917.
- Bian, L., & Markman, E. M. (2020). What should we eat for breakfast? American and Chinese children's prescriptive judgments about breakfast foods. *Cognitive Development*, 54, 100873. <https://doi.org/10.1016/j.cogdev.2020.100873>.
- Biro, F. M., & Wien, M. (2010). Childhood obesity and adult morbidities. *The American Journal of Clinical Nutrition*, 91, 1499S–1505S. <https://doi.org/10.3945/ajcn.2010.28701B>.
- Blaine, R. E., Kachurak, A., Davison, K. K., Klabunde, R., & Fisher, J. O. (2017). Food parenting and child snacking: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 14, 146. <https://doi.org/10.1186/s12966-017-0593-9>.
- Bleiweiss-Sande, R., Scheck, J. M., Chui, K., Goldberg, J. P., Bailey, C., & Evans, E. W. (2020). Processed food consumption is associated with diet quality, but not weight status, in a sample of low-income and ethnically diverse elementary school children. *Appetite*, 15, 1–8. <https://doi.org/10.1016/j.appet.2020.104696>.
- Caldwell, B. A., Ordway, M. R., Sadler, L. S., & Redeker, N. S. (2020). Parent perspectives on sleep and sleep habits among young children living with economic adversity. *Journal of Pediatric Health Care*, 34, 10–22. <https://doi.org/10.1016/j.pedhc.2019.06.006>.
- Carlson, J. A., Engelberg, J. K., Cain, K. L., Conway, T. L., Mignano, A. M., Bonilla, E. A., Geremia, C., & Sallis, J. F. (2015). Implementing classroom physical activity breaks: Associations with student physical activity and classroom behavior. *Preventive Medicine*, 81, 67–72. <https://doi.org/10.1016/j.ypmed.2015.08.006>.
- Center for Disease Control and Prevention. (2017). *National Health and Nutrition Examination Survey (NHANES)*. <https://www.cdc.gov/nchs/nhanes/aboutnhanes.htm>.
- Centers for Disease Control and Prevention. (2019a). *Know your limit for added sugars*. <https://www.cdc.gov/nutrition/data-statistics/know-your-limit-for-added-sugars.html>.
- Centers for Disease Control and Prevention. (2019b). *MEC In-Person, Dietary Interviewers Procedures Manual*. <https://www.cdc.gov/nchs/data/nhanes/2019-2020/manuals/2019-MEC-In-Person-Dietary-Interviewers-Manual-508.pdf>.
- Chooi, Y. C., Ding, C., & Magkos, F. (2019). The epidemiology of obesity. *Metabolism*, 92, 6–10. <https://doi.org/10.1016/j.metabol.2018.09.005>.
- Christofaro, D. G. D., De Andrade, S. M., Mesas, A. E., Fernandes, R. A., & Farias Júnior, J. C. (2016). Higher screen time is associated with overweight, poor dietary habits and physical inactivity in Brazilian adolescents, mainly among girls. *European Journal of Sport Science*, 16, 498–506. <https://doi.org/10.1080/17461391.2015.1068868>.
- Colberg, S. R., Sigal, R. J., Yardley, J. E., Riddell, M. C., Dunstan, D. W., Dempsey, P. C., Horton, E. S., Castorino, K., & Tate, D. F. (2016). Physical activity/exercise and diabetes: A position statement of the American Diabetes Association. *Diabetes Care*, 39, 2065–2079. <https://doi.org/10.2337/dc161728>.
- Crowe, M., Sampasa-Kanyinga, H., Saunders, T. J., Hamilton, H. A., Benchimol, E. I., & Chaput, J.-P. (2020). Combinations of physical activity and screen time recommendations and their association with overweight/obesity in adolescents. *Canadian Journal of Public Health*, 111, 515–522. <https://doi.org/10.17269/s41997-020-00313-6>.
- Cuevas, A. G., Chen, R., Slopen, N., Thurber, K. A., Wilson, N., Economos, C., & Williams, D. R. (2020). Assessing the role of health behaviors, socioeconomic status, and cumulative stress for racial/ethnic disparities in obesity. *Obesity*, 28, 161–170. <https://doi.org/10.1002/oby.22648>.
- de la Hunt, A., Gibson, S., & Ashwell, M. (2013). Does regular breakfast cereal consumption help children and adolescents stay slimmer? A systematic review and meta-analysis. *Obesity Facts*, 6, 70–85. <https://doi.org/10.1159/000348878>.
- Domoff, S. E., Borgen, A. L., & Robinson, C. (2020). Problematic use of screen media and mobile devices. In M. Knox (Ed.), *Clinicians toolkit for children's behavioral health* (pp. 175–198). Elsevier Inc. <https://doi.org/10.1016/C2017-0-03854-5>.
- Doom, J. R., Lumeng, J. C., Sturza, J., Kaciroti, N., Vazquez, D. M., & Miller, A. L. (2020). Longitudinal associations between overweight/obesity and stress biology in low-income children. *International Journal of Obesity*, 44, 646–655. <https://doi.org/10.1038/s41366-019-0447-4>.
- Drewnowski, A. (2013). New metrics of affordable nutrition: Which vegetables provide most nutrients for least cost. *Journal of the American Academy of Nutrition and Dietetics*, 113, 1182–1187. <https://doi.org/10.1016/j.jand.2013.03.015>.
- Duch, H., Fisher, E. M., Ensari, I., & Harrington, A. (2013). Screen time use in children under 3 years old: A systematic review of correlates. *International Journal of Behavioral Nutrition and Physical Activity*, 10, 102. <https://doi.org/10.1186/1479-5868-10-102>.
- East, P., Delker, E., Blanco, E., Burrows, R., Lozoff, B., & Gahagan, S. (2019). Home and family environment related to development of obesity: A 21-year longitudinal study. *Childhood Obesity*, 15, 156–166. <https://doi.org/10.1089/chi.2018.0222>.
- Faienza, M. F., Chiarito, M., Molina-Molina, E., Shanmugam, H., Lammer, F., Krawczyk, M., D'Amato, G., & Porticincasa, P. (2020). Childhood obesity, cardiovascular, and liver health: A growing epidemic with age. *World Journal of Pediatrics*, 16, 438–445. <https://doi.org/10.1007/s12519-020-00341-9>.
- Farooq, A., Martin, A., Janssen, X., Wilson, M. G., Gibson, A., Hughes, A., & Reilly, J. J. (2020). Longitudinal changes in moderate-to-vigorous-intensity physical activity in children and adolescents: A systematic review and meta-analysis. *Obesity Reviews*, 21, e12953. <https://doi.org/10.1111/obr.12953>.
- Fiese, B. H., & Bost, K. K. (2016). Family ecologies and child risk for obesity: Focus on regulatory processes: Family ecologies and child risk for obesity. *Family Relations*, 65, 94–107. <https://doi.org/10.1111/fare.12170>.
- Fogg, B. J., & Euchner, J. (2019). Designing for behavior change—New models and moral issues: An interview with B.J. Fogg. *Research-Technology Management*, 62, 14–19. <https://doi.org/10.1080/08956308.2019.1638490>.
- Fogg, B. J. (2020). *Tiny habits: The small changes that change everything*. Houghton Mifflin Harcourt Publishing.
- Fulkerson, J. A., Neumark-Sztainer, D., Story, M., Gurchich, O., Kubik, M. Y., Garwick, A., & Dudovitz, B. (2014). The healthy home offerings via the mealtime environment (HOME) plus study: Design and

- methods. *Contemporary Clinical Trials*, 38, 59–68. <https://doi.org/10.1016/j.cct.2014.01.006>.
- Garmy, P., Clausson, E. K., Nyberg, P., & Jakobsson, U. (2018). In-sufficient sleep is associated with obesity and excessive screen time amongst ten-year-old children in Sweden. *Journal of Pediatric Nursing*, 39, e1–e5. <https://doi.org/10.1016/j.pedn.2017.11.009>.
- Gauthier, K. I., & Krajicek, M. J. (2013). Obesogenic environment: A concept analysis and pediatric perspective: Obesogenic environment: A concept analysis and pediatric perspective. *Journal for Specialists in Pediatric Nursing*, 18, 202–210. <https://doi.org/10.1111/jspn.12027>.
- Gubbels, J. S. (2020). Environmental influences on dietary intake of children and adolescents. *Nutrients*, 12, 922. <https://doi.org/10.3390/nu12040922>.
- Guttentag, C. L., Landry, S. H., Williams, J. M., Baggett, K. M., Noria, C. W., Borkowski, J. G., Swank, P. R., Farris, J. R., Crawford, A., Lanzi, R. G., Carta, J. J., Warren, S. F., & Ramey, S. L. (2014). "My baby & me": Effects of an early, comprehensive parenting intervention on at-risk mothers and their children. *Developmental Psychology*, 50, 1482–1496. <https://doi.org/10.1037/a0035682>.
- Haines, J., McDonald, J., O'Brien, A., Sherry, B., Bottino, C. J., Schmidt, M. E., & Taveras, E. M. (2013). Healthy habits, happy homes: Randomized trial to improve household routines for obesity prevention among preschool-aged children. *JAMA Pediatrics*, 167(11), 1072. <https://doi.org/10.1001/jamapediatrics.2013.2356>.
- Haines, J., Rifas-Shiman, S. L., Horton, N. J., Kleinman, K., Bauer, K. W., Davison, K. K., Walton, K., Austin, S. B., Field, A. E., & Gillman, M. W. (2016). Family functioning and quality of parent-adolescent relationship: Cross-sectional associations with adolescent weight-related behaviors and weight status. *International Journal of Behavioral Nutrition & Physical Activity*, 13, 1–12. <https://doi.org/10.1186/s12966-016-0393-7>.
- Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017). Prevalence of obesity among adults and youth: United States, 2015–2016. *National Center for Health Statistics (NCHS) Data Brief*, 288, 8. https://www.cdc.gov/nchs/data/databriefs/db288_table.pdf#1.
- Harris, J. L., Webb, V., J Sacco, S., & L Pomeranz, J. (2020). Marketing to children in supermarkets: An opportunity for public policy to improve children's diets. *International Journal of Environmental Research and Public Health*, 17, 1284. <https://doi.org/10.3390/ijerph17041284>.
- Hart, C. N., Jelalian, E., & Raynor, H. A. (2020). Behavioral and social routines and biological rhythms in prevention and treatment of pediatric obesity. *American Psychologist*, 75, 152–162. <https://doi.org/10.1037/amp0000599>.
- Hyer, S., & Edwards, J. (2020). Weight management practices among Florida nurse practitioners: A cross-sectional study. *The Journal for Nurse Practitioners*, 16, 131–135. <https://doi.org/10.1016/j.nurpra.2019.10.025>.
- Illingworth, G. (2020). The challenges of adolescent sleep. *Interface Focus*, 10, 1–8. <https://doi.org/10.1098/rsfs.2019.0080>.
- Jansen, E. C., Peterson, K. E., Lumeng, J. C., Kaciroti, N., LeBourgeois, M. K., Chen, K., & Miller, A. L. (2019). Associations between sleep and dietary patterns among low-income children attending preschool. *Journal of the Academy of Nutrition and Dietetics*, 119, 1176–1187. <https://doi.org/10.1016/j.jand.2019.01.008>.
- Jacob, L., Stubbs, B., Firth, J., Smith, L., Haro, J. M., & Koyanagi, A. (2020). Fast food consumption and suicide attempts among adolescents aged 12–15 years from 32 countries. *Journal of Affective Disorders*, 266, 63–70.
- Jastreboff, A. M., Kotz, C. M., Kahan, S., Kelly, A. S., & Heymsfield, S. B. (2019). Obesity as a disease: The Obesity Society 2018 position statement. *Obesity*, 27, 7–9. <https://doi.org/10.1002/oby.22378>.
- Katzmarzyk, P. T., Powell, K. E., Jakicic, J. M., Troiano, R. P., Piercy, K., & Tennant, B. (2019). Sedentary behavior and health: Update from the 2018 Physical Activity Guidelines Advisory Committee. *Medicine and Science in Sports and Exercise*, 51, 1227–1241. <https://doi.org/10.1249/MSS.0000000000001935>.
- Kesztöy, D., Traub, M., Lauer, R., Kesztöy, T., & Steinacker, J. M. (2015). Correlates of longitudinal changes in the waist-to-height ratio of primary school children: Implications for prevention. *Preventive Medicine Reports*, 3, 1–6. <https://doi.org/10.1016/j.pmedr.2015.11.005>.
- King, N., Pickett, W., McNeven, S. H., Bowie, C. R., Rivera, D., Keown-Stoneman, C., Harkness, K., Cunningham, S., Milanovic, M., Saunders, K. E. A., Goodday, S., Duffy, A., & on behalf of the U-Flourish Student Well-Being and Academic Success Research Group. (2020). Mental health need of students at entry to university: Baseline findings from the U-Flourish Student Well-Being and Academic Success Study. *Early Intervention in Psychiatry*. <https://doi.org/10.1111/eip.12939>.
- Koulouglioti, C., Cole, R., Moskow, M., McQuillan, B., Carno, M.-A., & Grape, A. (2014). The longitudinal association of young children's everyday routines to sleep duration. *Journal of Pediatric Health Care*, 28, 80–87. <https://doi.org/10.1016/j.pedhc.2012.12.006>.
- Lakerveld, J., & Mackenbach, J. (2017). The upstream determinants of adult obesity. *Obesity Facts*, 10, 216–222. <https://doi.org/10.1159/000471489>.
- Lampard, A. M., Jurkowski, J. M., & Davison, K. K. (2013). Social-cognitive predictors of low-income parents' restriction of screen time among preschool-aged children. *Health Education & Behavior*, 40, 526–530. <https://doi.org/10.1177/1090198112467800>.
- Liu, B., Widener, M., Burgoine, T., & Hammond, D. (2020). Association between time-weighted activity space-based exposures to fast food outlets and fast food consumption among young adults in urban Canada. *International Journal of Behavioral Nutrition and Physical Activity*, 17, 62. <https://doi.org/10.1186/s12966-020-00967-y>.
- Loth, K. A., Tate, A. D., Trofholz, A., Fisher, J. O., Miller, L., Neumark-Sztainer, D., & Berge, J. M. (2020). Ecological momentary assessment of the snacking environments of children from racially/ethnically diverse households. *Appetite*, 145, 104497. <https://doi.org/10.1016/j.appet.2019.104497>.
- Maddison, R., Marsh, S., Foley, L., Epstein, L. H., Olds, T., Dewes, O., Heke, I., Carter, K., Jiang, Y., & Mhurchu, C. N. (2014). Screen-time weight-loss intervention targeting children at home (SWITCH): A randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity*, 11, 111. <https://doi.org/10.1186/s12966-014-0111-2>.
- Magriplis, E., Farajian, P., Panagiotakos, D. B., Rivas, G., & Zampelas, A. (2019). The relationship between behavioral factors, weight status, and a dietary pattern in primary school aged children: The GRECO study. *Clinical Nutrition*, 38, 310–316. <https://doi.org/10.1016/j.clnu.2018.01.015>.
- Mak, T. N., Prynne, C. J., Cole, D., Fitt, E., Roberts, C., Bates, B., & Stephen, A. M., (2012). Assessing eating context and fruit and vegetable consumption in children: New methods using food diaries in the UK National Diet and Nutrition Survey Rolling Programme. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 126. <https://doi.org/10.1186/1479-5868-9-126>.
- Malden, S., Reilly, J., Gibson, A.-M., Bardid, F., & Hughes, A. (2020). *Procedures and challenges of adapting an existing public health intervention for use in another setting: The ToyBox-Scotland preschool obesity prevention program*. SAGE Publications Ltd. <https://doi.org/10.4135/9781529724547>.
- Malik, V. S., Pan, A., Willett, W. C., & Hu, F. B. (2013). Sugar-sweetened beverages and weight gain in children and adults: A systematic review and meta-analysis. *The American Journal of Clinical Nutrition*, 98, 1084–1102. <https://doi.org/10.3945/ajcn.113.058362>.
- Matthews, C. E., Moore, S. C., Sampson, J., Blair, A., Xiao, Q., Keadle, S. K., Hollenbeck, A., & Park, Y. (2015). Mortality benefits for replacing sitting time with different physical activities. *Medicine and Science in Sports and Exercise*, 47, 1833–1840. <https://doi.org/10.1249/MSS.0000000000000621>.
- McTiernan, A., Friedenreich, C. M., Katzmarzyk, P. T., Powell, K. E., Macko, R., Buchner, D., Pescatello, L. S., Bloodgood, B., Tennant, B., Vaux-Bjerke, A., George, S. M., Troiano, R. P., & Piercy, K. L. (2019). Physical activity in cancer prevention and survival: A systematic review. *Medicine and Science in Sports and Exercise*, 51, 1252–1261. <https://doi.org/10.1249/MSS.0000000000001937>.
- Megson, M., Wing, R., & Leahey, T. M. (2017). Effects of breakfast eating and eating frequency on body mass index and weight loss outcomes in adults enrolled in an obesity treatment program. *Journal*

- of *Behavioral Medicine*, 40, 595–601. <https://doi.org/10.1007/s10865-017-9828-0>.
- Mehdizadeh, A., Nematy, M., Vatanparast, H., Khadem-Rezaian, M., & Emadzadeh, M. (2020). Impact of parent engagement in childhood obesity prevention interventions on anthropometric indices among preschool children: a systematic review. *Childhood Obesity*, 16, 3–13.
- Militello, L. K., Melnyk, B. M., Hekler, E., Small, L., & Jacobson, D. (2016). Correlates of healthy lifestyle beliefs and behaviors in parents of overweight or obese preschool children before and after a cognitive behavioral therapy intervention with text messaging. *Journal of Pediatric Health Care*, 30, 252–260. <https://doi.org/10.1016/j.pedhc.2015.08.002>.
- Mueller, R. C. (2020). Exploring family nurse practitioners' practices in recommending mHealth apps to patients. *CIN: Computers, Informatics, Nursing*, 38, 71–79. <https://doi.org/10.1097/CIN.0000000000000580>.
- National Academies Press. (2019). *Fostering healthy mental, emotional, and behavioral development in children and youth: A national agenda*. National Academies Press. <https://doi.org/10.17226/25201>.
- Newman, C. L., Howlett, E., & Burton, S. (2014). Implications of fast food restaurant concentration for preschool-aged childhood obesity. *Journal of Business Research*, 67, 1573–1580.
- Östlund et al., 2015.
- Östlund, A.-S., Wadensten, B., Kristofferzon, M.-L., & Häggström, E. (2015). Motivational interviewing: Experiences of primary care nurses trained in the method. *Nurse Education in Practice*, 15, 111–118. <https://doi.org/10.1016/j.nepr.2014.11.005>.
- Ofori-Asenso, R., Owen, A. J., & Liew, D. (2019). Skipping breakfast and the risk of cardiovascular disease and death: A systematic review of prospective cohort studies in primary prevention settings. *Journal of Cardiovascular Development and Disease*, 6, 30. <https://doi.org/10.3390/jcdd6030030>.
- Orri, M., Côté, S. M., Tremblay, R. E., & Doyle, O. (2019). Impact of an early childhood intervention on the home environment, and subsequent effects on child cognitive and emotional development: A secondary analysis. *PLoS One*, 14, e0219133. <https://doi.org/10.1371/journal.pone.0219133>.
- Overcash, F., Davey, C., Zhang, Y., & Reicks, M. (2020). Evening meal types and family meal characteristics: Associations with demographic characteristics and food intake among adolescents. *Nutrients*, 12, 886. <https://doi.org/10.3390/nu12040886>.
- Parks, E. P., Kazak, A., Kumanyika, S., Lewis, L., & Barg, F. K. (2016). Perspectives on stress, parenting, and children's obesity-related behaviors in black families. *Health Education & Behavior*, 43, 632–640. <https://doi.org/10.1177/1090198115620418>.
- Pedersen, T. P., Holstein, B. E., Flachs, E. M., & Rasmussen, M. (2013). Meal frequencies in early adolescence predict meal frequencies in late adolescence and early adulthood. *BMC Public Health*, 13, 445. <https://doi.org/10.1186/1471-2458-13-445>.
- Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., George, S. M., & Olson, R. D. (2018). The physical activity guidelines for Americans. *Journal of the American Medical Association* 320, 2020–2028. <https://doi.org/10.1001/jama.2018.14854>.
- Pinho, M. G. M. de., Adami, F., Benedet, J., & Vasconcelos, F. de A. G. de. (2017). Association between screen time and dietary patterns and overweight/obesity among adolescents. *Revista de Nutrição*, 30, 377–389. <https://doi.org/10.1590/1678-98652017000300010>.
- Ramsay, S. A., Bloch, T. D., Marriage, B., Shriver, L. H., Spees, C. K., & Taylor, C. A. (2018). Skipping breakfast is associated with lower diet quality in young US children. *European Journal of Clinical Nutrition*, 72, 548–556. <https://doi.org/10.1038/s41430-018-0084-3>.
- Ramsey Buchanan, L., Rooks-Peck, C. R., Finnie, R. K. C., Wethington, H. R., Jacob, V., Fulton, J. E., Johnson, D. B., Kahwati, L. C., Pratt, C. A., Ramirez, G., Mercer, S. L., & Glanz, K. (2016). Reducing recreational sedentary screen time. *American Journal of Preventive Medicine*, 50, 402–415. <https://doi.org/10.1016/j.amepre.2015.09.030>.
- Robson, S. M., DeLuccia, R., Baker, S., Bodt, B., & Trabulsi, J. (2020). Qualitative research on the real-time decision making of WIC participants while food shopping: Use of think aloud method. *Journal of the Academy of Nutrition and Dietetics*, 120, 111–119. <https://doi.org/10.1016/j.jand.2019.05.009>.
- Ronan, L., Alexander-Bloch, A., & Fletcher, P. C. (2020). Childhood obesity, cortical structures, and executive functioning in healthy children. *Cerebral Cortex*, 30, 2519–2528. <https://doi.org/10.1093/cercor/bhz257>.
- Rosiek, A., Maciejewska, N. F., Leksowski, K., Rosiek-Kryszewska, A., & Leksowski, E. (2015). Effect of television on obesity and excess of weight and consequences of health. *International Journal of Environmental Research and Public Health*, 12, 9408–9426. <https://doi.org/10.3390/ijerph120809408>.
- Schoeppe, S., Rebar, A. L., Short, C. E., Alley, S., Van Lippevelde, W., & Vandelandotte, C. (2016). How is adults' screen time behaviour influencing their views on screen time restrictions for children? A cross-sectional study. *BMC Public Health*, 16, 201. <https://doi.org/10.1186/s12889-016-2789-3>.
- Sharman, M. J., Jose, K. A., Venn, A. J., Banks, S., Ayton, J., & Cleland, V. J. (2019). "I love having a healthy lifestyle"—A qualitative study investigating body mass index trajectories from childhood to mid-adulthood. *BMC Obesity*, 6, 16. <https://doi.org/10.1186/s40608-019-0239-3>.
- Tamana, S. K., Ezeugwu, V., Chikuma, J., Lefebvre, D. L., Azad, M. B., Moraes, T. J., Subbarao, P., Becker, A. B., Turvey, S. E., Sears, M. R., Dick, B. D., Carson, V., Rasmussen, C., CHILD Study Investigators, Pei, J., & Mandhane, P. J. (2019). Screen-time is associated with inattention problems in preschoolers: Results from the CHILD birth cohort study. *PLoS One*, 14, 1–15. <https://doi.org/10.1371/journal.pone.0213995>.
- Tandon, P. S., Zhou, C., Lozano, P., & Christakis, D. A. (2011). Preschoolers' total daily screen time at home and by type of child care. *The Journal of Pediatrics*, 158, 297–300. <https://doi.org/10.1016/j.jpeds.2010.08.005>.
- Tang, L., Darlington, G., Ma, D. W. L., & Haines, J. (2018). Mothers' and fathers' media parenting practices associated with young children's screen-time: A cross-sectional study. *BMC Obesity*, 5, 1–10. <https://doi.org/10.1186/s40608-018-0214-4>.
- Thompson, D., Leach, M., Smith, C., Fereday, J., & May, E. (2020). How nurses and other health professionals use learning principles in parent education practice: A scoping review of the literature. *Heliyon*, 6, e03564. <https://doi.org/10.1016/j.heliyon.2020.e03564>.
- Toledo, F. P. de., Devincenzi, S., Kwecko, V., Mota, F. P., & Botelho, S. S. da C. (2018). A framework for modeling persuasive technologies based on the Fogg behavior model. 2018 IEEE Frontiers in Education Conference (FIE), pp. 1–5. <https://doi.org/10.1109/FIE.2018.8659195>.
- Traub, M., Lauer, R., Kesztyüs, T., Wartha, O., Steinacker, J. M., Kesztyüs, D., Briegel, I., Dreyhaupt, J., Friedemann, E.-M., Kelso, A., Hermeling, L., Georgiou, E., Goosmann, E., Lämmle, C., Muche, R., Pollatos, O., Steeb, L., Hoffmann, B., Kobel, S., ... the Research Group "Join the Healthy Boat." (2018). Skipping breakfast, overconsumption of soft drinks and screen media: Longitudinal analysis of the combined influence on weight development in primary schoolchildren. *BMC Public Health*, 18, 363. <https://doi.org/10.1186/s12889-018-5262-7>.
- U.S. Department of Health and Human Services. (2018). *Physical activity guidelines for Americans* (2nd ed.). U.S. Department of Health and Human Services.
- U.S. Department of Health and Human Services & U.S. Department of Agriculture. (2015). *Dietary guidelines for Americans, 2015–2020* (8th ed.). Human Nutrition Information Service.
- van Grieken, A., Wang, L., van de Gaar, V. M., Jansen, W., & Raat, H. (2019). Associations between family and home-related factors and child's snack consumption in a multi-ethnic population. *Journal of Public Health*, 41, 430–438. <https://doi.org/10.1093/pubmed/fdy124>.
- Vernon-Feagans, L., Willoughby, M., & Garrett-Peters, P. (2016). Predictors of behavioral regulation in kindergarten: Household chaos, parenting, and early executive functions. *Developmental Psychology*, 52, 430–441. <https://doi.org/10.1037/dev0000087>.
- Watanabe, Y., Saito, I., Henmi, I., Yoshimura, K., Maruyama, K., Yamauchi, K., Matsuo, T., Kato, T., Tanigawa, T., Kishida, T., & Asada, Y. (2014). Skipping breakfast is correlated with obesity. *Journal of Rural Medicine: JRM*, 9, 51–58. <https://doi.org/10.2185/jrm.2887>.

- World Health Organization. (n.d.). *Global school-based student health survey (GSHS)*. <https://www.who.int/ncds/surveillance/gshs/en/>.
- World Health Organization. (2015). *Guideline: Sugars intake for adults and children*. <https://www.ages.at/en/topics/nutrition/who-sugar-recommendations/>; <https://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028>.
- Wright, B., & Bragge, P. (2018). Interventions to promote healthy eating choices when dining out: A systematic review of reviews. *British Journal of Health Psychology*, 23, 278–295. <https://doi.org/10.1111/bjhp.12285>.
- Xiao, Q., Garaulet, M., & Scheer, F. A. J. L. (2019). Meal timing and obesity: Interactions with macronutrient intake and chronotype. *International Journal of Obesity* (2005), 43, 1701–1711. <https://doi.org/10.1038/s41366-018-0284-x>.
- Yee, A. Z., Lwin, M. O., & Ho, S. S. (2017). The influence of parental practices on child promotive and preventative food consumption behaviors: A systematic review. *International Journal of Behavioral Nutrition, and Physical Activity*, 14, 47. <https://doi.org/10.1186/s12966-017-0501-3>.
- Yu, C.-Y., Woo, A., Emrich, C. T., & Wang, B. (2020). Social vulnerability index and obesity: An empirical study in the US. *Cities*, 97, 102531. <https://doi.org/10.1016/j.cities.2019.102531>.