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Editorial

# Smart Management of a Persistently Puzzling Problem—Adolescent Obesity

Adolescent obesity, now a significant part of a worldwide epidemic among all age groups, was one of the first research topics that pioneer founders of Adolescent Medicine studied over 50 years ago [1,2]. Yet, we still lack effective solutions for this important problem.

Adolescents represent “ground zero” in the fight against the multigenerational obesity epidemic because they are the eventual parents of the next generation. Improvement in the health habits and resultant adiposity of today’s adolescents and young adults may be our best chance of improving the health of future generations because prevention appears much better than treatment of obesity. Risk factors are not distributed equally in the population, demonstrating health disparities among income groups, which is a critical factor to be addressed [3].

Recent data from the Framingham study underscore the importance of recognition and management of overweight and obesity and their complications in adolescence rather than in later life. Data from this study demonstrate that the health risks associated with obesity track according to the maximum weight attained and are decreased although not extinguished with weight loss in adult life [4].

In addition, maintaining a healthy body mass index (BMI) during adolescence may be the only way to improve transgenerational outcomes. The mother’s preconceptual BMI, pregnancy weight gain, and gestational diabetes are all known to be major factors in transmission of excess adiposity to her offspring. The parental genetic and maternal epigenetic environment, the biome, and the food and activity habits of a family are all risk factors passed on to offspring as well [5]. Therefore, any improvement in adolescent lifestyle and BMI not only is of direct benefit to the patient but may also help reduce the long-term population risk as well.

In this issue of the Journal, Chen et al. [6] have presented an exciting approach using adolescent friendly mobile health (mHealth) smart technology to intervene in this problem. Subjects in this study were drawn from a convenience sample of self-identified Chinese Americans, aged 13–18 years, who had a BMI >85th percentile (n = 40). The subjects were randomized to a culturally focused intervention based on social–cultural theory (Start Smart) or a control group, which was provided with general health education. The mHealth intervention group was provided with a fitness tracker and online smartphone education modules, whereas the control group received a pedometer and paper-based logs. Although benefit in outcomes occurred in both groups, the intervention group were reported to have statistically greater changes in anthropometric measures, which were associated with decrease in fast food, and sugar-sweetened beverage consumption as well increased physical activity and decreased sedentary activity. In association with these changes, Chen et al. report a statistically significant decreased BMI over a 6-month interval in the intervention but not in the control group. This culturally appropriate smartphone intervention had potential to reduce obesity and improve adherence to a healthy lifestyle among a selected and culturally narrow group of adolescents. The limitations of the study include the narrow cultural and age range of participants and relatively short follow up time. Analysis of the mediators and moderators of the intervention effect would assist the design of future strategies to manage obesity.

Telehealth, eHealth, or mHealth (i.e., electronically enhanced transactions regarding prevention, diagnosis, and treatment of disease) has been used in various forms since the 1950s [7]. Smartphone applications have made them less costly to develop and more accessible to a variety of populations. mHealth systems offer opportunities for surveillance and research in childhood obesity, as well as development, delivery, and dissemination of treatment and prevention programs [8]. Nikolaou et al. [9] found nearly 29,000 available smartphone applications relating to weight management, diet, and exercise. These applications have a particular attractiveness to adolescents, the majority of whom in the U.S. have texting access [10].

Research into mHealth solutions for weight management in adolescents and young adults (AYAs) has had mixed results. In a 10-week randomized controlled trial of 14- to 18-year-old childhood cancer survivors, Mendoza et al. [11] targeted increased physical activity using a commonly available technology (Fitbit and Facebook applications). They found physical activity gains were achievable but not sustained. Svetkey et al. [12] compared personal coaching plus smartphone application with smartphone alone and a control in a 24-month randomized controlled trial of 365 AYAs aged 18–35 years. They found no

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difference between smartphone only and controls but a 21 kg weight loss in the experimental group at 6 months, which was not sustained at 12 or 24 months. Nguyen et al. [13], in a 24-month randomized controlled trial of 151 13- to 16-year olds and their parents, compared the effect of seven weekly in-person weight management sessions followed by quarterly follow-up sessions with and without mHealth intervention delivered as once every 2-week personal phone coaching, text, or email. The mHealth group did not achieve benefits above that of the standard care group. Jensen investigated combined weekly in-person sessions with a smartphone application for self-monitoring and daily text messages in overweight adolescents compared with a text only and found that changes in BMI-Z-score that were not sustained [14].

Therefore, not only do we need more aggressive recognition of adolescents at risk for adult diseases based on BMI [15] but also better management of those identified. If mHealth studies like that of Chen et al., which have an adolescent-specific component, can be extended across a range of adolescent ethnic and sociocultural groups, they will be an important tool for addressing this critical public health issue. These mHealth methods of management are needed to add to the broad range of ongoing research into etiology including genetic, epigenetic, hormonal, the biome, the dietary, and the built environments.

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## References

[1] Heald FP. Natural history and physiological basis of adolescent obesity. Fed Proc 1966;25:1–4.
[2] Shenker IR, Fisichelli V, Lang J. Weight differences between foster infants of overweight and nonoverweight foster mothers. J Pediatr 1974;84:715–9.
[3] Jackson SL, Yang EC, Zhang Z. Income disparities and cardiovascular risk factors among adolescents. Pediatrics 2018 Nov;142. pii: e20181089.
[4] Xu H, Cupples LA, Stokes A, Liu C. Association of obesity with mortality over 24 Years of weight history: Findings from the Framingham Heart Study. JAMA Netw Open 2018;1:e184587.
[5] Yu Z, Han S, Zhu J, et al. Pre-pregnancy body mass index in relation to infant birth weight and offspring overweight/obesity: A systematic review and meta-analysis. PLoS One 2013;8:e61627.
[6] Chen J-L, Guedes CM, Lung AE. Smartphone-based healthy weight management intervention for Chinese American adolescents: Short-term efficacy and factors associated with decreased weight. J Adolesc Health 2019;64:443–9.
[7] Cline AD, Wong M. New frontiers in using telemedicine for nutrition intervention. J Am Diet Assoc 1999;99:1442–3.
[8] Tate EB, Spruijt-Metz D, O'Reilly G, et al. mHealth approaches to child obesity prevention: Successes, unique challenges, and next directions. Transl Behav Med 2013;3:406–15.
[9] Nikolaou CK, Lean ME. Mobile applications for obesity and weight management: Current market characteristics. Int J Obes (Lond) 2017;41:200–2.
[10] Teens, social media & technology 2018, Pew research Centre. Available at: www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/. Accessed January 2, 2019.
[11] Mendoza JA, Baker KS, Moreno MA, et al. A Fitbit and Facebook mHealth intervention for promoting physical activity among adolescent and young adult childhood cancer survivors: A pilot study. Pediatr Blood Cancer 2017;64. https://doi.org/10.1002/pbc.26660.
[12] Svetkey LP, Batch BC, Lin PH, et al. Cell phone intervention for you (CITY): A randomized, controlled trial of behavioral weight loss intervention for young adults using mobile technology. Obesity (Silver Spring) 2015;23:2133–41.
[13] Nguyen B1, Shrewsbury VA, O'Connor J, et al. Two-year outcomes of an adjunctive telephone coaching and electronic contact intervention for adolescent weight-loss maintenance: The Loozit randomized controlled trial. Int J Obes (Lond) 2013;37:468–72.
[14] Jensen CD, Duncombe KM, Lott MA, et al. An evaluation of a smartphone–assisted behavioral weight control intervention for adolescents: Pilot study. JMIR Mhealth Uhealth 2016;4:e102.
[15] Twig G, Yniv G, Levine H, et al. Body-mass index in 2.3 million adolescents and cardiovascular death in adulthood. N Engl J Med 2016;374:2430–40.