Obesity Prevention in Children in Latin America Through Interventions Using Technology

Abstract: *The number of children in Latin America with overweight and obesity has increased markedly in recent years. However, interventions focused on prevention of childhood obesity are still in their infancy in Latin America. Leveraging the use of technology in children and adolescents to introduce or reinforce patterns of healthy eating and mobility in interventions is a priority. Though there is a low number of intervention studies focused on obesity prevention in Latin America, several studies using technology have been conducted. Further implementation of such programs as part of multilevel interventions will allow for continued prevention efforts to address increasing rates of overweight and obesity in this population.*

Keywords: obesity; prevention; Latin America; technology; child

Between 1975 and 2016, the worldwide prevalence of obesity nearly tripled.¹ Over 340 million children and adolescents aged 5 to 19 years were overweight or obese in 2016, and these conditions are increasingly affecting youth in low- and middle-income countries.² It is estimated that by

2025 some 268 million children aged 5 to 17 years may be overweight, including 91 million obese, assuming no policy interventions prove to be effective at changing current trends.² The estimates of the likely numbers of children in 2025 with obesity-related comorbidities are as

7.5%, respectively, for women.³ From 1975 to 2016, there was an increase in age-standardized body mass index (BMI) in girls of 1.00 kg/m² per decade (0.69-1.35, PP > 0.9999) in central Latin America.⁴ Chile and Mexico stand out with the highest levels of overweight and

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follows: impaired glucose tolerance (12 million), type 2 diabetes (4 million), hypertension (27 million), and hepatic steatosis (38 million).³

A recent study revealed that the prevalence for overweight and obesity among children in Latin America younger than 20 years old is 21.7% and 7.4%, respectively, for men and 45.5% and

obesity for boys, at 11.9% (9.6-14.3) and 10.5% (8.8-12.4), respectively, and Uruguay and Costa Rica for girls, at 18.1% (14.9-21.9) and 12.4% (10.0-15.1), respectively.⁴

In addressing obesity, it is crucial to target various levels of influence, including the individual (intrapersonal), social environmental (interpersonal),

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physical environmental (community setting), and macrosystem (societal), as multilevel interventions are most likely to be effective.⁵ Pediatric obesity may be described as a multifactorial condition promoted by genetic and behavioral factors, as well as characteristics of the family, community, and broader society.⁶ Researchers have noted that culturally appropriated, local evidence that takes into account the particularities of the food and physical activity environment of the region is needed to determine the most effective actions for obesity prevention.⁷ Lifestyle factors such as a healthy diet and sufficient physical activity are an important area of focus in combating obesity and have been the center of a number of programs developed. To promote individual behavior change, Kline et al suggest that interventions based on behavioral economics theories to alter food and physical activity patterns should be tested, and specific obesity-related behaviors such as snacking, television viewing, computer/game use, and eating highly processed foods and sugar-sweetened beverages should be targeted.⁸

However, intervention experiments, which examine the results of modifying some aspect of childhood obesity and promoting lifestyle changes, are still in their infancy in Latin America. A recent study examining research capacity for childhood obesity prevention in Latin America revealed a very low number of intervention studies.⁹

Development of interventions using emerging technology may benefit children and adolescents in this region in attaining healthier lifestyles.¹⁰ Hutchinson et al identify several ways in which technology may be used as a tool against obesity.¹⁰ These include social marketing strategies focused on promoting healthy food products and presenting positive images of healthy behaviors, wearable technology and applications that record activity and present encouraging messages to promote healthy habits, and use of social media to provide recipes, weight loss tips, and health-related quizzes. The usefulness of social

networking sites as innovative platforms for health promotion among adolescents, particularly in hard-to-reach minority or underserved populations, has also been cited in other studies.¹¹ Social networking sites such as online social networking websites, online social media, Facebook, MySpace, and Twitter may be used as a platform to access, recruit, and deliver health interventions in a cost-effective manner to youth.¹¹ Text message was also identified as a way to promote healthy weight.¹⁰ Notably, a recent article focused on establishing a research agenda to guide progress on childhood obesity prevention in Latin America identified leveraging the use of technology in children and adolescents to introduce or reinforce patterns of healthy eating and mobility as a priority.⁸

Examples of Use of Technology for Obesity Prevention in Latin America

Though there is a low number of intervention studies focused on obesity prevention in Latin America, several studies using technology have been conducted. A description of 3 such studies is provided in the following paragraphs.

One such study assessed the effect of a comprehensive intervention on weight in schoolchildren in Mexico City.¹² The intervention consisted of 3 educational in-person sessions with parents and children to promote healthy eating habits and exercise. To reinforce this information, a website presented detailed information on various topics every 2 weeks, such as school snack menus and calculation of BMI in children and adults. In addition, parents received text messages on their mobile phones to further reinforce the information provided. Results of the study were favorable, with BMI Z-scores (BMIZ) in the intervention group decreasing and BMIZ in the control group increasing compared to BMIZ at baseline.

A second study focused on examining the effectiveness of Exergames, a tool involving use of digital games to combat

childhood obesity in the school environment in Brazil.¹³ Schoolchildren from an elementary school were divided into 2 groups, traditional physical education and physical education with use of active virtual games. Results indicated that there were no significant differences in the level of physical activity and motivation between the 2 groups. However, the researchers noted that Exergames have the potential to deliver physical education in a playful, fun, and motivating way, offering children the opportunity to experience unusual sports and activities.¹⁴

A third study assessed the impact of a web-based intervention supplemented with text messages to reduce cancer risk associated with unhealthy diet, obesity, and sedentary lifestyle, among other factors, in adolescents in Spain and Mexico.¹⁵ Participants were assigned to receive either exclusively the online intervention, which was based on psychosocial models and the school curriculum, or the intervention supplemented with encouraging text messages. Results indicated that the web-based intervention supplemented with text messages had some impact on risky behaviors and appeared to be useful in controlling overweight adolescents. At follow-up, there was a reduction in overweight in the group receiving the intervention supplemented with text messages. The researchers noted that almost all adolescents, both in Spain and Mexico, had Internet access either at school or at home.¹⁶

Opportunities for Use of Technology for Obesity Prevention in Latin America

In terms of different types of technology that may be used for obesity prevention among youth in Latin America, mobile phones may be a useful vehicle for delivery of interventions, as there is widespread use in this region.¹⁷ Text message may be an effective way to reach children and adolescents with educational information related to obesity prevention. Mobile phones have

been cited as useful tools for interventions focused on health promotion because of widespread use, tendency to carry phones at all times, and attachment to these devices.¹⁸ According to the Pew Research Center, a median of 76% of people in emerging and developing markets say they have used their cell phones to send text messages in the past 12 months.¹⁹ A number of interventions using cell phones to promote healthy behavior have been conducted in diverse populations in the United States,²⁰⁻²³ and the same strategy may be further tested in Latin American youth. There have been studies specifically focused on Latinos in the United States as well, such as research seeking to build a short messaging service for use with Latina adolescents.²⁴ Of note, a 2013 systematic review of mobile phone-based interventions for health did not identify any studies conducted in Latin America.²⁵ Additional research is needed in this area, and researchers have noted that the widespread availability of smartphones, tablets, and portable activity devices such as accelerometers presents the opportunity to encourage physical activity and healthful eating, particularly in adolescents.²⁶

In addition, computer ownership is relatively high in a number of Latin American nations. Majorities in Chile (72%), Venezuela (61%), Argentina (58%), and Brazil (55%) have computers in their homes.¹⁹ Previous studies conducted in youth in Latin America have indicated frequent use of the Internet and suggest that it is a useful vehicle for delivery of health education. For example, results of a qualitative study on influences on eating habits of adolescents in Lima, Peru, conducted by Banna et al revealed that participants frequently mentioned the television and/or the Internet as part of their daily routine.²⁷ Nearly all participants stated that computers interested them and that they used the Internet frequently for both schoolwork and social activities. The majority had used the Internet to search for nutrition information and viewed Internet sources as credible. The researchers note that the

frequent use of technology in this group is important to consider when designing nutrition education interventions, with computers and mobile phones as potential vehicles for information delivery.²⁷ Of note, a 2016 systematic review of the effectiveness of e- and mHealth interventions to promote physical activity and healthy diets in developing countries only identified 3 studies in Latin America.²⁸

Implementation of interventions using technology in conjunction with strategies at the physical environmental and macrosystem levels may prove to be an effective means of combating obesity in youth in Latin America. A recent article highlights some of the challenges present in this region, such as the double burden of overweight and malnutrition, and describes some of the recent policies put in place to combat the obesity epidemic.²⁹ In designing and implementing educational programs, the complexity of addressing both malnutrition and obesity should be considered, as well as the insights gained from the strategies that have been put in place already.

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Informed Consent

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Trial Registration

Not applicable, because this article does not contain any clinical trials. **AJLM**

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