GAMES FOR HEALTH JOURNAL: Research, Development, and Clinical Applications
Volume 2, Number 3, 2013

DOI: 10.1089/g4h.2013.0020

Are Pediatricians "Game"? Reducing Childhood Obesity by Training Clinicians to Use Motivational Interviewing Through Role-Play Simulations with Avatars

Linda Radecki, MS,[1] Ron Goldman, BBA,[2] Alison Baker, MS,[1]
Jeanne Lindros, MPH,[1] and Jenelle Boucher, MS[2]

Abstract

The results of a feasibility study funded by a National Institutes of Health Small Business Innovation Research Phase 1 grant to assess the potential of using online, avatar-based simulation technology to increase pediatricians' use of motivational interviewing techniques to reduce childhood obesity are promising, with potentially positive implications for individual and public health outcomes.

Background

Childhood obesity is a serious public health issue with significant health risks and high medical costs. Today, nearly one in three U.S. children 10–17 years old is overweight or obese, and approximately 20 percent of 6–11 year olds are obese.[1] More than 20 percent of 2–5 year olds are overweight or obese, and even among the youngest children, infants, and toddlers, 10 percent have a high weight-for-height ratio.[2] Overweight and obese children suffer from traditionally "adult diseases," including type 2 diabetes, hypertension, liver disease, sleep apnea, and joint pain.[3–5] Recent estimates of the annual medical costs of obesity have been reported as high as $147 billion.[6]

As one of the most frequent points of contact in the health care of children, pediatricians are on the front lines of childhood obesity prevention and treatment. To address healthy weight at the point of care, the American Academy of Pediatrics (AAP) recommendations from 2003 (reaffirmed in 2006) call for the calculation of body mass index (BMI) for all children $\geq$2 years old as well as counseling on physical activity and nutrition.[7] However, pediatricians are skeptical about the value of this type of counseling and lack training in effective counseling methods.[8]

Motivational interviewing (MI) is a patient-centered method for enhancing intrinsic motivation to change health behavior by exploring and resolving ambivalence.[9] Numerous studies highlight MI as a promising strategy to encourage positive health behavior change around substance abuse, oral health, diet, and exercise.[9–13] Using brief MI strategies around nutrition and physical activity in the context of an office visit has shown positive results in terms of health behavior change and weight loss in both pediatric and adult populations[13–15] and is believed to be more cost-effective than other treatments.[16,17]

Despite studies demonstrating the effectiveness of MI as a time-efficient tool in the patient–physician encounter, most practicing clinicians lack MI training.[18,19] MI is continually identified as an educational need in AAP needs assessments and continuing medical education evaluations, but such training is primarily only available in traditional workshop format and is therefore viewed as costly in dollars and time.

Studies indicate that using Web-based technologies and virtual patient avatars to teach interpersonal skills to practitioners, interns, and medical students is at least as effective as live role play and text-based content.[20–23] This presents an opportunity to create a role-play simulation that will provide realistic practice scenarios and an accessible, scalable, and cost-effective alternative to classroom training on MI. Such a simulation can have positive impact on the frequency with which pediatricians use MI and their subsequent capacity to address obesity and overweight effectively in the office encounter.

Kognito Interactive (New York, NY) specializes in developing role-playing training simulations with avatars in the areas of health and behavioral health. Using a proprietary technology called the "Human Interaction Game Engine" and approaches based on research in neuroscience and social cognition, Kognito generates virtual practice environments where users engage in challenging conversations with emotionally responsive avatars that act and respond like real people. In each role-play conversation, users learn and practice applying effective conversation tactics such as MI techniques

[1]American Academy of Pediatrics, Elk Grove Village, Illinois.
[2]Kognito Interactive, New York, New York.

to build trust and positively influence the behavior of the avatar. Recent Kognito simulations include "At-Risk in Primary Care," which educates providers on applying MI to increase treatment adherence in patients with trauma-related mental health disorders, and "Family of Heroes," a simulation designed to assist military families in learning MI skills to effectively manage challenging conversations they may encounter with their veteran while adjusting to post-deployment life. A randomized controlled-study analyzing "Family of Heroes" was published in *Games for Health Journal*.[24]

Materials and Methods

Description of research

This study examines the acceptability and feasibility of using Kognito's role-play simulation technology to train clinicians to use MI for childhood obesity prevention and treatment. In addition, it examines the overall interest of pediatricians to learn and apply MI to address childhood obesity. It is important to note that, although the research examines the Kognito technology, many of its findings are relevant for other role-play simulation technologies with virtual patients.

Recruitment

Participants were recruited via an e-mail announcement to members of select AAP Councils, Committees, and Sections. Those interested provided background information through a brief online survey. The final sample was selected to reflect, to the extent possible, general AAP membership on characteristics such as gender (56 percent female) and age (35 percent under 40 years of age). We also oversampled physicians serving populations at higher risk for obesity, including African American and Hispanic/Latino children.

Study design

The study design included two components. In Component 1, participants viewed and tested a prototype that included (1) a 10-minute online module about MI and its benefits in the context of pediatric clinical care (Fig. 1) and (2) a 15-minute online role-play simulation taken from Kognito's "Family of Heroes" program, where users learn MI skills relevant in encouraging an avatar exhibiting signs of posttraumatic stress disorder to seek help. The role-play simulation allowed participants to "test" the simulation technology that could be used to develop MI trainings for pediatricians. To explore knowledge and attitudes about MI and the simulation technology, participants completed a pre- and post-questionnaire immediately before and after viewing the prototype. Component 1 was completed online at participants' convenience.

Approximately 1–3 weeks after completing Component 1, participants took part in Component 2, a structured, one-on-one telephone interview or a telephone-based focus group. The purpose of these interviews was to allow a more in-depth and reflective examination of the user experience. Discussion focused on the acceptability and usability of this simulation technology to provide training in MI to address childhood obesity. All interviews and focus groups were conducted by the same facilitator using a semistructured discussion guide. Individual interviews typically lasted 30–45 minutes; focus groups typically lasted approximately 1 hour.

Participants who completed both components received a $50 electronic gift card. The study was approved by the AAP's Institutional Review Board. SPSS software (SPSS, Inc., Chicago, IL) was used to analyze questionnaire data. Audio recordings of interviews and focus group sessions were transcribed, and transcripts were organized and coded for

FIG. 1. Snapshot of a virtual role-play conversation with avatars.

key content and themes using Atlas.ti software (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany).

Description of role-play simulation

To provide participants with hands-on practice examining the simulation technology, they were provided with access to one of the three role-play conversations included in Kognito's "Family of Heroes" post-traumatic stress disorder and resiliency training simulation. Each practice conversation in "Family of Heroes" is structured as a minigame where users assume the role of a family member and engage in conversation with an emotionally responsive returning-veteran avatar that possesses his or her own memory, personality, and emotional state and adapts his or her responses and behaviors to the learners' tactical conversation decisions, thereby replicating real-life interactions. The user's goal is to utilize effective conversation tactics including MI to achieve a specific goal. In the conversation provided to study participants, they assumed the role of a veteran's wife and needed to de-escalate an argument with her husband, who was experiencing post-traumatic stress disorder/mild traumatic brain injury.

Users communicate with the veteran avatar by selecting conversation choices from a dynamic menu of dialogue options. Each option represents a specific conversation tactic that is either effective or ineffective in helping accomplish the learners' goal. Once users choose a dialogue option, they see their character "perform" the dialogue and then observe the verbal and non-verbal response of the veteran avatar. A new set of dialogue options then appears based on which tactic was selected. To successfully complete the conversation and "win" the game, users must apply effective conversation tactics and adapt their decisions to the personality and reactions of the veteran avatar. The underlining architecture of the conversation is designed to repeatedly expose users to patterns of behaviors as a way to accommodate new information into existing mental schemas and support changes in real-life behaviors.

Results

The final sample included 35 physicians who went through the prototype, of which 34 also completed one of five telephone-based focus groups ($n = 23$) or a one-on-one telephone interview ($n = 11$).

The majority of participants were female (57 percent), with a mean age of 44 years. All provided direct patient care; 40 percent reported spending some time in another specialty or pediatric subspecialty such as adolescent medicine, gastroenterology, endocrinology, internal medicine, pediatric hospitalist, nonoperative orthopedics, rheumatology, or sports medicine. The sample included clinicians practicing in urban, suburban, and rural settings.

Fewer than 40 percent reported ever receiving any type of MI training. Twenty-six percent rated their own knowledge of MI as "good" or "excellent," whereas only 11 percent felt well prepared to use MI to help an adult caregiver/child find the motivation to change behaviors around nutrition, physical activity, or screen time. The majority (63 percent) used MI in practice "to a little extent" or "not at all," and nearly half (45 percent) expressed a lack of confidence in their ability to use MI strategies when counseling about weight concerns.

Sixty-six percent of participants said that they would prefer to spend about 1 hour on an online MI training simulation, and 29 percent said they would prefer to spend 60–90 minutes. Sixty-three percent said they would access such training from home. Finally, 94 percent said they would access such training via their laptop/desktop and 51 percent via their tablet.

After completing the prototype, 100 percent of participants viewed MI as a valuable technique for pediatricians to use in discussions with patients and families about a child's weight, and 100 percent expressed interest in learning MI skills.

Acceptability and feasibility

In a post-prototype survey, nearly all participants (97 percent) agreed/strongly agreed that role-play simulations can be an effective instructional approach to learn MI skills to address child weight. One hundred percent believed that the type of simulated role-play conversations portrayed in the prototype could be useful to prepare for interactions in the office setting. Furthermore, every participant expressed interest in taking a pediatric-focused, Web-based role-playing simulation on MI, if one existed.

Focus group discussions and individual interviews probed participants' experiences with the prototype in greater detail. Reaction was enthusiastic, as physicians praised not only the technology but also its applicability to developing and practicing skills around counseling for healthy weight, nutrition, and physical activity.

Across participant comments, several themes emerged contributing to the acceptability of the Kognito role-play simulation technology as a learning/training method. These included quality of the technology, portability and convenience, innovation, and advantages of simulation technology over traditional teaching methods.

Quality of the technology. Participants frequently commented on the caliber of the simulated conversation technology, realism of the characters, effectiveness of the dialogue, and ease of use. Words like "elegant," "believable," and "fun" were often used to describe the experience:

> When I started doing it I thought, "Wow this really happens to me every day in practice and these are really answers that I get from parents and this patient is very similar to my patients."

Convenience and portability. Participants found the convenience and on-demand availability of the simulation highly desirable:

> … this was very convenient…you can just take out your device and do this anytime at your own convenience and if you can download it offline that's even easier.

Innovation. Comments surrounding innovation focused not only on the technology but also on MI as a different approach to working with patients and families around weight concerns, nutrition, and activity counseling:

> I would use this type of technology. It is much better than just reading about motivational interviewing on the web or in a text book because those do not represent anything that is close to real life scenarios…reading and learning is different than practicing on such a technology.

Advantages over traditional teaching methods. Participants perceived numerous benefits of simulation technology over more conventional learning approaches. The opportunity for immediate, interactive practice and feedback on newly learned concepts was highly valued, as was the ability to replay a module for ongoing review and skill reinforcement:

> … having it in a module like this allows you to go back and play it again if there are parts that you wonder, "I'm not sure if I said it the right way. Did I really pick it up the right way?" Because otherwise when you go to a conference you're in there, you're out and there's no chance of being back to this kind of playing the conversation again…you get a second chance to go back and hear what's being said.

A subset of respondents also noted and appreciated the nonthreatening learning environment that simulation technology offered:

> … there's a certain embarrassment factor if you're doing it live and you volunteer to role-play and you make a mistake or say the wrong thing whereas with this technology you can make mistakes, you can even make mistakes on purpose to just kind of see where it leads.

> Any tool that will help us get better outcomes! I know that obesity specifically is one of the most frustrating things because you have patients that you love that you just can't get through to…having another tool in your toolbox to really help a family and help an individual person is a very powerful thing.

Discussion

To address childhood obesity prevention and treatment, pediatric healthcare professionals require effective tools and resources to support their efforts. With patients from infancy through young adulthood, pediatricians are among the most trusted advisors regarding health and well-being, yet many pediatricians feel ill-equipped to address the challenging topics of healthy weight, nutrition, and physical activity.

Although methods such as MI have shown promise in the clinical setting, most clinicians have not received formal training. Furthermore, training can be costly and time consuming, so innovative approaches designed to reach a broader audience should be pursued.

Results of the current study suggest that online simulation technology in general and specifically Kognito's simulation technology may be a highly acceptable and cost-effective way to teach MI skills and strategies. When 35 clinicians tested the technology and extrapolated on its use for MI training and skill enhancement, they valued the technology's sophistication and ability to create realistic scenarios and authentic conversations while providing immediate and personalized feedback. Their observations suggest that simulation technology can create a nonthreatening and conveniently accessible extended classroom for pediatricians and lend support to the development of future simulation experiences for pediatric healthcare professionals to build skills around childhood obesity prevention and treatment. Simulation technology in general allows for rapid dissemination to practicing clinicians in a variety of settings, including continuing education activities, as well as to trainees through professional schools (e.g., medical, nursing, and physician assistant training programs), and targeted outreach to those serving populations at the highest risk for obesity and obesity-related co-morbidities. Further work is needed, not only to develop content-specific MI training modules but also to assess whether this type of learning and skill building improves patient care, satisfaction, and ultimately better nutrition, increased physical activity, and healthier weight for children:

Our findings do have limitations. As a feasibility study, the sample size was necessarily small as dictated by resources and study design. Furthermore, our participants were self-selected and thus may represent a group more interested in childhood obesity, technology, innovative teaching methods, or some combination of these factors. Our sample cannot be considered representative of all U.S. pediatricians or all members of the AAP.

Building upon the results of this study, the AAP and Kognito are working together to secure funding to build a series of MI role-play training simulations for pediatricians to reduce childhood obesity. The simulations will be available both online and via mobile devices and will offer a variety of difficulty levels and scenarios. Kognito is also pursuing several projects to apply its technology to address the challenges of treatment adherence and patient engagement around chronic diseases such as diabetes, congestive heart failure, and mental disorders.

Acknowledgments

We offer sincere gratitude to our study participants. We also thank Robert Schwartz, MD, FAAP, and Sandra G. Hassink, MD, FAAP, for their guidance and insights in developing the motivational interviewing module and study protocol. This project was funded by a National Heart, Lung and Blood Institute Small Business Innovation Research Phase 1 grant awarded to Kognito Interactive.

Author Disclosure Statement

R.G. is co-founder and CEO of Kognito Interactive. J.B. is Chief Creative Officer at Kognito Interactive. No competing financial interests exist for L.R., A.B., and J.L.

References

1. Ogden CL, Carroll MD, Flegal KM. High body mass index for age among US children and adolescents, 2003–2006. JAMA 2008; 299:2401–2405.
2. Harnack L, Lytle L, Himes JH, et al. Low awareness of overweight status among parents of preschool-aged children, Minnesota, 2004–2005. Prev Chronic Dis 2009; 6(2). www.cdc.gov/pcd/issues/2009/apr/08_0043.htm (accessed February 27, 2013).
3. Freedman DS, Zuguo M, Srinivasan SR, et al. Cardiovascular risk factors and excess adiposity among overweight children and adolescents: The Bogalusa Heart Study. J Pediatr 2007; 150:12–17.
4. Li C, Ford ES, Zhao G, Mokdad AH. Prevalence of prediabetes and its association with clustering of cardiometabolic risk factors and hyperinsulinemia among US adolescents. Diabetes Care 2009; 32:342–347.
5. Dietz WH. Overweight in childhood and adolescence. N Engl J Med 2004; 350:855–857.
6. Finkelstein EA, Trogdon JG, Cohen JW, Dietz W. Annual medical spending attributable to obesity: Payer and service specific estimates. Health Aff (Millwood) 2009; 28:822–831.

7. Krebs NF, Jacobson MS; American Academy of Pediatrics Committee on Nutrition. Prevention of pediatric overweight and obesity. Pediatrics 2003; 112:424–430.
8. American Academy of Pediatrics. Executive Summary: Periodic Survey #65: Counseling on and Management of Childhood Obesity/Overweight. Elk Grove Village, IL: American Academy of Pediatrics. 2006. www.aap.org/en-us/professional-resources/Research/Pages/PS65_Executive_Summary_CounselingonandManagementofChildhoodObesityOverweight.aspx. (accessed February 27, 2013).
9. Erickson SJ, Gerstle M, Feldstein SW. Brief interventions and motivational interviewing with children, adolescents, and their parents in pediatric health care settings. Arch Pediatr Adolesc Med 2005; 159:1173–1180.
10. Rollinick S, Mason P, Butler C. *Health Behavior Change; A Guide for Practitioners*. London: Churchill Livingstone; 1999.
11. Sindelar HA, Abrantes AM, Hart C, et al. Motivational interviewing in pediatric practice. Curr Probl Pediatr Adolesc Health Care 2004; 34:322–339.
12. Resnicow K, Davis R, Rollinick S. Motivational interviewing for pediatric obesity: Conceptual issues and evidence reviews. J Am Diet Assoc 2006; 1106:2024–2033.
13. Schwartz RP, Hamre R, Dietz WH, et al. Office-based motivational interviewing to prevent childhood obesity. Arch Pediatr Adolesc Med 2007; 161:495–501.
14. Pollak KI, Alexander SC, Coffman CJ, et al. Physician communication techniques and weight loss in adults—Project CHAT. Am J Prev Med 2010; 39:321–328.
15. Rollnick S, Butler CC, McCambridge J, et al. Consultations about changing behavior. BMJ 2005; 331:961–963.
16. Burke BL, Arkowitz H, Menchola M. The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. J Consult Clin Psychol 2003; 71:843–861.
17. Knight KM, Bundy C, Morris R, et al. The effects of group motivational interviewing and externalizing conversations for adolescents with Type-1 diabetes. Psychol Health Med 2003; 8:149–158.
18. Meriwether RA, Wilcox S, Parra-Medina D. Physical activity interventions in clinical settings. Curr Cardiovasc Risk Rep 2007; 1:237–246.
19. Haeseler F, Fortin AH, Pfeiffer C, et al. Assessment of a motivational interviewing curriculum for year 3 medical students using a standardized patient case. Patient Educ Couns 2011; 84:27–30.
20. Bell DS, Fonarow GC, Hays RD, Mangione CM. Self-study from web-based and printed guideline materials. Ann Intern Med 2000; 132:938–946.
21. Fleetwood J, Vaught W, Feldman D, et al. MedEthEx online: A computer-based learning program in medical ethics and communication skills. Teach Learn Med 2000; 12:96–104.
22. Triola M, Feldman H, Kalet AL, et al. A randomized trial of teaching clinical skills using virtual and live standardized patients. J Gen Intern Med 2006; 21:424–429.
23. Holsbrink-Engels GA. Using a computer learning environment for initial training in dealing with social-communicative problems. Br J Educ Technol 2001; 32:53–67.
24. Albright G, Goldman R, Shockley KM, et al. Using an avatar-based simulation to train families to motivate veterans with post-deployment stress to seek help at the VA. Games Health J 2012; 1:21–28.

Address correspondence to:
Linda Radecki, MS
American Academy of Pediatrics
141 Northwest Point Boulevard
Elk Grove Village, IL 60007

E-mail: LRadecki@aap.org