



Published in final edited form as:

J Pediatr Health Care. 2011 ; 25(3): 153–161. doi:10.1016/j.pedhc.2009.12.003.

Coping Skills Training in a Telephone Health Coaching Program for Youth at Risk for Type 2 Diabetes

Vanessa Jefferson, MSN, Sarah S. Jaser, PhD, Evie Lindemann, MA, MAAT, Pamela Galasso, RD, CD-N, Alison Beale, DTA, Marita G. Holl, PhD, RD, CD-N, and Margaret Grey, DrPH, RN, FAAN

Yale University School of Nursing, New Haven, CT

Abstract

Introduction—The purpose of this paper is to describe components of a health coaching intervention based on coping skills training delivered via telephone. This intervention was provided to urban adolescents at risk for type 2 diabetes mellitus (T2DM), reinforcing a school-based curriculum designed to promote a healthy lifestyle and prevent T2DM.

Method—Health coaching via telephone was provided to at-risk, urban youth enrolled in a study of an intervention to reduce risk for T2DM. Vignettes are used to describe the use of several coping skills in this high risk youth population.

Results—A variety of vignettes illustrate how telephone health coaching reinforced lifestyle changes in students by incorporating coping skills training.

Discussion—Given the benefits and the challenges of the telephone health coaching intervention, several suggestions for others who plan to use a similar method are described.

Once rare, the incidence and prevalence of type 2 diabetes mellitus (T2DM) is increasing among adolescents, and in particular, among ethnic minority groups (e.g., 2004; American Diabetes Association, 2000; Bloomgarden, 2004; Singh, Shaw, & Zimmet, 2004). The epidemics of obesity and diabetes co-exist as health burdens in our society; thus, the term “diabesity” was coined (Astrup & Finer, 2000; Shafir, 1996). Although this term was used in reference to the escalation of these health conditions in adults, there is now an increasing prevalence of both of these conditions in youth. Among adolescents aged 12–19, the prevalence of obesity has tripled in the last decades, increasing from 5% in 1980 to 17.6% in 2006 (Ogden, Carroll, & Flegal, 2008). Sedentary lifestyles combined with increased caloric intake have contributed to this problem in youth (Gordon-Larsen, 2001).

There is evidence that overweight in children is related to impaired glucose tolerance, a precursor of diabetes. A study by Weiss and colleagues (2005), for example, noted that 10% of children (ages 4–18) who were overweight with a normal glucose tolerance test eventually developed impaired glucose tolerance (IGT). Twenty-four percent of those who were initially classified as having IGT developed T2DM over an 18–24 month period, while

© 2009 National Association of Pediatric Nurse Associates and Practitioners. Published by Mosby, Inc. All rights reserved.

Corresponding Author: Sarah S. Jaser, 100 Church Street South, PO Box 9740, New Haven, CT 06536, sarah.jaser@yale.edu, phone: (203) 785-6715, fax (203) 737-4480.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

None of the authors have financial interests or potential conflicts of interest to report.

30% continued to exhibit IGT, and 45% reverted to normal glucose tolerance (Weiss et al., 2005). The majority of the study's participants who later developed T2DM were African American females who had gained a significant amount of weight, contributing to an increased BMI. Those who maintained their weight and BMI reverted to normal glucose tolerance, suggesting that there are opportunities for prevention of T2DM (Weiss et al., 2005).

Increased insulin levels and insulin resistance have also been reported in overweight and obese youth, indicating the need for early intervention to prevent progression to T2DM (Conwell, Trost, Brown, & Batch, 2004; Uwaifo et al., 2002). Insulin resistance, a component of metabolic syndrome, is also associated with the presence of early cardiovascular disease (Chen, Srinivasan, Elkasabany, & Berenson, 1999). Diabetes is a component of the metabolic syndrome and is also a significant cardiovascular risk factor (Goran, Ball, & Cruz, 2003; Klein et al., 2004). In two landmark studies, the Diabetes Prevention Program and the Finnish Diabetes Prevention Study, a low fat diet, increased physical activity of 150 minutes a week, and a modest weight loss of 5–7% of body weight decreased the onset of T2DM in adults (Knowler et al., 2002; Tuomilehto, Lindstrom, & Eriksson, 2001). Although conducted with adults, these studies suggest that early intervention may prevent the progression to T2DM and may decrease cardiovascular risk factors, but there is a need for more research with youth at risk for T2DM.

Health Coaching and Coping Skills Training

The lifestyle changes needed to cope with and manage obesity and prevent T2DM require ongoing support and follow-up until changes are internalized. Health coaching may be an effective way to support such lifestyle changes and improve health outcomes in overweight youth (Saelens et al., 2002). Based on Bandura's framework (1986), health coaching interventions attempt to achieve behavior change by improving self-efficacy through modeling and reinforcing new behaviors. Health coaching is a patient-centered process that consists of setting goals, identifying obstacles, and mobilizing existing supports. In pilot work, health coaching conducted over the telephone, in combination with a multi-component behavioral weight control intervention for adolescents, has shown promise as an effective way to reduce BMI levels and increase healthy behaviors in some youth (Alm et al., 2008; Saelens et al., 2002). However, there is scant literature on health coaching related to the prevention of T2DM in youth. These findings suggest that telephone health coaching may reinforce nutrition and physical activity education, in accordance with recent recommendations for obese youth (e.g., Spear et al., 2007), resulting in improved healthy lifestyle outcomes (Grey et al., 2004).

Originally developed with adults, training in interpersonal and coping skills has been shown to be important in assisting individuals to carry out personal health behaviors (Grey, Boland, Davidson, Li, & Tamborlane, 2000). Coping skills training (CST) focuses on retraining non-constructive coping styles into more productive behaviors. The major skills involved are social problem solving, communication skills, stress reduction, cognitive behavior modification, and conflict resolution (Davidson, Penney, Muller, & Grey, 2004). In this paper, we describe components of a health coaching intervention provided to overweight adolescents, with the goal of promoting a healthy lifestyle for the prevention of T2DM. A variety of vignettes illustrates how health coaching reinforced lifestyle changes in students by incorporating coping skills.

The Current Study

The health coaching intervention was provided as part of a study of a multi-faceted school-based intervention (nutrition and physical activity education, including information about

risk factors for developing T2DM, coping skills training, health coaching) to prevent T2DM in youth who were at high risk (BMI > 85th percentile and family history of diabetes). Participants were recruited from six inner city middle schools. The purpose of the study was to determine the efficacy of this educational program as compared to a similar program with the addition of coping skills training and telephone health coaching. Results from the study have been published elsewhere (Grey et al., 2009). CST was designed to increase the youth's sense of competence and mastery by teaching constructive coping skills. The specific coping skills addressed were: social problem solving, communication skills (including social skills training and assertiveness), stress reduction/management, conflict resolution, and cognitive restructuring. The schools were composed of students of similar demographic background, where pilot data indicated that approximately 40% of the students had BMI \geq 85th percentile (Grey et al., 2004). Inclusion criteria included any English or Spanish-speaking 7th grade youth who assented and whose parent or guardian consented to their participation in the project, had a family history of diabetes, BMI \geq 85th percentile, and no other significant health problems (other than well-controlled asthma). The University's Internal Review Board approved the study. Students were in 7th grade (age ranged from 10 to 15 years old, $M = 12.3$; $SD = .7$), and slightly more than half the sample was female (53%). In terms of race and ethnicity, the sample was 48.7% Black, 47.2% Hispanic/Latino, 7.1% biracial, and 1.5% other. Socioeconomic status as measured by annual income was generally low with 16% under \$5,000, 17.5% under \$10,000, 27.5% between \$10,000–20,000, 15.7% between \$20,000–40,000, and 12.8% at \$40,000 or more.

Health coaching that emphasized coping skills was provided as part of the experimental intervention to a subgroup of students ($n=98$). Coaching began after the classroom component (nutrition and physical education) was completed and continued for 9–12 months post-classroom intervention. Conducting health coaching over the telephone was an innovative approach to reach families with limited resources and other barriers to effective care (Staudt, 2003). The multi-disciplinary health coaching team consisted of a registered dietitian, two nurse practitioners, a nutritionist, a family therapist, and a child psychologist. Two of the health coaches were bilingual in Spanish. Coaches rotated every 3 months, allowing each student the opportunity to work with different coaches. Health coaches scheduled weekly calls with students, with the semi-structured sessions lasting approximately 5–10 minutes. During the coaching call, coaches helped students choose a goal from a list of 20 healthy lifestyle goals related to the classroom curriculum, including several related to diet (e.g., eat breakfast, increase water intake), physical activity (e.g., increase daily activity), and coping skills (e.g., use of problem solving skills to resolve conflict). Each week, the health coach asked about the student's progress toward his/her self-selected goal, reinforced healthy behaviors, and discussed barriers to achieving goals. Before the call ended, students decided whether to continue with the same goal or choose a new one (e.g., increasing physical activity), and develop a plan of action (e.g., walk to school on Monday, Wednesday, and Friday).

A HIPAA-compliant and secure web-based system was developed to document clinical and administrative aspects of the coaching. Telephone coaching sessions were documented on the secure website after each contact. Written records of student responses to coaching methods served to enhance the continuity of treatment for each participant; as a student rotated to a new member of the multidisciplinary health coaching team, the student's records were accessed by the new coach. Students, therefore, had the benefit of working with a variety of coaches who emphasized different aspects of health goals based on their professional orientations.

In this paper, we describe health coaching vignettes chosen to illustrate the coping skills taught and the techniques used in health coaching to foster healthy lifestyle behaviors. In

addition, we provide information on the number of contacts and weight change in participants. All children's names have been changed to assure confidentiality.

Social Problem Solving

Making good decisions with regard to one's lifestyle choices requires an ability to consider alternative approaches and select one that allows for the best outcome. The skill of social problem solving is designed to help youth look at potential ways of handling situations and raises awareness of possible consequences of their decisions. Savannah, a focused and well-mannered African-American 12 year old, was able to use problem-solving to her advantage.

Savannah was mothered by a loving and caring woman who was chronically ill and wheelchair bound. Savannah had difficulty in school with discipline and grades. Initially, she was reluctant to engage in the weekly coaching program, stating that she did not need to work on any healthy lifestyle goals because she was satisfied with her health habits. After several contacts with the coach, Savannah agreed that part of her difficulty in school was related to not getting enough sleep, with a 2 AM bedtime and a 7AM wake-up. The first goal involved turning off the TV, reading for a short time, and getting to bed earlier. She expressed not having any interesting books at home. The coach suggested going to the free public library or the school library to obtain books of interest. Though at first she had trouble following through with the action plan, she eventually began to read. She found that it promoted her desire to turn off the TV, and she began to go to sleep earlier. The coach suggested turning off the TV at 1:00 AM, and in half hour increments arriving at 11:00 PM for bedtime. Savannah also liked to write short stories and poems. With encouragement from her coach, she began to write prior to bedtime. She often shared her writings with the coach during the coaching sessions. She also stated that she was part of a church program, in which she planned to read several of her poems. Gradually, the coach felt a bond with Savannah, both by phone and during school encounters. Savannah became very respectful towards the coach and demanded that other students also show respect.

Finding positive solutions to her problems helped Savannah see herself as competent. What began as a challenging experience ended with Savannah finding ways to meet her goals. Savannah's grades improved and she was able to get into the senior high school of her choice. Although Savannah's BMI increased from 25 to 28 over 12 months, her triglycerides decreased from 87 to 69, her total cholesterol decreased from 186 to 163, and her homeostatic model assessment (HOMA, a measure of insulin resistance) decreased from 5.28 to 4.48. Savannah was coached over 10 months by 3 coaches: 70 calls resulted in 24 coaching contacts, for a total of 146 minutes.

Communication: Social Skills Training

A key element in successful coaching is the establishment of trust and building rapport between the coach and the student, which often leads to greater motivation to achieve weekly goals. Social skills training is designed to teach children skills that will enable them to work with peers and adults in a way that results in positive outcomes for all. Sam's case illustrates this process.

Initially, Sam did not like talking to the health coach and was uncomfortable with the focus on his health-promotion goals. He favored sedentary activities, such as television and video games, and early attempts to engage him in making healthy behavior changes failed. However, he was very enthusiastic about his participation on the school football team, and he especially enjoyed being part of a team. The health coach built rapport with Sam by finding ways to relate his interest in football

to healthy behaviors. His strong desire to succeed at football, and to be the best player he could be for his teammates, provided him the incentive to change. He attended 2-hour practices six days a week, and he decided to add weight lifting at home to build strength. The health coach helped him to see the connection between his commitment to his teammates and his lifestyle. As a result, Sam replaced some of his TV viewing at home with weight lifting and reduced his video game time to one hour per day by setting an alarm on the microwave. In addition, he chose to drink water at football practice instead of soda and juice, his previous beverages of choice. Sam identified the social aspect of being part of the football team as his motivation for healthy behavior. To continue participation in a team activity after football season, he joined the drill team, which required an hour of marching three times a week. Identifying his passion for self-chosen physical activities with a social component kept him motivated and physically active.

As this vignette illustrates, Sam found that the ability to work together with the coach helped him to achieve his goals. Over the 12 months, Sam's BMI remained stable at 37, his percent body fat decreased from 51% to 45%, his triglycerides decreased from 57 to 45, and his HOMA score decreased from 8.9 to 4.6. In addition, Sam's weekly physical activity levels (self-reported metabolic equivalent, or MET) increased from 40 to 55. Sam was coached over 8 months by 3 coaches: 45 calls resulted in 12 coaching contacts, for a total of 111 minutes.

Communication Skills: Assertiveness

Communication skills help students obtain social support, which is important in making lifestyle changes. Sometimes, the coach can help the student learn to ask others for support. Assertiveness training allows children the opportunity to express themselves in open, direct, honest, and appropriate ways. This was the case with Ann.

Ann, a 13-year-old Hispanic female, was a respectful adolescent who was somewhat shy on the phone. The health coach's first priority was establishing trust in order to provide a safe environment for setting health promotion goals. After several successful coaching sessions Ann shared her personal cell phone number with the health coach, allowing for more consistent contact.

Ann was already very active in sports and gym activities. It was apparent that there was a strong family connection and a high level of daily interaction with her mom. The health coach built on the existing family support by encouraging Ann to use assertive communication to engage her family in the program. For example, she established a new grocery routine with her parents for buying items such as fresh vegetables, low fat milk, and whole grain breads. Building on this goal, Ann also learned a new, healthy recipe with her mom. The need for continued exercise was also a priority, so she participated on a soccer team with her mom and went to the gym with a family member one or two nights a week.

Ann began preparations for her 15th birthday, a monumental coming of age celebration in her culture. An activity goal was planned through the creation of a "hip-hop" dance routine for her party. This goal required her mother's support for transportation to dance lessons twice a week. The health coach encouraged Ann to communicate her healthy goals to her family in order to get the support she needed for achieving positive results.

The focus on assertiveness helped Ann to reach her goals by asking for what she needed. Her BMI decreased from 27 to 25 over the course of the program. In addition, Ann's total cholesterol decreased from 172 to 165, and her HOMA decreased from 4.6 to 1.7. Ann was

coached over 8 months by 2 coaches: 65 calls resulted in 18 coaching contacts for a total of 35 minutes.

Stress Reduction

These urban, inner-city youth deal with many stressors, so a common need in coaching is to help them learn effective approaches for managing stress. Techniques such as deep breathing can help to lessen feelings of stress, and are part of stress reduction instruction. José provides an example.

“I don’t sleep very well, and I have trouble falling asleep,” José said during one of the initial calls with his coach. A 13 year old boy from a Hispanic family, he lived with his mother, stepfather, and sister in an impoverished area of the city. José’s father had been murdered in a car-jacking incident when he was very young. He got along well with his stepfather, but he reported numerous fights with his younger sister.

In his conversations with his coach, he expressed high levels of anxiety about his life. To address his sleep issues, the coach suggested skipping his afternoon naps, reading before bedtime, and writing his thoughts in a journal. Over time, he trusted the coach more with his inner feelings and concerns, and his sleep patterns began to improve. Through participation in two middle school programs for gifted students, José took field trips to exciting new places that included the court system, a university, a museum, and the city of Philadelphia. José incorporated his field trips, classroom learning, and home life into a form of creative expression that yielded rich benefits. He began writing a novel in which the main character was a boy similar in age to him. This fictional character, much like José, had to endure social difficulties and find solutions in order to survive.

As the phone coaching drew to a close, José and his coach looked back over the months to review what he had learned. Instead of staying awake worrying about life, he used communication to allay his anxieties and concerns. He talked to his Mom about the fights with his sister, came to a new understanding with both of them, and the fighting decreased. He developed new social supports in his life, including peers, teachers, and extended family members. When coaching ended, José was thinking about where he wanted to go to college. Over the course of the intervention, Jose’s BMI remained stable at 32, he maintained his physical activity level (weekly MET = 35) and his total cholesterol decreased from 207 to 191. Jose was coached over 4 months by one coach: 18 calls resulted in 16 coaching contacts, for a total of 210 minutes coached.

Conflict Resolution

Conflict resolution skills are also a key component in developing and maintaining healthier lifestyle habits. Helping teens to develop the skills necessary to negotiate conflict is the basis of conflict resolution. The training focuses on reworking problematic situations, with the goal of finding a solution that would result in better outcomes. Claritza, a 14 year old Hispanic girl, needed to overcome barriers to physical activity, as described below.

Although she was reserved during her first contact with the coach, Claritza set an initial goal of controlling portion size at meals and snacks. As she gained success with her first few goals, she began to explore more difficult targets, such as positive ways to resolve conflict with others. She role-played with her coach to help her to gain confidence. In preparation for her Quinceñera, a milestone of young womanhood in Mexican culture, she shopped with her Mom and a few close friends. She entered a store and walked into the teen section. When the shop owner

asked what event they were celebrating, Claritza replied, “My Sweet 15 party.” The shop owner looked at her disapprovingly and directed her to the plus size dresses, stating that only in that section would she find her correct size. Claritza looked at the owner and said, “Excuse me?” The shop owner started to repeat herself and Claritza quickly interrupted, a little louder this time, “Excuse me?” The owner, now aware that she had made an insulting remark, tried to smooth things over by indicating that the larger size gowns offered a variety of different colors that she could try on. Still very upset by the owners “size discrimination,” Claritza said to her friends and family, “We need to leave now. This salesperson is clueless about a Sweet 15 celebration.” They went to a smaller shop, where they were well-treated, and Claritza was able to find something she liked. Though Claritza was clearly upset as she described the confrontation to her coach, she felt encouraged.

Handling this conflict in a positive way, by standing up to a stranger, was a turning point for Claritza. This life lesson helped her to work on a map of positive experiences rather than a scorecard of defeats. Over the course of the study, she maintained a stable BMI of 31, her triglycerides decreased from 97 to 85, and her HOMA decreased from 5.7 to 4.0. Claritza was coached over 8 months by 2 coaches: 44 calls resulted in 18 coaching contacts, for a total of 166 minutes.

Cognitive Restructuring

Negative self-talk can influence decision-making and health-related behaviors. When coaches teach students how to move from negative self-talk to more positive internal messages, students become empowered to develop new responses. Cognitive restructuring is also called cognitive-behavior modification.

When the coach started working with Alex, a 14-year-old African American boy, he was attending summer camp, where he was exercising consistently throughout the day. After only a few weeks, Alex reported losing 5 pounds. He was clearly proud of this accomplishment, and he asked the health coach to assist him in continued weight loss. The coach encouraged him to use positive self-talk (e.g., “I can do this”) as a method to stay motivated with his goals. By the end of the summer, he had lost 15 lbs, which was confirmed by research staff. When school started, Alex reported that he wanted to stay active to maintain his weight loss. To reach this goal, he tried out for the football team. His cousin and older brother, who also played football, provided emotional support to Alex during tryouts. He also viewed the coach as an important part of his support system; he specifically requested her to call on the day that football tryout results were posted. He proudly reported that he made the team as a linebacker. In the fall, Alex continued to exercise regularly, attending daily football practice for 2 hours. He also committed to cutting back on junk food, and went through an entire week without buying candy. With help from the coach, he used self-talk to avoid the corner store so that he wasn't tempted to buy candy there. As a measure of his success, Alex reported that he only ate only 3 candy bars during the week of Halloween. In late fall, when the football season was ending, he planned to try out for basketball. He reported ongoing weight loss, and loose-fitting clothes.

The use of cognitive restructuring allowed Alex to come up with alternative solutions and resist temptation. He felt pleased with his progress and committed to incorporating healthy changes. Over the course of the program, Alex's BMI decreased from 37 to 35, his body fat decreased from 42% to 33%, his triglycerides decreased from 101 to 68, and his HOMA decreased from 22.8 to 5.6. Alex also reported a notable increase in physical activity

(weekly MET increased from 12 to 105). Alex was coached by 3 coaches over 10 months: 52 calls resulted in 25 coaching sessions, for a total of 167 minutes.

Discussion

The vignettes above, identified through a review of student coaching records, illustrate the six coping skills addressed in telephone health coaching. These included social problem solving, communication skills (both social skills training and assertiveness), stress reduction/management, conflict resolution, and cognitive restructuring. By using these skills to enhance their healthy lifestyle changes, these students were able to maintain or lose weight over the duration of the program.

The health coaching component of the intervention was conceived as a way to individualize students' goals and reinforce healthy lifestyle behaviors. Through this mode of intervention, students began to practice and apply key concepts that they had learned in the classroom component. Conducting health coaching over the telephone added the benefit of regular contact with a health provider to increase the students' accountability and adherence to healthy goals. One of the benefits of health coaching was the ability to address the needs of the students in a more holistic way. For instance, if a student failed to meet his/her goal of eating more fruits/vegetables over several weeks, the coach explored possible barriers with the student. This often led to a student revealing conflicts with family or peers, which could then be addressed by suggesting a goal related to social problem-solving or stress reduction. Similarly, the coaches inquired about students' interests to find ways to incorporate healthy behaviors in culturally appropriate ways. For example, many students reported that they enjoyed dancing, but that they did not consider it to be a form of exercise. When students were encouraged to keep track of time spent dancing, they were then able to meet their activity goals. In accordance with previous research indicating that social support is positively related to youth physical activity (Duncan, Duncan, & Strycker, 2005), coach facilitation of social support systems helped some students reach their goals. In many instances, coaches encouraged students to accompany a family member to the grocery store to select a new fruit or vegetable, or to go for a walk with a friend on the weekend. These examples suggest that health coaching is most effective when it addresses multiple aspects of a child's life. Further, social learning theory predicts that experiencing success in achieving weekly goals is likely to increase students' self-efficacy for healthy behaviors (Bandura, 1986).

A strength of the health coaching component of the intervention was the level and degree of communication between health coaches. Because health coaches rotated approximately every 3 months, issues related to the continuity of student needs and goals were paramount. Cases in which students had particular psychosocial difficulties were discussed in bi-monthly meetings to help coaches manage those difficulties, obtain support, and find resources from the other coaches. The psychosocial support provided by the health coaches to one another was also a significant aspect of intervention management. Clinicians with psychological skills offered specific resources not shared by all the coaches. Conversely, clinicians with nutritional and nursing expertise provided input to those whose training was psychosocially oriented. As a result, the intervention was enhanced by the interdisciplinary nature of the coaching team.

Using the telephone as a means of conducting individual coaching sessions with students has several advantages. First, any population of urban, minority youth is likely to have difficulty attending regular appointments in an office setting (Staudt, 2003). Several barriers to treatment have been identified, including transportation difficulties and a lack of child care for other siblings (Alm et al., 2008; McKay, Stoewe, McCadam, & Gonzales, 1998). By

using the telephone to coach students, many of these barriers were eliminated. The use of the telephone is also natural for teens, who typically spend a significant amount of time on the phone with friends (Lenhart, Madden, & Hitlin, 2005). Despite the popularity of the internet among youth, teens still report that the landline telephone is their preferred method of communication (“Teen Internet Usage,”). Further, students may feel less inhibited on the phone, and provide information that they might not be comfortable sharing in person. Even when the coach was unable to reach a student by phone, he/she may have received the message that the coach was reaching out to him/her. Moreover, the contact with a health coach may have been the most positive contact in a student’s life that day, particularly for those students who were not doing well academically and/or were experiencing family conflict.

While addressing many of these barriers, other issues related to the use of the telephone persisted throughout the coaching process. One of the significant limitations of this method was the lack of nonverbal feedback. As a provider, it was difficult to know how engaged the student was in the session. When a student was quiet, the health coach could not know if the student was listening, or whether he/she was multitasking while on the phone (e.g., watching television, playing on the computer, being distracted by friends or family members in the room). This difficulty required health coaches to make sensitive verbal inquiries regarding the student’s current availability for a coaching call. In addition, unlike an individual counseling session, there was no way to ensure privacy for the student. Frequently, loud background noise suggested a chaotic household, which was not conducive to a coaching session.

Another difficulty encountered was maintaining regular health coaching appointments, even by phone. For example, students’ phone numbers were sometimes out of service (5% of all calls (n = 194) were not in service), making it impossible to coach some students consistently over time. Similarly, some families had only one cellular phone instead of a landline phone. In such cases, coaching sessions could only be conducted when the person with the cell phone (usually the mother) was with the student and could hand the phone to him/her. This problem also led to frequent calls in which the student did not have adequate privacy to talk freely with the coach. If the family member answering the phone was not familiar with the program, he/she also may have been reluctant to give the phone to the student or take a message. In situations where the coach asked a family member to give a message to the student, it was sometimes difficult to know if students were receiving the messages. Providing the family member with enough information to reduce their concerns about the coaching call helped to solve this problem. Although the original plan proposed weekly calls, the average rate of contact was less frequent (an average of one coaching every 2.2 weeks). It often took several attempts to reach the student (only 27% of calls resulted in coaching). Finally, many children temporarily moved to other locations during the summer months, making it particularly difficult to update student contact information during that time.

One limitation of the study was the limited contact with parents. Although coaches occasionally spoke with parents during coaching calls, parents were primarily engaged by the students participating in the study. Involving parents in healthy lifestyle changes may have both a direct effect on children (e.g., preparing healthier foods) and an indirect effect on children, in which children model parents’ healthy behaviors (Davis et al., 2007). Previous research has shown that parent-centered approaches are more successful in achieving and maintaining childhood weight loss than child-centered approaches, suggesting that involvement of parents is critical for success (Golan, Fainaru, & Weizman, 1998).

Implications for Practice

Given the benefits and the challenges of the intervention, several suggestions for others who plan to use similar approaches are described. First, we emphasize the capacity for the coach to maintain flexibility and change strategies as students' needs evolve. Success occurs more often when the coach is able to find an appropriate strategy that fits the student's needs at a specific time. Second, to address problems with reaching the student by phone, it is helpful to include regular check-ins with the student at school. These visits could help to build rapport and aid in determining the best phone number and time to reach the student. In addition, obtaining students' perspective on coaching could help identify barriers to the process. Third, checking in regularly with other members of the family to remind them of the program and its goals also facilitates contact. Fourth, prefacing a coaching call by asking the student if it is a good time to talk gives the student an opportunity to reschedule if there is a lack of privacy, or if they are currently engaged in other activities. This question also conveys that the coaching call is important, and requires the student's attention. Fifth, frequent and positive communication among health coaches is vital to success.

In conclusion, clinicians who wish to use telephone health coaching need to acknowledge and attempt to address the limitations of the method. The vignettes illustrate the importance of addressing students' psychosocial issues before they will be able to make healthy lifestyle behavior changes. While only two of these students lost weight over the time period of the intervention, the majority of the other students maintained their weight, and all of them showed some decrease in clinical indicators of health (e.g., triglycerides, total cholesterol, HOMA). None of these students developed T2DM. In conclusion, these vignettes suggest that coping skills training, reinforced through telephone health coaching, has the potential to promote healthy behavior changes in youth at risk for T2DM.

Acknowledgments

Funding for this study was provided by grant R01 NR008244 from the National Institute of Nursing Research. This publication was made possible also by CTSA Grant Number UL1 RR024139 from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH), and NIH Roadmap for Clinical Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official view of NCRR or NIH.

References

- Alberti G, Zimmet P, Shaw J, Bloomgarden Z, Kaufman F, Silink M. Type 2 diabetes in the young: The evolving epidemic: The international diabetes federation consensus workshop. *Diabetes Care*. 2004; 27:1798–1811. [PubMed: 15220270]
- Alm M, Soroudi N, Wylie-Rosett J, Isasi CR, Suchday S, Rieder J, et al. A qualitative assessment of barriers and facilitators to achieving behavior goals among obese inner-city adolescents in a weight management program. *Diabetes Educator*. 2008; 34(2):277–283. [PubMed: 18375777]
- American Diabetes Association. Type 2 diabetes in children and adolescents. *Diabetes Care*. 2000; 23:381–389. [PubMed: 10868870]
- Astrup A, Finer N. Redefining type 2 diabetes: 'Diabesity' or 'obesity dependent diabetes mellitus'? *Obesity Review*. 2000; 1(2):57–59.
- Bandura, A. *Self-efficacy: The exercise of control*. New York: W. H. Freeman; 1986.
- Bloomgarden ZT. Type 2 diabetes in the young: The evolving epidemic. *Diabetes Care*. 2004; 27:998–1010. [PubMed: 15047665]
- Chen W, Srinivasan SR, Elkasabany A, Berenson GS. Cardiovascular risk factors clustering features of insulin resistance syndrome (syndrome X) in a biracial (black-white) population of children, adolescents, and young adults: The Bogalusa Heart Study. *American Journal of Epidemiology*. 1999; 150:667–674. [PubMed: 10512420]

- Conwell LS, Trost SG, Brown WJ, Batch JA. Indexes of insulin resistance and secretion in obese children and adolescents: A validation study. *Diabetes Care*. 2004; 27(2):314–319. [PubMed: 14747206]
- Davidson M, Penney EA, Muller B, Grey M. Stressors and self-care challenges faced by adolescents living with type 1 diabetes. *Applied Nursing Research*. 2004; 17:72–80. [PubMed: 15154119]
- Davis MM, Gance-Cleveland B, Hassink S, Johnson R, Paradis G, Resnicow K. Recommendations for prevention of childhood obesity. *Pediatrics*. 2007; 120(Suppl 4)
- Duncan SC, Duncan TE, Strycker LA. Sources and types of social support in youth physical activity. *Health Psychology*. 2005; 24:3–10. [PubMed: 15631557]
- Golan M, Fainaru M, Weizman A. Role of behaviour modification in the treatment of childhood obesity with the parents as the exclusive agents of change. *International Journal of Obesity and Related Metabolic Disorders*. 1998; 22:1217–1224. [PubMed: 9877257]
- Goran MI, Ball GD, Cruz ML. Obesity and risk of type 2 diabetes and cardiovascular disease in children and adolescents. *Journal of Clinical Endocrinology and Metabolism*. 2003; 88(4):1417–1427. [PubMed: 12679416]
- Gordon-Larsen P. Obesity-related knowledge, attitudes, and behaviors in obese and non-obese urban Philadelphia female adolescents. *Obesity Reviews*. 2001; 9:112–118.
- Grey M, Berry D, Davidson M, Galasso P, Gustafson E, Melkus G. Preliminary testing of a program to prevent type 2 diabetes among high-risk youth. *Journal of School Health*. 2004; 74(1):10–15. [PubMed: 15022370]
- Grey M, Boland EA, Davidson M, Li J, Tamborlane WV. Coping skills training for youth with diabetes mellitus has long-lasting effects on metabolic control and quality of life. *Journal of Pediatrics*. 2000; 137:107–113. [PubMed: 10891831]
- Grey M, Jaser SS, Holl MG, Jefferson V, Dziura J, Northrup V. A multifaceted school-based intervention to reduce risk for type 2 diabetes in at-risk youth. *Preventive Medicine*. 2009; 49:122–128. [PubMed: 19643125]
- Klein DJ, Friedman LA, Harlan WR, Barton BA, Schreiber GB, Cohen RM, et al. Obesity and the development of insulin resistance and impaired fasting glucose in black and white adolescent girls: A longitudinal study. *Diabetes Care*. 2004; 27(2):378–383. [PubMed: 14747217]
- Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine*. 2002; 346(6):393–403. [PubMed: 11832527]
- Lenhart, A.; Madden, M.; Hitlin, P. Teens forge forward with the internet and other new technologies. Washington, DC: Pew Internet and American Life Project; 2005.
- McKay MM, Stoewe J, McCadam K, Gonzales J. Increasing access to child mental health services for urban children and their caregivers. *Health and Social Work*. 1998; 23(1):9–15. [PubMed: 9522199]
- Ogden CL, Carroll MD, Flegal KM. High Body Mass Index for Age Among US Children and Adolescents, 2003–2006. *JAMA*. 2008; 299(20):2401–2405. [PubMed: 18505949]
- Saelens BE, Sallis JF, Wilfley DE, Patrick K, Cella JA, Buchta R. Behavioral weight control for overweight adolescents initiated in primary care. *Obesity Research*. 2002; 10(1):22–31. [PubMed: 11786598]
- Shafir E. Development and consequences of insulin resistance: Lessons from animals with hyperinsulinaemia. *Diabetes Metabolism*. 1996; 22(2):122–131. [PubMed: 8792092]
- Singh R, Shaw J, Zimmet P. Epidemiology of childhood type 2 diabetes in the developing world. *Pediatric Diabetes*. 2004; 5:154–168. [PubMed: 15450011]
- Spear BA, Barlow SE, Ervin C, Ludwig DS, Saelens BE, Schetzina KE, et al. Recommendations for treatment of child and adolescent overweight and obesity. *Pediatrics*. 2007; 120(Suppl 4)
- Staudt MM. Helping Children Access and Use Services: A Review. *Journal of Child & Family Studies*. 2003; 12(1):49.
- Teen Internet Usage. [Retrieved April 13, 2009]. from <http://www.infoplease.com/science/computers/teen-internet-usage.html>

- Tuomilehto J, Lindstrom J, Eriksson J. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *New England Journal of Medicine*. 2001; 334:1343–1350. [PubMed: 11333990]
- Uwaifo GI, Fallon EM, Chin J, Elberg J, Parikh SJ, Yanovski JA. Indices of insulin action, disposal, and secretion derived from fasting samples and clamps in normal glucose-tolerant black and white children. *Diabetes Care*. 2002; 25(11):2081–2087. [PubMed: 12401760]
- Weiss R, Taksali SE, Tambolane WV, Burget TS, Savoye M, Caprio S. Predictors of change in glucose tolerance status in obese youth. *Diabetes Care*. 2005; 28(4):902–909. [PubMed: 15793193]

Table 1

Coping Skills Training Themes

Skill	Example
Social Problem Solving	Making a plan to deal with hostile peers.
Communication (Assertiveness)	Asking a parent to try a new recipe.
Stress Reduction/Management	Reading and writing in a journal to relax before bedtime.
Conflict Resolution	Addressing a negative situation in a constructive way.
Communication (Social Skills Training)	Role-playing how to handle an argument with a peer.
Cognitive Restructuring	Student says to himself, "I can do this," when presented with a challenge