

Doggone Diabetes: Implementing a Physical Activity Intervention with Therapy Dogs

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Abstract

Purpose: The American Diabetes Association recommends that adults with diabetes participate in at least 150 minutes of exercise weekly, yet most do not achieve this goal. Researchers at a college of nursing explored opportunities to enhance walking in those living with diabetes by integrating therapy dogs into a walking program. Specific objectives included (1) implement a walking program that includes adults living with diabetes or prediabetes walking with therapy dogs and (2) increase and sustain walking activity in study participants to 150 minutes per week.

Methods: This correlational study involved collection of baseline data followed by supervised dog-walking in the community with participants over three months with final measurements obtained at study conclusion. The primary outcome, minutes of walking per week, was tracked by researchers at each walking session and secondary outcomes of weight, body mass index, waist circumference, blood pressure, and heart rate were measured at baseline, once per month, and study conclusion. Haemoglobin A1C was measured at baseline and study conclusion.

Results: This pilot program met considerable opposition in recruitment and implementation due to the pandemic. Walking time increased for participants, and they qualitatively reported they had walked more since joining the study both with therapy dogs and on their own.

Conclusion: Although this pilot program did not yield results as anticipated due to low participant numbers, insight was gained into future studies linking community outreach among people living with chronic conditions and therapy dog programs from those who actively participated.

Keywords: Physical activity; Type 2 diabetes mellitus; Animal assisted interventions; Dog walking

Background and Significance

People living with diabetes mellitus should participate in 150 minutes of moderate to vigorous exercise each week over at least three days per week. The benefits of exercise for people living with diabetes include improved glycaemic control, weight loss, decreased cardiovascular risk, and improved well-being [1,2]. For people with prediabetes, the American Diabetes Association (ADA) also recommends 150 minutes per week of physical activity. Increased physical activity in conjunction with a 5-7% weight loss can prevent development of T2DM in people with prediabetes [3]. While the U.S. obesity rate is approximately 42%, the Centres for Disease Control (CDC) reported that only 52% of Americans get the recommended amount of aerobic activity per week and those percentages decrease as people age [4,5]. For people living with diabetes, studies have consistently indicated low rates of participation in physical activity with rates commonly reported in the 30% range [6-8]. Walking is an ADA recommended exercise and is ideal because it is inexpensive, does not require special equipment or a gym, and is easily accessible to most.

Dog Walking

Dog walking is a proven intervention to increase physical activity in adolescents through adulthood and older adulthood [9-13]. Pet ownership is linked to more walking minutes. A pilot study of 58 self-reported inactive dog owners increased their physical activity after receiving persuasive material regarding dog health and walking [14]. Another study surveyed 391 adults using the Dogs and Walking Survey (DAWGS) and found dog walkers were less likely to be overweight/obese and were more physically active than their non-dog walking counterparts [15]. Even in populations with existing health conditions such as in cancer and ischemic heart disease, those who owned dogs

were more likely to engage in light, physical activity than non-dog owners [16,17]. Having a dog makes participants want to walk more and keeping their dog healthy by walking was a motivating factor.

Most of the structured dog walking studies are geared to dog ownership. Limited research exists regarding interventions geared to dog walking programs not involving pets. There are, however, dog walking programs involving shelter dogs. A university developed a program to walk shelter dogs one day a week during their lunch break. Seven employees participated in the pilot program. Findings indicated engagement and adherence to the program was evident with the shelter dogs and participants were motivated to engage in this physical activity. The study was limited to one day a week over a four-week period and the walk lasted 30 minutes [18]. Another study, focused on veterans and shelter dogs, used a two-group repeated measures cross over design to evaluate the effect of walking a shelter dog compared to walking with other participants and the change in physiological stress markers over the 4-week period [19]. Although this study did not discuss dog walking as a form of physical activity, it did show walking dogs over the four weeks improved stress levels, especially in those with higher levels of PTSD, more so than walking with humans. Both studies

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highlight the important health benefits to walking dogs even without dog ownership.

Social support with physical activity

Social support has been associated with greater participation in physical activity and is an important aspect of weight management [20,21]. Interventions designed to increase activity that also provide social support can be beneficial for managing weight in people living with diabetes. Studies indicate that dogs not only facilitate increases in physical activity, but also provide social support [15]. Dogs, Physical Activity, and Walking (Dogs PAW) was a randomized controlled trial that linked social support and a sense of obligation to the dog through regular walking [22]. In an intervention to increase physical activity, 86 dog owners planned walks through social networking. Of those participants using the social networking site, there was an increase in their daily steps and a perceived positive outcome of dog walking [9]. An integrative review of how dog walking affects physical activity found that walking a dog increased activity and frequency of interactions with other people. The authors suggested that facilitation of social interactions was a strong feature of dog walking programs and interventions should encourage these interactions [23].

Commitment and adherence to physical activity

A dog increases commitment and adherence to a walking program and can result in sustained physical activity over time [24,25]. When one walks with a dog, they have a companion and a sense of obligation to the dog [14,15,22]. A four-year qualitative study regarding perspectives about implementing and sustaining physical activity in people living with type 2 diabetes revealed that walking, especially with a dog, was an achievable and sustainable form of exercise because it offered regular, routine activity and companionship [24].

Dogs and Diabetes

Throughout history, dogs have functioned in a variety of roles to include therapy for various mental health conditions, guides for the visually and hearing impaired, medical response to acute and/or chronic health concerns and improving physical function for the mobility impaired [26,27]. For patients living with diabetes and prediabetes, medical response dogs are gaining in popularity [28], but limited research exists relating to diabetes and other purposes for dogs outside of medical response. Animal assisted therapy (AAT) applies animals as “therapeutic and social agents to improve well-being” [29]. By utilizing dogs trained in AAT, the researchers can explore other methods to increase a dog’s purpose for people living with diabetes.

The ADA recommends participation in supervised exercise programs over non-supervised programs to gain more health benefits [3]. Additionally, research indicates that people living with diabetes who engage in supervised exercise programs are more likely to be compliant with exercise and have better blood glucose control [2,3, 30]. Patients with diabetes could benefit from interventions focusing on dog-walking to increase physical activity [9]. Limited research exists regarding the use of dogs to increase motivation for exercise in people living with diabetes.

Specific Aim and Objectives

The purpose of this study was to increase physical activity among people living with diabetes/prediabetes through a community walking program implemented with animal assisted therapy dogs. Specific objectives of the study included:

1. Implement a walking program that includes adults living with

diabetes or prediabetes walking with dogs from an established animal assisted therapy program.

2. Increase and sustain physical activity (walking) in study participants to 150 minutes per week.

Researchers hypothesized that incorporating AAT dogs into a walking program would serve as a motivator for people living with prediabetes/diabetes to increase physical activity.

Research Design

Sampling Method/Subjects

People living with type 1 or type 2 diabetes or prediabetes from a small university town in the South-eastern United States were recruited for study inclusion. Researchers planned to enroll a minimum of 30 participants. Inclusion criteria for study participation included adults aged 19 and older with a self-reported diagnosis of type 1 or 2 diabetes or prediabetes and the physical ability to participate in exercise as evidenced by an exercise pre-participation screening or physician clearance for exercise. Exclusion criteria for study participation included women with gestational diabetes and those who are physically unable to walk or who have not received physician clearance for exercise.

Measures/Instruments

The primary study outcome, minutes of walking per week, was documented for each participant at the conclusion of walks by undergraduate research assistants. These data were entered into an Excel spreadsheet by study researchers. Secondary study outcomes of weight, body mass index (BMI), waist circumference, blood pressure, and heart rate were measured at baseline, once per month, and study conclusion. Hemoglobin A1C (HA1C) was measured at baseline and study conclusion. The Three Question Physical Activity Assessment (3QPA) was used to determine participants’ baseline participation in exercise. The 3QPA measures the number of incidences of vigorous intensity activity lasting at least 20 minutes and incidences of walking or moderate-intensity activity lasting at least 30 minutes during a usual week. Participants respond with the number of days per week they participate in physical activity. The measure has demonstrated reliability and validity [31].

The ADA states that pre-exercise medical clearance is generally unnecessary for asymptomatic individuals prior to beginning low- or moderate-intensity physical activity not exceeding the demands of brisk walking or everyday living. Some individuals who meet higher risk criteria should be referred to a healthcare provider prior to beginning an exercise program [3]. The Physical Activity Readiness Questionnaire (PAR-Q) was used to identify people who can safely participate in physical activity without obtaining further medical clearance and those higher-risk individuals who should seek medical clearance before beginning an exercise program. Participants responded to seven questions about their health. If a participant answered yes to one or more questions, the participant was asked to contact their health care provider to receive medical clearance before beginning the exercise program. Participants were instructed to notify their primary care physician if they experienced any unexpected injuries or problems during the intervention.

Methods/Data Collection Procedures

Institutional Review Board for human subject and Institutional Animal Care and Use Committee (IACUC) approval by the university was obtained prior to program start. Prior to study advertisement,

walking paths and schedules were determined by researchers. The university has designated walking paths and trails and is a pedestrian-friendly campus. Walking schedules included various times and locations on and around campus during the work week to accommodate participants' schedules. Research indicates that having convenient exercise settings is a predictor of regular participation in physical activity [32].

Undergraduate research assistants (URA) from the college of nursing and other health profession programs on campus were recruited to assist with the project. These URA were trained on study protocols and educated about hypoglycaemia signs and symptoms and trained to respond to hypoglycaemia. Study participants were recruited using multiple advertising methods including the weekly campus newsletter that is emailed to all faculty and students; campus medical clinic, employee pharmacy and wellness centre; nursing website, Facebook and Twitter pages; university weekly newspaper; local community newspaper; and flyers placed in physicians' offices and across campus.

Participants were enrolled on a rolling basis. Those interested in participating met with researchers in the college of nursing to obtain informed consent and baseline measurements. The PAR-Q was administered to determine readiness for exercise. Walking schedules were distributed at this time.

Researchers and/or URA met participants at the designated walking location with dogs ten minutes prior to walk start time. Snacks and water were available for each participant. Participants were monitored for signs and symptoms of hypoglycaemia throughout and immediately following the walk. Participants walked at their own pace with dogs, researchers and/or URA. At the conclusion of the walk, walking times were documented and participants were encouraged to attend the next scheduled walk.

Participants met monthly with researchers to obtain weight, body mass index, waist circumference, blood pressure, and heart rate. Researchers and participants reviewed monthly activity to identify trends and problem-solve for ways to increase activity in those not meeting weekly activity goals. Scheduled walking was planned for a six-month time, but due to difficulties described below, was decreased to three months. Following intervention conclusion, researchers planned to examine number of minutes of weekly activity from study beginning to study end; differences in activity level and HA1C values; and changes in weight, BMI, waist circumference, blood pressure, and heart rate.

Results

A total of seven participants were recruited for the study after multiple attempts to increase enrolment including placing additional advertisements in the local newspaper and physician offices and asking enrolled participants to refer other potential participants. Participant demographics included three males and four females ranging in age from 53 to 78. Five of the participants were Caucasian and two were African American. All had type 2 diabetes mellitus, and most had been diagnosed for eight years or more. The average body mass index for participants was 33 with an average waist circumference of 47. All participants were on oral medications for diabetes and the average HA1C was 6.8. Only two participants stated they currently walked with a dog and six of the seven stated they currently walked less than 150 minutes per week.

Of the seven participants, only five actively participated in walks. These five met regularly with the research team for planned walks and all increased their walking time over the three-month period. Only

three of the enrolled seven participants participated in the final data collection. Due to the small sample size, researchers were unable to complete the planned statistical analyses; however of the three who completed all data collection points, two decreased HA1C from greater than 7 to less than 7 and the third maintained at less than 7. Qualitative questions were asked of the three participants who completed the final data collection to gain insights into methods for improving the study. Participants reported their motivation to enter the study was to improve their health and increase physical activity. They identified both the dogs and undergraduate research assistants as motivators to walk. They all reported that they had increased their weekly physical activity because of the walking program and had benefited from the walking and socialization with others. When asked what could have been done differently, participants stated implementing the study at a different time of year would have been better since the weather impacted several of the walks and offering more flexibility in walking times to accommodate schedules. Regarding ways to improve recruitment, participants did not offer any suggestions that were not implemented by the researchers to promote enrollment, but they did note that the pandemic likely affected people's willingness to join the study.

Discussion

Implementing Research during COVID-19

The COVID-19 pandemic affected research implementation as institutions of higher education limited in-person activities, research, and training. This research study was significantly stalled due to the pandemic. Researchers originally planned to begin the study in March of 2020, but due to the pandemic, the university moved to remote operation. Once able to return to campus in the fall of 2020, researchers had to decide if the research should proceed knowing that people with diabetes were at significantly higher risk for COVID-19 complications. Ultimately, the researchers decided that with modifications to the study protocol that would ensure safety for all participants, investigators, and undergraduate research assistants, the study could be safely implemented. The institutional review board was informed of modifications to the protocol and after receiving approval, the study began in February 2021.

Researchers were unable to recruit the desired sample size for the study. Recruitment strategies included distribution of flyers to local primary care offices, endocrinology physician offices, and the diabetes education centre; multiple advertisements in the local newspaper; and snowball recruitment through enrolled participants. Because the study was implemented when COVID-19 was still very prevalent and before the vaccination was widely available, researchers hypothesized that the small sample size was due to people with diabetes not being comfortable being out among other people due to the complications associated with COVID-19 in people with diabetes. The participants who completed the final data collection qualitatively reported that this was a potential concern for them as well, but because the study was outside, they felt comfortable participating.

Student Involvement

Undergraduate nursing students, pre-nursing students, and students enrolled in the animal assisted therapy elective course were recruited to participate in the Doggone Diabetes program. Including students provided them the opportunity to engage with participants and dogs and enabled researchers to offer more walking opportunities for the study. Faculty determined recruitment of students would yield many dedicated students based on similar research findings. Recruitment efforts were successful, and 29 students attended the

mandatory training session for the study. Although recruitment was successful, retaining students was not. By the study conclusion, only eight students were participating in the regular walks and data collection. The majority of students did not provide a rationale for their lack of involvement, but some students stated previous work requirements, course load, and conflicting clinical rotations as reasons to leave the program.

All CDC and university safety protocols were followed during implementation of the study. During the study period, some student workers tested positive for or were placed in quarantine after contact with COVID-19 due to exposure outside the study setting. This resulted in a two-week quarantine which limited the number available for walking sessions. Researchers filled some of these scheduling gaps and other students signed up for additional walking sessions. It is important to note that no participants tested positive for COVID-19 during the study period.

Logistical Considerations

The logistics of the walks created some issues. Walks were scheduled for morning (pre-working hours), lunchtime, and afternoon (after working hours) around campus and surrounding areas. Although these times were established to prevent conflicts with work schedules, some participants stated they didn't have time to get to work after completing the walk or their lunchtime was too short to be able to walk and get back to work on time. Getting the dogs to the predetermined walking path was another challenge. The students assigned to the walk were in charge of transportation of canines to the walks outside of campus. Transportation to certain sites became problematic because some undergraduate research assistants relied on public transportation and could not take the canines. Therefore, faculty switched to only offering walks in the general area of the college of nursing.

Three dogs are part of the college of nursing AAT program. Each dog was included in the Doggone Diabetes program, however not all the dogs were scheduled for each walk due to the number of walking sessions per day. Two issues related to walking speed arose during the intervention phase. First, participants had varying walking speeds and endurance and often when only one dog was scheduled for a session, some participants were left not walking with a dog. Second, the dogs also had varying walking speeds and endurance. Some dogs scheduled could not keep up with the participants and again left some participants walking without a dog. Having more dogs of varying abilities would allow for more opportunities for community participants to walk alongside a dog.

Weather was also a factor with the scheduled walking times. The Doggone Diabetes program began in the winter; many morning walks were cancelled due to below freezing temperatures or wind chills. As the program continued through the spring, spring showers and thunderstorms were present. Researchers had initially planned to utilize indoor walking trails but because of COVID-19 concerns during the intervention stage of the program, only outdoor walks were implemented. The original plan was to implement the study beginning in March which would have been a better time of year to begin, but because the pandemic delayed start of the study for almost a full year, researchers wanted to begin as soon as possible.

Conclusion

Literature supports implementation of dog walking as an effective strategy to enhance physical activity. This study implemented a novel approach to improve physical activity among people living with diabetes. The study was implemented in a safe manner related to

COVID-19, but researchers had difficulty recruiting, possibly because of the higher morbidity and mortality rates among people living with diabetes. Participants reported increased walking as a result of study participation. Future research studies should explore recruitment strategies to enroll a larger and more robust sample to examine dog walking as a strategy to improve physical activity among people living with diabetes.

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