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Willingness to pay for a telemedicine-delivered healthy lifestyle programme

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Abstract

Introduction: Effective weight-management interventions require frequent interactions with specialised multidisciplinary teams of medical, nutritional and behavioural experts to enact behavioural change. However, barriers that exist in rural areas, such as transportation and a lack of specialised services, can prevent patients from receiving quality care.
Methods: We recruited patients from the Dartmouth-Hitchcock Weight & Wellness Center into a single-arm, non-randomised study of a remotely delivered 16-week evidence-based healthy lifestyle programme. Every 4 weeks, participants completed surveys that included their willingness to pay for services like those experienced in the intervention. A two-item Willingness-to-Pay survey was administered to participants asking about their willingness to trade their face-to-face visits for videoconference visits based on commute and copay.
Results: Overall, those with a travel duration of 31–45 min had a greater willingness to trade in-person visits for telehealth than any other group. Participants who had a travel duration less than 15 min, 16–30 min and 46–60 min experienced a positive trend in willingness to have telehealth visits until Week 8, where there was a general negative trend in willingness to trade in-person visits for virtual. Participants believed that telemedicine was useful and helpful.
Conclusions: In rural areas where patients travel 30–45 min a telemedicine-delivered, intensive weight-loss intervention may be a well-received and cost-effective way for both patients and the clinical care team to connect.

Keywords

Obesity, telemedicine, rural, weight loss, feasibility, economics, telehealth

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Introduction

Obesity is a costly and preventable disease that affects 42.4% of Americans[1] with a significantly higher prevalence among adults living in rural counties.[2] Effective weight-management interventions require frequent interactions with specialised multidisciplinary teams of medical, nutritional and behavioural experts to enact behavioural change[3]; however, this becomes difficult in rural areas as barriers, such as transportation and a lack of specialised services,[4] can prevent patients from receiving quality care. High direct and indirect costs for the patient and system can arise from these travel burdens. Intangible opportunity costs include a patient's travel time to specialised clinics, in addition to direct costs of gasoline and lost wages from taking time off. Telemedicine, two-way live videoconferencing, has the potential to reduce these costs for rural patients, and mobile healthcare (mHealth) has the potential to enact behavioural change and have an impact on patient, provider and community engagement through bi-directional feedback.

Current literature on telemedicine is sparse with the majority of studies looking at the feasibility of remote

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healthcare. To the best of our knowledge, few trials have explored the patient's willingness to pay for telemedicine and even fewer have explored willingness to pay in the context of rural obesity management. Outside of rural obesity management, the current literature offers a favourable outlook on paying for telemedicine. A German study attempted to determine who is more likely to undergo online treatment and found willingness to pay for telemedicine is partly influenced by monthly net income and education level.[5] Another study found that patients with a history of psoriasis or melanoma were willing to pay a median out-of-pocket cost of US$25 for a telehealth visit if it meant faster access to dermatological care.[6] Lastly, a study attempting to quantify consumer demand indicated representative US households were willing to pay between US$4 and US$7 per month for the ability to receive diagnosis, treatment, monitoring and consultations remotely, with patients living more than 20 mi away willing to pay a greater amount for telecare.[7] The purpose of this manuscript is to present preliminary findings on how willing rural adult patients are to pay for remote healthcare delivery in a weight-management programme.

Methods

Study design and setting

A single-arm, non-randomised pilot study enrolled participants attending the Dartmouth-Hitchcock (D-H) Weight & Wellness Center between November 2017 and September 2018. D-H is a 396-bed hospital located in Lebanon, NH, on the New Hampshire and Vermont border in Grafton County, serving over 1.5 million persons in the region. According to the 2010 census, the region's classification was rural, with 65% of persons living in a health professional shortage or medically underserved area.[8] The Weight & Wellness Center, established in 2016, is staffed by three physicians, an advanced practice registered nurse, a behavioural psychologist, a registered nurse exercise specialist, two health coaches, two registered dietitians and administrative staff. During this study period, the centre evaluated 385 new consultations for adult obesity management. The Committee for the Protection of Human Subjects at Dartmouth College approved the study, and the clinical trial was registered with clinicaltrials.gov (NCT03309787).

Intervention description

The healthy lifestyle programme consisted of a 16-week curriculum based on the previously described Diabetes Prevention Programme[9] that focused on health-behaviour change (mindfulness, movement, problem-solving and nutrition) delivered by a health coach, a registered dietitian, and a nurse exercise specialist. Patients are referred from their primary care providers and complete an initial comprehensive multidisciplinary intake form before entering the programme, where they have the option of participating in up to 15-20 weekly coaching visits, either individually (1:1) or in a group. For this study, participants had the opportunity, after their initial evaluation, to complete 30-min, individual, 1:1 remote coaching visits via telemedicine in place of in-person care. Patients who did not consent to the study received regular clinical care while every patient who consented to be in the study received the intervention treatment. The structure of the remote programme paralleled on-site routine care. Participants who consented to the study also wore a fitness device, either a Dartmouth College designed Amulet,[10] a Fitbit (San Francisco, CA) or both to track their physical activity. These wearables were embedded as part of a separate research study.

Telemedicine delivery

The D-H Center for Telehealth has an extensive infrastructure to support clinical initiatives within D-H and provided logistical and technical support for this project. All staff participated in on-site training sessions to ensure familiarity with the telehealth platform. Live mock sessions, and ongoing on-site support were provided by the research assistant (RA) and by a Center for Telehealth staff. All communications came through HIPAA (Health Insurance Portability and Accountability Act)-compliant *Vidyo* software. Coaching sessions took place in a private clinical area. An encrypted Samsung Galaxy Tab A 10.1 tablet (Seoul, South Korea), given to each participant for the home-based intervention with the same software, allowed them to interact with study personnel.

Study procedures

Selection criteria and study procedures were previously described.[9] New patients were approached by the treating clinician and introduced to the study. If interested, the RA provided additional information and obtained informed consent. On-site objective assessments included a 6-min walk test, a 30-s sit-to-stand test, a grip strength test and a bioelectrical impedance analysis scan, all of which occurred at baseline and at 16 weeks. Subjective assessments began 4 weeks into the study and occurred in 4-week intervals until Week 16. A two-item Willingness-to-Pay survey asked participants about their willingness to trade their face-to-face visits for videoconference visits based on commute time and copay/cost for medical services. The first question asked participants at

what point they would trade face-to-face visits for specified commute times (options included 0–15 min, 16–30 min, 31–45 min, 46–60 min and ≥60 min). The second item asked participants whether they would be willing to engage in a telehealth visit with an upfront copay (options included US$0–10, US$11–20, US$21–30, US $31–40, US$41–50, and ≥US$50). Lastly, a 1:1 structured exit-interview conducted by the senior author at the end of the study gauged the participant's impressions of the overall programme and of the utility of telemedicine for a health coaching programme. All received a US $20 incentive at each in-person outcome assessment.

Statistical analysis

We combined all data into a single dataset for analysis with continuous variables expressed as mean ± standard deviation and categorical variables as counts (percent). Unpaired *t*-tests and chi-square tests assessed differences between baseline and follow-up. Our primary outcome was willingness to pay, assessed by the two aforementioned questions. The outcomes of these questions dichotomised at <30 min, and <US$30, respectively. A repeated measures analysis of variance assessed the change in willingness to pay over time. We captured survey data using REDCap (Vanderbilt University, Nashville, TN, USA). All data were analysed using STATA version 14 (College Station, TX). A p-value <0.05 was considered statistically significant. Interview data were digitally audio-recorded and transcribed by a commercial transcription programme and analysed using Dedoose (Hermose Beach, CA). Topics were grouped and presented in aggregate.

Results

Overall, 27 participants completed the study with a mean age of 46.1±12.3 years (88.9% female). Participants indicated favourable satisfaction on a 5-point Likert scale, with higher scores indicating higher satisfaction with the programme (4.7±0.48), and that they would recommend telemedicine visits to others using the same scale format (4.74±0.45). Table 1 presents data on potential opportunity costs from a patient perspective. Most participants spent half a day travelling to and from the medical centre at both baseline (14 out of 27) and follow-up (17 out of 27), which was statistically significant ($p = 0.001$). Individuals felt they spent more at follow-up, and more were willing to pay for a copay for telemedicine at follow-up. Some 41.5% of participants spent over $US100 on travel costs, childcare, meals and lost wages to visit their provider ($p < 0.001$). At the end of 16 weeks, 69% reported that they would be willing to pay US$30 or less for a telemedicine visit compared to 58% at baseline ($p = 0.003$).

Figure 1 presents the trends of participants willing to trade their in-person visits for telemedicine visits throughout the study based on travel time. Those with a travel duration of 31–45 min had a greater willingness to trade in-person visits for telehealth than any other group. Participants who had a travel duration less than 15 min, 16–30 min and 46–60 min experienced a positive trend in willingness to have telehealth visits until Week 8, where there was a general negative trend in willingness to trade for in-person visits (overall $p = 0.24$). Figure 2 shows that most were willing to consider telemedicine if their commute exceeded 30 min. However, the trends exhibited in Figure 2 were non-significant ($p = 0.15$) over time.

A copay that did not exceed US$30 was more acceptable than a higher copay amount for participants. While there were trends over the 16-week intervention in their willingness to pay, they were non-significant (data not shown). We found no difference at baseline or follow-up as to whether miles from the medical centre had an impact on one's willingness to pay for a telemedicine visit.

Table 1. Patient satisfaction and willingness to pay.

Question	Answers	Baseline	Follow-up	*p*-value
How much time, including travel, does it take from your day to travel to Dartmouth-Hitchcock for an in-person visit with your provider?	Full day	2 (6.5)	2 (6.9)	0.001
	Half day	14 (45.2)	17 (58.6)	
	Few hours	8 (25.8)	6 (20.7)	
	Minimal time	7 (22.6)	4 (13.8)	
How much money might you spend on things like gas, meals, childcare, lost wages to travel to Dartmouth-Hitchcock for an in-person visit with your provider?	<US$50	15 (48.3)	14 (48.3)	<0.001
	US$50–99	8 (25.8)	3 (10.3)	
	US$100–149	5 (16.1)	10 (34.5)	
	US$150–199	1 (3.2)	1 (3.5)	
	US$200+	2 (6.5)	1 (3.5)	
Would you be willing to pay a copay for a telemedicine appointment if not covered by insurance?	<US$50	5 (16.1)	3 (10.3)	0.003
	<US$30	18 (58.1)	20 (69.0)	
	No	8 (28.8)	6 (20.7)	

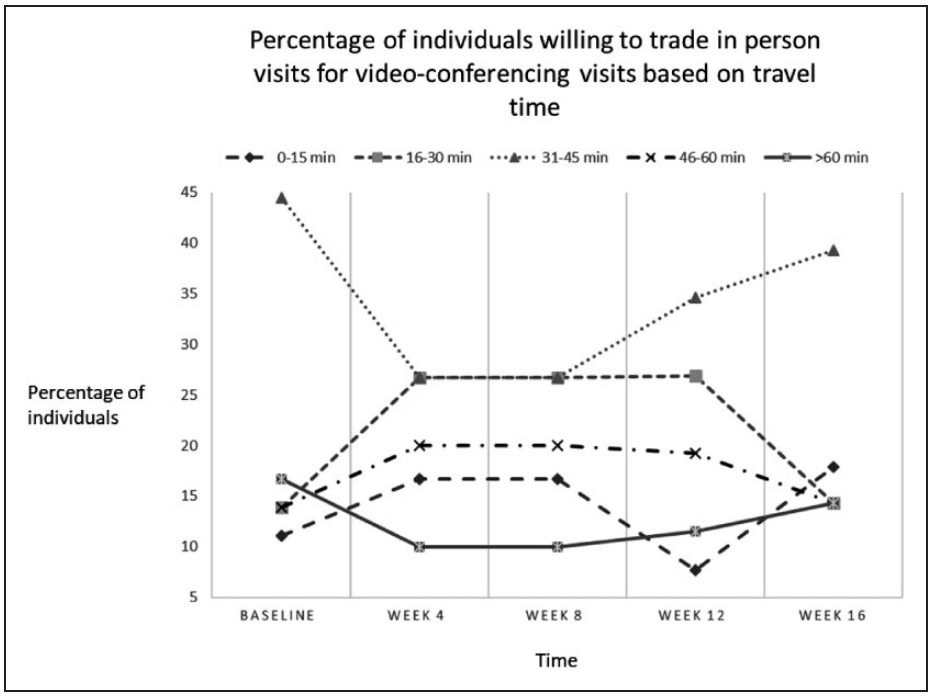

Figure 1. Willingness to trade in-person visit based on travel time.
Figure 1 indicates how willing participants are to trade their in-person visits for remote visits based on different commute times over the duration of 16 weeks. Participants were asked at what point they would trade face-to-face visits for specified commute times (0–15 min, 16–30 min, 31–45 min, 46–60 min, >60 min)

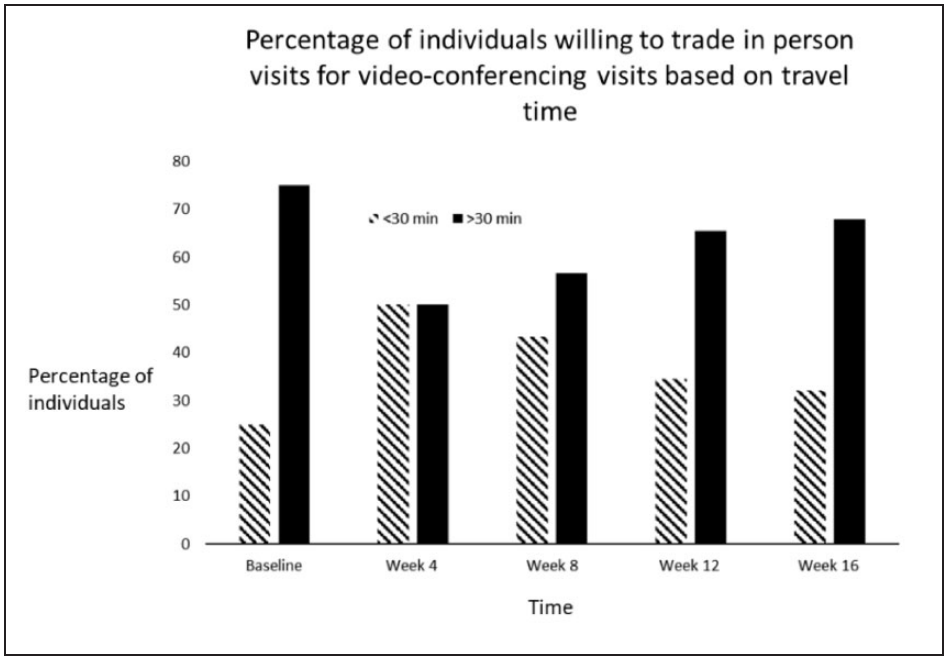

Figure 2. Willingness to trade in-person for telemedicine – travel time.
Figure 2 indicates the percentage of individuals who are willing to trade in-person visits for videoconferencing based on travel time being greater than or less than 30 min over the duration of the 16 weeks. Participants were asked at what point they would trade face-to-face visits for specified commute times (<30 min vs. >30 min).

Table 2. Representative quotes by participants using telemedicine.

Theme	Representative quote
Flexibility ($n = 13$)	You can be in your pyjamas if you want to and do it [telemedicine]
	Being able to be where I wanted to be or where I had to be. It made it work for me. You are not fighting traffic or rushing to get to an appointment
Cost savings ($n = 10$)	We are a one-income family. It puts a lot of pressure for me to make it work
	It is nice it is at a cost I could afford
Time savings ($n = 19$)	I did not need to take time off from work in the middle of the day to come in for an appointment
	Not having to lose work time, family time, all of that
Travelling ($n = 12$)	The once a week drive up there [Dartmouth] plus the doctor's appointment, I mean, that is a lot of driving
	It was nice to be able to be at home, not have to worry about driving an hour and a half to get here

Counts in brackets indicate the number of respondents identifying such themes

Table 2 describes select representative quotes from the exit interviews regarding the impact of telemedicine in the current study. Participants generally believed that this modality was productive and helpful and that it led to reduced travel and expenses, flexibility and cost savings for their family and work.

Discussion

This study represents a unique assessment of patients' willingness to pay for specialised obesity medicine care using a multidisciplinary team approach. Participants were highly satisfied with their telemedicine visits, and distance travelled to medical appointments had an impact on patients' willingness to pay for such visits. These results suggest that this delivery modality may help overcome barriers to delivering the frequency and intensity necessary for obesity medicine in a rural population.

The current study provides preliminary but cautious support for the use of a remotely delivered intensive lifestyle programme in a rural setting. Specifically, the results highlighted that having to drive for a duration of 31–45 min might be the 'tipping point' where patients consider remote in place of in-person visits. The findings from in-person interviews indicated that the majority of participants felt the convenience and time savings were beneficial. In rural areas, it is not uncommon to drive such distances, and access to public transportation is limited.[11] Delivering care via telemedicine not only reduces driving time for patients but also lessens work-related absences and travel-associated costs. Obesity is a chronic disease and requires long-term, frequent communication between a patient and their care team for successful management.[12] A telemedicine design can foster frequent communication and provide such treatment. Future, adequately powered studies should evaluate the impact of telemedicine on these elements and in other rural settings.

Based on the results supporting distance trade-offs and how much patients would be willing to spend on videoconferencing, the data suggest that clinics may be able to recoup costs. In fee-for-service environments, health coaches and nurses are currently unable to bill for their services in our model, while dietitians can bill if they fulfil Medicare criteria for locality.[13] Our results paralleled others who have demonstrated patient participant willingness-to-pay for weight-loss interventions using technology. For instance, Donelan[14] found that at Massachusetts General Hospital, participants were willing to pay a copay of up to US$50, mainly if they lived at a distance. This pay-versus-travel observation can also be seen in a study of participants with psoriasis or melanoma using telemedicine.[6] The observed cost participants would be willing to pay in our study was lower, and may reflect the different average socioeconomic status of patients residing in rural New Hampshire.[15] Our pilot results highlight that both distance and time spent travelling play critical roles in a patient's willingness to pay.

The amounts observed with regard to willingness to pay for telehealth differ slightly than in other clinical arenas.[7] In southeast Nigeria, participants were willing to pay ~US$2.04 per primary care visit,[16] a price that is only affordable to families with higher socioeconomic standing. In Australia, where healthcare is available to all citizens, participants indicated a willingness to pay up to US$1.18 to change their visit from a general practitioner to a teledermoscopy visit, US$43 for a dermatologist to review their results, and US$117 to increase the chance of detecting melanoma if it was present.[17] Literature suggests that patients who are more willing to pay for telemedicine come from higher socioeconomic backrounds.[5,7, 16] These findings are in contrast to participants facing various health issues that frequently travel to remote destinations. In rural regions, they would be willing to pay US$50 to receive telecare while traveling[15] for routine care, health advice while abroad, or medical support while on expeditions. These findings differ considerably from our own participants

who were less likely to pay for a visit if the copay was US$50.

While we were successful at gathering data throughout this study, a more prolonged study is probably needed to fully reflect a patient's willingness to pay for telemedicine services. Such surveys are limited as they measure only what patients' claim they would be willing to pay and are reliant on patient understanding of what they are currently paying for services. Estimated values might be more reflective of what they would like to pay for the service versus what they might actually pay. The current sample size was small and there was no control group; a larger randomised control trial could better answer such questions. Furthermore, the cohort was at risk of self-selection bias, as they may have been willing to experiment with telemedicine over traditional in-person visits; hence, they may be more willing to pay for a telemedicine option than those who did not consent to our study. This, though, is in line with our pragmatic strategy of conducting a study within the clinical infrastructure. Strengths include acceptability and high satisfaction feedback from rural adult participants. Performing an economic analysis of telehealth for future studies is crucial to enabling the translation into both future practice and policy initiatives. As most participants spent over half the day travelling to and from medical appointments, more were willing at the study's conclusion, to trade in-person for telehealth visits. Importantly, these findings suggest that a rural population with obesity can be engaged and could potentially benefit financially from a telemedicine intervention, through time and gasoline saved without sacrificing programme satisfaction.

Conclusion

Our results found that the telemedicine-based obesity management programme demonstrated high willingness-to-pay over in-person visits. Future studies should increase the sample size and the intervention time to accurately gauge patients' willingness to pay over a greater amount of time.

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This study was approved by the Committee for the Protection of Human Subjects #30240. All participants gave informed consent. The authors approve publication if accepted. The data that support the findings of this study are available from Dartmouth-Hitchcock but restrictions apply to the availability of these data, which were used under licence for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with the permission of Dartmouth-Hitchcock.

Declaration of Conflicting Interests

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