

Multidisciplinary Pediatric Obesity Clinic via Telemedicine Within the Los Angeles Metropolitan Area: Lessons Learned

Clinical Pediatrics
1–9
© The Author(s) 2015
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0009922815594359
cpj.sagepub.com


Wendy Slusser, MD, MS^{1,2}, Margaret Whitley, MPH³,
Nilufar Izadpanah, BS⁴, Sion L. Kim, BS¹, and Don Ponturo¹

Abstract

Telemedicine has been shown to be effective for rural populations, but little is reported on pediatric obesity care via telemedicine in urban settings. This study aims to assess feasibility and acceptability of multidisciplinary pediatric obesity care via telemedicine within the same metropolitan area in terms of information technology, coordination, patient care, and clinical outcomes. All project notes and communications were reviewed to extract key lessons from implementation. Patient and Provider Satisfaction Questionnaires were conducted to assess overall satisfaction; baseline and follow-up information were collected from chart reviews to evaluate clinical outcomes. Based on the questionnaires, 93% of responding patients (n = 28) and 88.3% of referring providers (n = 17) felt satisfied with the appointment. Chart review indicated a trend for decreased or stabilized body mass index and blood pressure (n = 32). Implementation of telemedicine for tertiary multidisciplinary pediatric obesity care in urban settings is both feasible and acceptable to patients and health care providers.

Keywords

telemedicine, telehealth, obesity, pediatric, urban, obesity management

Introduction

Why Telemedicine Within an Urban Area?

Multidisciplinary pediatric obesity care is recommended for children and adolescents who do not meet the goal of stabilizing excessive weight gain in the primary care setting.¹ Previous studies utilizing telemedicine to connect patients from rural communities with a multidisciplinary pediatric obesity clinic in university hospitals found it to be not only feasible but also associated with high patient satisfaction^{2–4} and positive patient outcomes measured by stabilization of body mass index (BMI).⁵ Interestingly, many of the same challenges that make it nearly impossible for individuals in rural communities to travel to an urban hospital also exist for low-income city residents in a sprawling and traffic-filled metropolitan area like Los Angeles, California. While obesity disproportionately affects children from low-income families, both in Los Angeles and across the United States,⁶ this very population suffers most from transportation challenges and subsequent delay in medical care.⁷ Lack of regular access to a car,⁸ limited public transportation options,⁹

heavy traffic congestion,¹⁰ high gas prices,¹¹ and expensive parking cost¹² all contribute to making it impractical, if not impossible, for low-income families in Los Angeles to travel from one end of the city to another.

Furthermore, research and our clinicians' anecdotal evidence support the idea that pediatric obesity patients can be reticent to be seen at a big hospital, particularly for weight-related conditions, which are stigmatized¹³ and not always considered a health problem by parents.¹⁴ While large, crowded hospitals can be physically intimidating and bewildering for any first-time visitors, for a large portion of the patient population in Los Angeles county who are nonnative English speakers and mostly monolingual Spanish speakers,¹⁵ language barrier makes

¹UCLA David Geffen School of Medicine, Los Angeles, CA, USA

²UCLA Fielding School Public Health, Los Angeles, CA, USA

³RAND Corporation, Santa Monica, CA, USA

⁴California State University Northridge, CA, USA

Corresponding Author:

Wendy Slusser, 2231 Murphy Hall, Box 951405, Los Angeles, CA 90095-1405, USA.

Email: wslusser@conet.ucla.edu

navigating through a large medical center even more intimidating. In contrast, a metropolitan telemedicine program at a local clinic would allow patients to travel to the familiar location within their vicinity, where the same front desk and medical assistance staff already acquainted with the patient would receive them as usual; in this way, each visit to the multidisciplinary obesity clinic feels much like a regular primary care visit.

Additionally, from the perspective of the pediatric obesity care providers, telemedicine allows a team of clinicians to use their time and space more efficiently. Generally, personnel costs are significant for a multidisciplinary team given that patients are seen by multiple providers during each visit, including a pediatrician, registered dietitian, psychologist, as well as a surgeon if bariatric surgery is being considered. To optimize time and financial resources, these providers should ideally see a continuous flow of patients throughout the duration of clinic. Time not spent on caring for a patient—either because an appointment slot was left open (rarely) or (more commonly) because of a last minute cancellation or no show—represents money and resources wasted. Yet the limited availability of examining rooms in the hospital might mean that not all providers comprising the multidisciplinary team can see patients at any given period. Adding telemedicine patients to the schedule makes better use of such time gaps between in-person appointments, allowing each provider to see more patients. Given that conducting a telemedicine visit typically requires a private room with minimal space for a chair, a laptop, and a cable modem, clinics can also benefit from making use of unused rooms not ideal for seeing in-person patients due to its size.

Considering all the grounds elucidated above, this study aims to explore the feasibility of connecting community- and school-based clinics to a multidisciplinary pediatric obesity telemedicine care located at a children's hospital within the same metropolitan area, with a particular focus on whether this method of care delivery is acceptable to patients and primary care providers. Davis and colleagues² were able to successfully implement telemedicine pediatric obesity care in a school setting. A pilot study for initial scale development of our clinic, the UCLA Fit for Healthy Weight Clinic (Fit Clinic), suggested effectiveness of multidisciplinary tertiary pediatric obesity clinic in stabilizing weight gain and normalizing blood pressures.¹⁶ To our knowledge, the present study adds to the small but growing literature reporting the acceptability of telemedicine care in an urban community. We recognize that the medical community can greatly benefit from information regarding effective implementation of telemedicine within the same geographical confines of an urban setting. The present study aims to evaluate acceptability and feasibility of such patient care

model in terms of information technology, patient coordination, patient care, and clinical outcomes from the 30 months of a pediatric obesity telemedicine clinic.

Materials and Methods

The Fit Clinic has been caring for morbidly obese pediatric patients using traditional in-person ambulatory appointments at a large urban resident-training children's hospital since 2008. During each Fit Clinic visit, patients see a pediatrician, dietitian, psychologist, and in rare cases a surgeon; the team guides families in making healthy lifestyle changes and manages comorbid conditions related to obesity. In order to increase access to the multidisciplinary clinic for low-income underinsured or uninsured pediatric patients, Fit Clinic launched the telemedicine clinic in October 2011. Currently, the telemedicine appointments are conducted between the providers at the UCLA Medical Offices in Westwood and the telemedicine patients at the Los Angeles Unified School District (LAUSD) San Miguel school clinic in South Gate (see Figure 1) and the Venice Family Clinic (VFC) in Santa Monica (see Figure 2), both serving predominantly Latino communities. The Telemedicine Fit Clinic is held once a month at the LAUSD site, and twice a month at the VFC site due to a greater demand in this community.

Between October 2011 and April 2014, we evaluated and managed 62 patients via telemedicine. All telemedicine patients during this period were invited to participate in the evaluation by completing the questionnaires at their initial appointment; parent permission as well as assent from the child were obtained. Parents of patients completed the questionnaire if the patient was too young to comprehend the content. The Patient Satisfaction Questionnaire contained 12 questions assessing satisfaction with the telemedicine appointment, covering topics such as ability of patients and providers to communicate effectively and protection of patient privacy. Response options were "Yes," "No," and "I don't know," and the last question was open-ended. Primary care providers who referred patients and/or provided the initial physical exam and review of labs on the day of telemedicine clinic completed the Provider Satisfaction Questionnaire, which contained 12 items assessing similar domains as those of the Patient Satisfaction Questionnaire. The Provider Questionnaire used a 5-point Likert-type scale for responses, as well as open-ended questions. Twenty-eight patients and 17 providers completed the survey. Both questionnaires were designed specifically for this study; the Patient Satisfaction Questionnaire was also available in Spanish.

Research staff incorporated semistructured qualitative research methods, such as informal interviews, participant

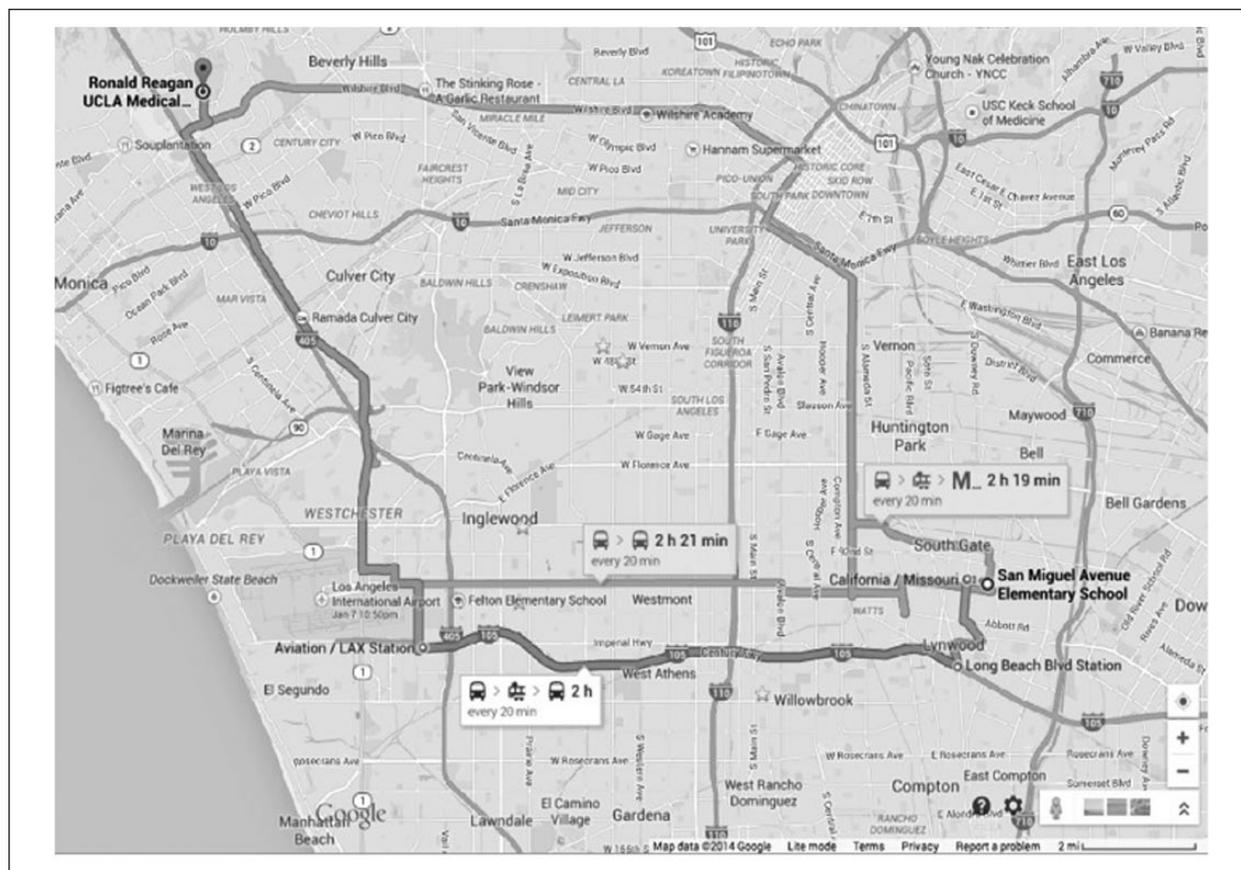


Figure 1. Estimated travel time via public transportation from San Miguel Avenue Elementary School to Ronald Reagan UCLA Medical Center.

observation, and narrative field logs, in an iterative manner with the ultimate goal of recording and extracting lessons from the field notes and communications. Responses on the Patient and Provider Satisfaction Questionnaires were analyzed in both quantitative and qualitative manners to determine further key findings. In order to assess clinical outcomes, baseline and follow-up weight, height, and blood pressure values were collected from chart reviews. BMI was calculated and percentiles determined.

Results

Information Technology

For video telecommunication between patient and provider, the Fit Clinic located at the Ronald Reagan UCLA Medical Center uses Cisco Jabber Video for TelePresence (Movi) software that connects to the Internet through the UCLA Health System telehealth network hub. In terms of hardware, the community clinic site uses a GlobalMedia telemedicine cart, whereas the Fit Clinic and the school clinic site use the Hewlett Packard EliteBook Workstation

8560w laptops with built-in web cameras. We originally planned to use a cart at both satellite sites, but based on the experience of using the telemedicine cart at the community clinic, we concluded the laptop was the preferred option that was easier to store securely and equipped with sufficient functionality for both satellite clinic sites—considering that our patient care consists primarily of counseling and does not require attachments (eg, an otoscope that hooks up to cart).

Implementing telemedicine software at a school clinic also presented initial challenges because the connection had a limited bandwidth and the school firewall blocked access to our telehealth network hub. After many calls with the IT staff at both sites, we eventually used a mobile hotspot purchased through a commercial cellular communications company to connect to the Internet. This enabled us to avoid the firewall and have our own bandwidth. The mobile hotspot turned out to be an affordable (with a discount as a public institution) and effective way to achieve an online connection and provide telemedicine care.

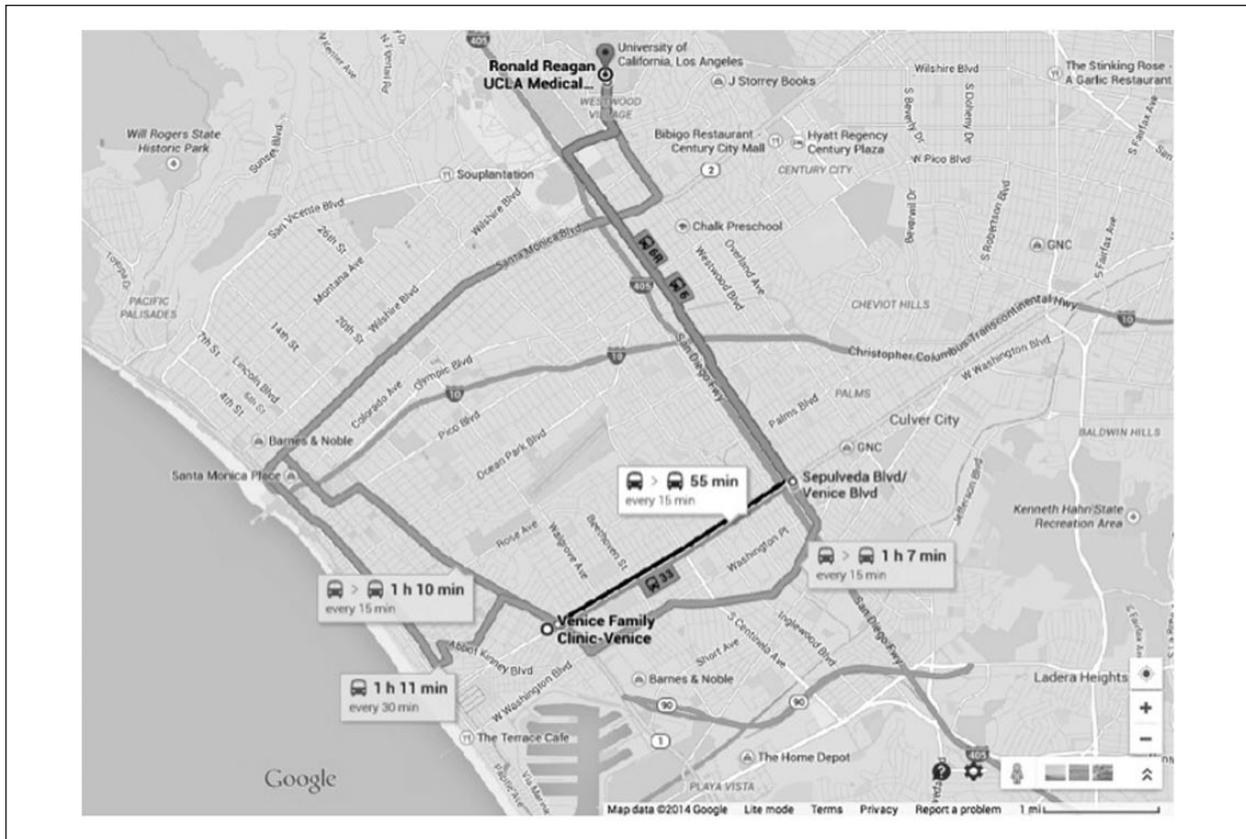


Figure 2. Estimated travel time via public transportation from Venice Family Clinic to Ronald Reagan UCLA Medical Center.

Patient Coordination

In order to maximize clinic efficiency, Fit Clinic providers at the medical center saw both in-person and telemedicine patients on a given clinic day. With one exam room dedicated to telemedicine visits with a laptop set up inside, providers rotated through to provide care to the satellite clinic patients in a manner similar to how they would with in-person patients.

Patient registration and scheduling required careful communication between staff at both sites. Having a designated coordinator present at each site—the satellite clinic and the medical center—during clinic visits was crucial in ensuring effective communication, particularly in regard to notifying when the patient was ready to be seen, assisting families to complete paperwork, and facilitating transfer of clinical documents or laboratory results to the providers at the medical center. Considering that 60.6% of families at the satellite clinics primarily speak Spanish (based on completion of Spanish rather than English patient questionnaire), involvement of bilingual coordination staff and/or an interpreter for the providers who do not speak Spanish also played an essential role in coordinating patient care.

Patient Care

Due to a delay in approval of a Memorandum of Understanding required for telemedicine, Fit Clinic providers initially visited the satellite community clinic in person and provided face-to-face evaluation so as to meet patient care objectives. While this was a viable option for the launching phase given that these providers also happened to have privileges at this particular community clinic, the notion of providers commuting between clinics located across heavily congested metropolitan area for a few patients at a time per site was perceived as cumbersome and impractical for the long term. From the patient care delivery standpoint, this further affirmed the preferred option of telemedicine considering its practicality and convenience in an urban setting.

Patient Satisfaction

Telemedicine Patient Questionnaire responses were collected from 28 patients, the majority of whom were Latino with an average age of 11 years. Of the respondents, 93% felt satisfied with the video appointment overall, whereas the other 7% reported, “I don’t know,”

with 0% responding as unsatisfied. In regard to comparing their telemedicine experience with in-person office visits, 96% of the patients reported that they found the telemedicine appointment to be “easier than going to UCLA to see the specialist,” while the other 4% did not. Furthermore, 89% reported virtual communication with a doctor to be “as good as talking to a doctor in person,” whereas 4% denied so, and 7% reported “I don’t know.” With respect to the quality of communication, 96% felt they could express themselves and their health concerns, while the other 4% reported “I don’t know.” Ninety-two percent felt comfortable talking to their providers through video, while 4% did not feel comfortable and another 4% reported “I don’t know.” Notably, 100% of the patients felt that the providers heard their concerns, and 100% felt that the providers understood their situation. The majority of patients also reported that they felt their privacy was protected (89%), while the other 11% did not know. As for quality of care, 89.0% reported to have received good-quality care and the other 11.0% did not know.

The lowest percentage of the “Yes” response among the 12 questions pertained to the process of making the appointment, for which 82% responded that they found it to be easy, while the other 18% of the patients replied “I don’t know.” This could possibly reflect the fact that some of the patients or parents may not have been directly involved with the appointment-making component of their care for various reasons, including age and the involvement of referring provider and coordinator.

Referring Provider Satisfaction

Among the 17 provider respondents, over half of them were pediatrics residents from a community clinic with very limited experience with telemedicine. Approximately a quarter of the respondents were providers of tertiary pediatric obesity care (1 physician, 2 dietitians, 1 psychologist) with some background in telemedicine care, while a few were school nurse practitioners with limited exposure to telemedicine. Results from the Telemedicine Referring Provider Questionnaire collected at both sites reflected strong satisfaction with the service (see Table 1). Of note, however, only 70.6% found telemedicine appointment to be more convenient for their respective patient than an appointment in person, while the other 29.4% remained neutral. Also, 76.5% reported that there were no technological problems during the appointment, while 11.8% disagreed or strongly disagreed, and the other 11.8% remained neutral. These findings on convenience and technological problems are consistent with the fact that the majority of the providers did not find the referral process and the equipment set-up to be easy.

Less than half (43.8%) reported that it was easy to set up the equipment for the telemedicine appointment, while 6.3% disagreed or strongly disagreed, and 50% remained neutral.

Body Mass Index and Blood Pressure Outcomes

Chart reviews for baseline and follow-up information were conducted for 32 patients with outcome measurements. (Of note, only 28 of 32 patients were able to complete the satisfaction questionnaire due to time constraints and other logistical issues.) While the sample is small, the results reflect a general improvement in clinical outcomes for these patients. Changes over time noted include decreased or stabilized BMI and improvement in blood pressure among prehypertensive or hypertensive patients (see Table 2). Specifically, 82% of telemedicine patients either stabilized or decreased in BMI Z-score at follow-up.

Discussion

Information Technology (IT)

Ensuring strong IT support and frequent updating of protocols proved to be essential, given that implementation of electronic health records or changes in the network can often present unexpected technical issues. A recent article on the experience of the first 120 consultations delivered from a refugee telemedicine clinic in Australia reported that technical issues were faced in 25% of consultations, most frequently sound issues and Internet connection dropouts. Furthermore, this study concluded that a bandwidth of at least 512 kbps and latency of no more than 300 ms were required to conduct a satisfactory multipoint videoconference.¹⁷ In light of such findings, telemedicine projects in the future would benefit from a more thorough assessment of the firewalls in use and the plans for changes to the network prior to installing the equipment. In addition, testing of equipment before providing service helps overcome IT glitches prior to patient care and in turn, ensure a smooth delivery of care.

Patient Coordination

Given that many obesity clinic patients are dealing with comorbidities¹⁸ and other familial and social stressors,¹⁹ availability of an empathetic coordinator with strong interpersonal skills on site and over the phone line to assist with scheduling, answer questions, and provide additional appointment reminders appeared to contribute

Table 1. Telemedicine Referring Provider Questionnaire From Venice Family Clinic Simms Mann and LAUSD San Miguel, Years 1, 2, and 3.

	Strongly Agree or Agree	Neutral	Disagree or Strongly Disagree
I feel satisfied with this telemedicine appointment. (n = 17)	15 (88.3%)	2 (11.8%)	0 (0%)
It was easy to set up the equipment for the telemedicine appointment. (n = 16)	7 (43.8%)	8 (50.0%)	1 (6.3%)
There were no technological problems during the appointment. (n = 17)	13 (76.5%)	2 (11.8%)	2 (11.8%)
For this patient, seeing a specialist via telemedicine was as effective as seeing a specialist in person. (n = 16)	14 (87.5%)	2 (12.5%)	0 (0%)
Having a telemedicine appointment is more convenient for my patient than attending an appointment in person. (n = 17)	12 (70.6%)	5 (29.4%)	0 (0%)
The patient seemed comfortable having a telemedicine appointment. (n = 17)	16 (94.1%)	1 (5.9%)	0 (0%)
I felt like the patients' privacy was being protected in the appointment. (n = 17)	17 (100%)	0 (0%)	0 (0%)
I felt like the specialist listened to what the patient told him/her during the telemedicine appointment. (n = 16)	14 (87.5%)	2 (12.5%)	0 (0%)
I felt like the specialist understood what the patient said during the telemedicine appointment. (n = 15)	14 (93.3%)	1 (6.7%)	0 (0%)
I felt like the patient communicated effectively during the telemedicine appointment. (n = 17)	16 (94.1%)	1 (5.9%)	0 (0%)
The patient received high-quality care in this telemedicine appointment. (n = 17)	16 (94.1%)	1 (5.9%)	0 (0%)
Responses to open-ended question asking "What else can you tell us about your experience during this telemedicine appointment?"			
"As we all get used to this system, things will run much more smoothly and with less wait time for patients families."			
"Having a Spanish-speaking specialist was helpful in conveying information to the patients. Translators were also very helpful in this process." (for Spanish speaking clients)			
"For the first visit the whole process was quite easy and efficient. I feel that it is a great asset for our obese patients and the level of counseling by the dietitian was beyond my own capabilities."			
"It is convenient for families since they cannot always find the transportation into Westwood."			
"Initially there were problems with equipment connections but after that everything went smoothly."			
"Appointments take a long time and are difficult for the parents when they have children under age."			
"Most patients have been showing up for their appointments. Patients leave very happy after appointment."			

greatly in promoting a sense of assurance and accountability among families. This high level of coordination can help reduce no-show rates, thereby increasing efficiency in a clinical setting characterized by multiple providers and staff. Moreover, providing access to a frequently updated and user-friendly website—which includes a description of clinic services, contact information, provider biography, as well as downloadable forms for referrals and other essential paperwork—enables the appointment setup process to be as simple as possible for the patients and their families.

In regard to the findings that the majority of referring providers either remained neutral or expressed difficulty with the referral process, a few modifications may need to be implemented to facilitate the ease of making

referrals. One solution would be to identify a designated person at the community clinic and school site who would coordinate the appointment process. In addition, reminding the physicians at the community and school sites periodically about the process of referral could potentially improve the process. Finally, orienting and providing a copy of the telemedicine protocol patient care manual to all persons involved with the telemedicine clinic could be helpful.

Patient Care and Outcomes

An advantage of providing telemedicine care within an urban area is that the medical center providers can conveniently visit the satellite and school clinic sites to offer

Table 2. Summary Statistics and Clinical Outcomes of Patients Seen at Fit for Healthy Weight Telehealth Clinic at Venice Family Clinic Simms Mann and LAUSD San Miguel, Years 1, 2, and 3.

Summary Statistics (n = 32)	
Sex	47% male; 53% female
Average age	11 years
Average BMI percentile at baseline	98.6th percentile (SD = 1.15)
Changes over time	
Reduction in BMI Z score at follow-up to telemedicine visit	13 patients (40.6%) decreased BMI Z score 13 patients (40.6%) stabilized ^b 6 patients (18.8%) increased
Improvement in blood pressure among prehypertensive or hypertensive patients (n = 4)	Year 2: Of 3 patients with prehypertension or hypertension at a visit, 2 had healthy blood pressure at follow-up visit Year 3: Of 1 patient with prehypertension or hypertension at a visit and follow-up data available, 1 had healthy blood pressure at follow-up visit

Abbreviation: BMI, body mass index.

^bStabilization is defined as maintaining BMI Z score within 0.05 standard deviations at most recent follow-up. Most recent follow-up ranges from 4 months to 24 months after each telemedicine visit.

orientation training and provide care directly if needed, especially during the initial installment phase. Albeit often unexpected, this improvisational development at the inception of the program can result in several positive outcomes, as it did in our study. The physical presence of the providers allows for testing and refining of the patient care and coordination protocols prior to delivering care via telemedicine. Furthermore, initial physical interaction between the medical center providers and the satellite sites can serve as an opportunity to train the community and school clinic staff in preparation of providing tertiary obesity care.

Responses to patient questionnaires suggest that many aspects of the telemedicine appointments, particularly privacy protection and effective communication, were implemented in a satisfactory manner. Given that obesity, especially in childhood and adolescence, can be a sensitive topic for many patients, telemedicine may serve as a secure medium through which those patients could more freely communicate without feeling judged as he or she might have otherwise been if physically surrounded by staff and other patients in the waiting room. Not surprisingly, 96% reported having a video appointment was easier than going to UCLA to see the specialist, consistent with 90% reporting they received good-quality care and 92.3% responding as satisfied with the appointment. These results are comparable to those of a recent study on an acute care pediatric telemedicine service in urban settings, which revealed that the majority of the survey respondents were highly satisfied or satisfied with the neighborhood telemedicine service (97.6%) and reported greater convenience than alternatives (94.5%).²⁰ Exploring these findings further

with respect to how exactly telemedicine experience appealed to our patients may help us ascertain valuable implications toward improving communication and privacy in treating childhood and adolescent obesity patients.

While the present study adds a unique set of insights to the small but growing literature on the effectiveness of pediatric obesity telemedicine care in an urban setting, a number of substantial limitations exist in our study. First of all, this present study was conducted in the setting of an academic hospital partnering with a school-based clinic and a community clinic. Such a backdrop potentially confines certain aspects of the study to reflect the motives, objectives, barriers, resources, and personnel dynamics innate to these particular environments, which may render this study less than ideal for generalizability to diverse settings. Second, although clinical measurements, including BMI Z score and blood pressure, showed promising positive outcomes for this patient care model, limitations in sample size precluded any inferential statistical analysis of the findings. With more clinical data forthcoming given the continual growth of the telemedicine Fit Clinic, future studies may need to carry out extensive statistical analysis for more definitive conclusions.

Third, the present study design is susceptible to conclusions based solely on face validity, in that it relies heavily on internal quality assessment, devoid of a systematic approach to monitoring or enhancing quality. Shaikh et al²¹ reported that implementation of telehealth quality improvement learning network in 7 rural clinics in California resulted in significant improvement in patients' nutrition and physical activity as a result of enhanced clinicians' adherence to

guidelines for childhood obesity prevention. This study demonstrates that use of telehealth technology is not limited to the delivery of care component but can be extended to quality improvement efforts, involving clinician teams to participate in learning sessions and formulate strategies to accelerate improvement in their respective practice. The present study can certainly benefit from a more structured quality monitoring system in order to ensure construct validity in assessment of clinical outcomes.

In conclusion, the present study demonstrates that use of telemedicine allows tertiary multidisciplinary pediatric obesity care to be more accessible not only in rural but also in urban settings. Furthermore, results from this study suggest that the acceptability of telemedicine in multidisciplinary pediatric obesity care is comparable to that of in-person visits from both patient and provider perspectives. The advantages of telemedicine in pediatric obesity care pertain especially to metropolitan residents who face geographic barriers tightly intertwined with socioeconomic factors. Multidisciplinary provider teams also benefit from opportunities to make use of their time and resource more efficiently with telemedicine patient care model. In view of a broader scale application, future studies should further investigate ways to refine the implementation process and to evaluate the outcomes of telemedicine within the same geographical confines of an urban setting.

Acknowledgments

The Fit for Healthy Weight Clinic would like to thank staff at Venice Family Clinic and LAUSD Student Medical Services for their many contributions in implementing telemedicine care. We would also like to thank the UCLA Children's Discovery and Innovation Institute for their invaluable support throughout the process.

Author Contribution

WS did study conception and implementation, protocol development, interpretation of data, manuscript preparation and final approval. MW did study implementation, protocol development, literature search, analysis and interpretation of data, manuscript preparation and final approval. NI did study implementation, protocol development, interpretation of data, manuscript final approval. SLK did literature search, interpretation of data, manuscript preparation, critical revision, and final approval. DP did study conception and implementation, manuscript final approval.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the California Proposition 1D and the UniHealth Foundation, a non-profit philanthropic organization whose mission is to support and facilitate activities that significantly improve the health and well-being of individuals and communities within its service area.

References

1. Barlow S. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007;120:S164-S192.
2. Davis AM, James RL, Boles RE, Goetz LR, Belmont J, Malone B. The use of telemedicine in the treatment of paediatric obesity: feasibility and acceptability. *Matern Child Nutr*. 2011;7:71-79.
3. Irby MB, Boles KA, Jordan C, Skelton JA. TeleFIT: adapting a multidisciplinary, tertiary-care pediatric obesity clinic to rural populations. *Telemed J E Health*. 2012;18:247-249.
4. Mulgrew KW, Shaikh U, Nettiksimmons J. Comparison of parent satisfaction with care for childhood obesity delivered face-to-face and by telemedicine. *Telemed J E Health*. 2011;17:383-387.
5. Shaikh U, Cole SL, Marcin JP, Nesbitt TS. Clinical management and patient outcomes among children and adolescents receiving telemedicine consultations for obesity. *Telemed J E Health*. 2008;14:434-440.
6. Shih M, Dumke KA, Goran MI, Simon PA. The association between community-level economic hardship and childhood obesity prevalence in Los Angeles. *Pediatr Obes*. 2013;8:411-417.
7. Diamant AL, Hays RD, Morales LS, et al. Delays and unmet need for health care among adult primary care patients in a restructured urban public health system. *Am J Public Health*. 2004;94:783-789.
8. Research and Innovative Technology Administration. National Personal Transportation Survey: households. Bureau of Transportation Statistics. http://www.transstats.bts.gov/TableInfo.asp?Table_ID=1037&DB_Short_Name=NPTS&Info_Only=1. Published 1995. Accessed March 4, 2015.
9. Roberto E. Commuting to opportunity: the working poor and commuting in the United States. Transportation Reform Series for the Metropolitan Policy Program at Brookings. http://www.brookings.edu/~media/research/files/reports/2008/3/14%20transportation%20puentes/0314_transportation_puentes.pdf. Published February 2008. Accessed March 4, 2015.
10. Woolsey M. Best and worst cities for commuters. *Forbes*. http://www.forbes.com/2008/04/24/cities-commute-fuel-forbeslife-cx_mw_0424realestate.html. Published April 24, 2008. Accessed March 4, 2015.

11. Lauder TS. Today's average gas prices for the U.S., California and Los Angeles. *Los Angeles Times*. <http://www.latimes.com/business/autos/la-fi-hy-gas-prices-standing-htlmlstory.html>. Accessed March 4, 2015.
12. University of California, Los Angeles (UCLA). Patient parking. UCLA Transportation. <https://main.transportation.ucla.edu/campus-parking/patients>. Accessed March 4, 2015.
13. Zeller MH, Reiter-Purtill J, Ramey C. Negative peer perceptions of obese children in the classroom environment. *Obesity (Silver Spring)*. 2008;16:755-762.
14. Guerrero AD, Slusser WM, Barreto PM, Rosales NF, Kuo AA. Latina mothers' perceptions of healthcare professional weight assessments of preschool-aged children. *Matern Child Health*. 2011;15:1308-1315.
15. US Census Bureau. 2008-2012 American Community Survey 5-year estimates: language spoken at home by ability to speak English for the population 5 years and over. http://www.census.gov/acs/www/data_documentation/2012_release. Published December 17, 2013. Accessed March 4, 2015.
16. Thang C, Whitley M, Izadpanah N, DeUgarte D, Slusser W. Effectiveness of a multidisciplinary tertiary weight management clinic at improving body mass indexes and blood pressures among morbidly obese pediatric patients. Oral presentation at: American Federation for Medical Research Western Regional Meeting; January 26, 2013; Carmel, CA.
17. Schulz TR, Richards M, Gasko H, Lohrey Y, Hibbert ME, Biggs BA. Telehealth: experience of the first 120 consultations delivered from a new refugee telehealth clinic. *Intern Med J*. 2014;44:981-985.
18. Estrada E, Eneli I, Haml S, et al. Children's hospital association consensus statements for comorbidities of childhood obesity. *Child Obes*. 2014;10:304-317.
19. Gundersen C, Mahatmya D, Garasky S, Lohman B. Linking psychosocial stressors and childhood obesity. *Obes Rev*. 2011;12(5):e54-e63.
20. McIntosh S, Cirillo D, Wood N, Dozier AM, Alarie C, McConnochie KM. Patient evaluation of an acute care pediatric telemedicine service in urban neighborhoods. *Telemed J E Health*. 2014;20(12):1-6.
21. Shaikh U, Nettiksimmons J, Joseph JG, Tancredi D, Romano PS. Collaborative practice improvement for childhood obesity in rural clinics: the healthy eating active living telehealth community of practice (HEATLH COP). *Am J Med Qual*. 2014;29:467-475.