The Diffusion of Telehealth in Rural American Indian Communities: A Retrospective Survey of Key Stakeholders

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Abstract

Objective: Mental health issues are a serious concern for many American Indian Veterans, especially for post-traumatic stress disorder and related psychiatric conditions. Yet, acquiring mental health treatment can be a challenge in Native communities where specialized services are largely unavailable. Consequently, telehealth is increasingly being suggested as a way to expand healthcare access on or near reservation lands. In this study, we wanted to understand the factors affecting the diffusion of telehealth clinics that provided mental health care to rural, American Indian Veterans. **Materials and Methods:** We surveyed 39 key personnel and stakeholders who were involved in the decision-making process, technological infrastructure, and implementation of three clinics. Using Roger Everett's Diffusion Theory as a framework, we gathered information about specific tasks, factors hindering progress, and personal reactions to telehealth both before and after implementation. **Results:** Many participants expressed initial concerns about using telehealth; however, most became positive over time. Factors that influenced participants' viewpoint largely included patient and staff feedback and witnessing the fulfillment of a community health need. The use of outside information to support the implementation of the clinics and personal champions also showed considerable influence in the clinics' success. **Conclusion:** The findings presented here address critical gaps in our understanding of telehealth diffusion and inform research strategies regarding the cultural issues and outcomes related to telemental health services. Information contained in this report serves as a long overdue guide for developing telemental health programs and policies among American Indians, specifically, and rural populations in general.

Key words: military medicine, telepsychiatry, telehealth

Introduction

Mental health issues are a serious concern for many American Indian Veterans. According to the American Indian Vietnam Veterans Project (AIVVP), American Indian and Alaska Native Veterans in the western

United States exhibit higher rates of post-traumatic stress disorder (PTSD) and other comorbid psychiatric conditions compared with their White counterparts.¹ PTSD is often a serious and chronic condition which requires ongoing therapeutic and medical intervention. However, acquiring mental health treatment can be a significant challenge in Native communities.² American Indian reservations and trust lands are predominantly located in rural, isolated areas where the average household income falls well below the poverty line.^{2,3} Consequently, the availability of specialized healthcare services is sparse.⁴ The Indian Health Service, which provides most of the healthcare on and near reservation communities, struggles to find physicians^{5,6} and reports significant problems recruiting culturally-competent doctors.⁷

Due to the difficulties of acquiring specialized healthcare, alternative models of service delivery are desperately needed. One growing method of providing mental healthcare to underserved areas is through the use of telemental health services.^{8,9} The Department of Veterans Affairs (VA) offers a series of telemental health clinics serving American Indians with PTSD. The clinics arose, in part, because of the AIVVP research documenting access difficulties to mental health care among Native Veterans. For example, in one community now offering telehealth, the nearest VA facility is a 4 h drive away, proving impractical for acquiring ongoing clinical treatment.¹⁰ Despite the high need for culturally competent mental health services in reservation communities, these clinics are the only such programs specifically targeting treatment for American Indian Veterans with PTSD.

Although there exists growing evidence regarding the validity and effectiveness of telemental health,^{11,12} its acceptance and implementation in rural areas is still quite slow.^{13–15} In its simplest form, Everett Roger's *Diffusion Theory* posits that multiple events interact to facilitate or impede the adoption of new technologies among a specific group. According to Rogers, the diffusion of new technologies occurs in five stages: (1) knowledge: learning about the existence and purpose of the innovation; (2) persuasion: forming an opinion about the utility of the innovation; (3) decision: adopting or rejecting the use of the innovation; (4) implementation: putting the innovation to use, and (5) confirmation: seeking support of the innovation or reversing a previous decision to adopt or reject the new technology.¹⁶ Although other researchers have used the *Diffusion Theory* to examine some aspects of telehealth,^{14,17–19} missing from the literature is a broader understanding about the *process* of telehealth diffusion; specifically, how users' learn about telehealth, why telehealth is selected as a means of care delivery, and at what rate telehealth is adopted in a system.

In this investigation, we attempted to address this gap in knowledge by systematically identifying the factors that affect telemental health diffusion using Everett Roger's five stages of the adoption process. We examined the diffusion of three of the VA-sponsored telehealth clinics for American Indians, each in a slightly different stage of development. The similar structure and shared environment of these programs provided a unique opportunity to understand the impact of telemental health at the individual, programmatic, and organizational level. The value of such information allows us to revise and refine existing clinic structures for greater community adoption, and to implement new clinics with a greater probability of acceptance. This information may further extend beyond reservation communities, leading us to understand the adoption of telemental health in general or for use with multiple diagnostic needs and differing populations.

Materials and Methods

TELEHEALTH CLINICS AND PARTICIPANTS

This study examined the diffusion of three telemental health clinics serving American Indian Veterans. At the time this study was conducted, two of the clinics were fully operational while the third was still in the implementation phase and had not yet begun seeing patients. The clinics are located in the Northern Plains and services include individual and group therapy, medication management, and diagnostic assessment. Currently under the auspices of the VA's Office of Rural Health's *Veterans Rural Health Resource Center-Western Region*, the clinics are collaboratively operated with partners at the University of Colorado Denver's *Centers for American Indian and Alaska Native Health*, local and regional VA medical facilities, the Indian Health Service, and multiple tribal organizations.

We conducted telephone-based interviews with individuals professionally linked to any of the three telemental health clinics. Participants were critical stakeholders and key personnel from the tribal, federal, and state agencies involved with the development and implementation of the clinics and included program administrators, clinicians, technical staff, and veteran representatives. These individuals were identified by the research team before the start of the study. We requested interviews with 48 individuals: 40 (83%) consented and 39 (81%) completed the interview (one dropped out due to scheduling difficulties). Of those that did not consent to an interview, five were current or former medical/associate/mental health directors, one administrative officer, one patient provider, and one minority patient representative. We did not carry out patient interviews for this research project.

APPARATUS AND PROCEDURE

The semistructured interview built upon Rogers' *Diffusion Theory* and examined the five general stages of diffusion (knowledge, persuasion, decision, implementation, and confirmation) that occurred during the clinic development. We asked respondents to describe the local mental health services before telehealth was introduced; the process by which the telehealth was introduced to—and adopted by—their organization; and the acceptance of telehealth by the commu-

nity. Participants were also asked about the "fit" of telehealth within their organization (i.e., whether special measures had to be undertaken to accommodate telehealth); their initial and current impression of telehealth; and initial and continuing problems. The interview consisted of both open-ended and forced-choice questions; we asked follow-up questions depending on the participant's initial response. For example, one question read: "Did you receive information about starting telemental health clinics from external agencies?" If the participant answered "yes," we followed with, "What type of information did you receive?"

We contacted participants with an interview request via e-mail and a follow-up e-mail to nonresponders. Interviews were conducted by a study team member who was not acquainted with the participants. The length of the interview varied, generally lasting between 30 min to an hour. Participants could skip questions for information they did not know or did not want to answer and they were given the option to end the interview at any time. In this study, no participants terminated the interview early and all responses were kept anonymous and confidential. We examined participant responses to the diffusion interview using descriptive analysis and SPSS statistical software.

Several layers of approvals were obtained for this study as respondent affiliations crossed multiple VA networks and outside agencies. We obtained Institutional Review Board approval from our local authority, the Colorado Multiple Institutional Review Board and VA approvals from areas where the study was conducted. Tribal approvals and support were obtained through the tribal councils whose communities were the focus of this research.

Results

As shown in *Table 1*, the majority of respondents were male (80%), White (56%), and worked at the VA (69%). Respondents reported that their knowledge of their local American Indian community and culture averaged about 3.3–3.4 (on scale of 1 [low] to 5 [high]). Using the same rating system, participants' knowledge of the local tribal language scored about 1.5. Native respondents reported a higher degree of knowledge about their community than non-Native respondents.

KNOWLEDGE

Perceived need for services. We examined participants' knowledge of local mental health services and their perception of the community's need for PTSD care. All respondents recognized that PTSD was a problem in their community and, on average, had been aware of PTSD issues for 12 years. Although most respondents reported local options for PTSD treatment almost half (49%) said that the existing services were only "slightly effective" or "completely ineffective." Among these individuals, access, personnel, cultural, and quality concerns were specified as problems with existing services (see *Fig. 1*). One respondent commented that the distance needed to travel to the existing services was impractical for routine, effective care.

Attitudes and education about telehealth. Most participants learned about the establishment of the telehealth clinics from

Table 1. Respondent Characteristics

CHARACTERISTICS	%/X (N, SD)
Age in years (avg.)	53 (6.8)
Gender, %	
Female	20% (8)
Male	80% (31)
Ethnicity	
American Indian	39% (15)
Asian	5% (1)
Hispanic	5% (1)
White	56% (22)
Elder (American Indians only)	53% (8)
Education	
High school/some college	23% (9)
4-Year degree	21% (8)
Grad/MD	56% (22)
Primary employer	
University	10% (4)
VA	69% (27)
his	3% (1)
Tribal	15% (6)
Other	3% (1)
Years of employment (avg.)	21 (17.4)
VA, Department of Veterans Affairs.	

within their organization. Many Respondents initial impression about the telehealth clinic was positive (67%), although several people reported mixed (10%) or skeptical (15%) feelings. When asked to elaborate on these concerns, participants expressed apprehension about patients' acceptance of telehealth, potential

Fig. 1. Problems with existing services.

technological problems, or the therapists' inability to respond to emergency situations.

PERSUASION

We wanted to know what information participants collected to learn more about telehealth and the process by which such information was delivered. Approximately 74% of respondents reported that they received information from other organizations and that this material assisted in the planning and development of the telemental health clinics. A variety of information was accessed; among those most frequently cited were general background information about telehealth, clinical protocols, and contact information/personal contacts. Participants reported that the information they received was very useful at helping them plan and implement the telehealth clinic ("usefulness" rating: 4.6 on a 1 [low] to 5 [high] scale).

DECISION

Participants largely reported that the decision to establish the clinics was made by consensus, with about 21% of respondents reporting some level of disagreement among the decision-makers. The individuals charged with making the decision to implement the clinics primarily did so "because it was their job" in conjunction with the perceived need for mental health services in the community. The average time needed to reach a consensus about using telehealth was 4 months. As shown in *Table 2*, over half of the respondents said they turned to external organizations for information used during the decision-making process, with "support" cited as the primary influence offered by external entities.

IMPLEMENTATION

Necessary tasks, time, and challenges. Once organizations decided to move forward with telehealth, many tasks were necessary

Table 2. Decision-Making Process

FEATURE	%/X (N, SD)
Type of process	
Consensus	72% (28)
Individual decision	10% (4)
Average time to decide (in months)	4 (4.1)
Any disagreement among decision makers	21% (8)
Decision influenced by other factors	54% (21)
Type of Influence	
Financial	5% (2)
Support	23% (9)
Supplementary information	10% (4)

Percentages may exceed 100% due to multiple responses by a single participant.

to implement the clinics such as personnel training (41%), preparing the technological infrastructure (31%), obtaining tribal and community support (28%), patient outreach (21%), preparing the general infrastructure of the clinics (18%), developing a formal clinic protocol (13%), and obtaining funding (13%). The average time to implement the clinics was 11 months. As shown in *Figure 2*, respondents noted many challenges in the clinic implementation process. Among these were staffing issues (39%), setting up the telehealth backbone (31%), obtaining trust and acceptance of the new technology (by staff and patients, 23%), patient transportation (15%), and recruitment (13%). Respondents emphasized the need to instill trust in the Native community and the need to hire on-site staff who were aware of the cultural needs of the community. Nearly a quarter (23%) of respondents spoke about the difficulties working with several organizations. In particular, participants' commented on the complexity of getting all parties to agree to a decision and problems with communication which led to delayed services.

Telehealth fit. We also examined the fit of telemental health within the existing organizational structure. Largely, participants reported that telehealth was easily adopted into the existing infrastructure and complemented other mental health services and technology. Challenges to the fit included the need for additional resources to support telehealth and changes to the existing clinical protocol. Many respondents (46%) further noted that telehealth changed the way their organization interacted with other entities by increasing interactions with local tribes, community members, and the Indian Health Service.

Attitudes after implementation. Over time, ambivalence and skepticism toward telehealth softened with the majority of respondents reporting positive feelings about using telehealth. For those with initial misgivings, respondent attitudes changed due to hands-on experience and positive feedback patients and other staff. Many respondents reported that individuals within their organization convinced them to support the telehealth clinic or at least "give it a try" (*Table 3*).

Fig. 2. Challenges to implementing telehealth clinics.

Table 3. Impression of Telehealth	
FEATURE	% (N)
Initial impression of telehealth	
Positive	67% (26)
Neutral	8% (3)
Mixed	10% (4)
Skeptical	15% (6)
Concerns (prior to implementing)	
Acceptance	8% (3)
Emergencies	5% (2)
Technology	8% (3)
Current impression of telehealth	
Positive	82% (32)
Neutral	10% (4)
Mixed	3% (1)
Reason for changing opinion	
Feedback	13% (5)
Experience	8% (3)
Percentages may exceed 100% due to multiple responses by a single participant.	

CONFIRMATION (ESTABLISHED CLINICS)

Over half of respondents (64%) reported that the clinics felt like a regular part of services offered by their organization, noting that it took an average of 8 months to feel routine. Patients reported that factors such as patient trust, stable personnel, and routine operations made the clinics feel established. When we asked respondents what worked well in creating the clinics, they reported features such as interorganizational cooperation, patient and staff acceptance, the role of the telehealth outreach worker (TOW), and the meeting community needs. Almost all participants (90%) reported that they received feedback about the clinics once they were up and running. The source of the feedback came from patients and other staff members, was a blend of positive and negative comments, and half of the respondents reported that the feedback was used to modify the existing telehealth services.

As seen in *Table 4*, many respondents helped us to identify remaining challenges for the telehealth services. Several people reported that patient transportation remained problematic, in addition to ongoing bureaucratic, technological, funding, and scheduling difficulties. We also heard that, despite the remaining challenges, many respondents wanted to see an expansion of services—especially for Veterans' family members.

Table 4. Remaining Challenges

FEATURE	%	N
Need to expand services	18%	7
Bureaucracy/collaboration	15%	6
Patient transportation	15%	6
Technological difficulties	13%	5
Scheduling	5%	2
Funding	8%	3
Communication	8%	3
Cultural differences	5%	2
Staff support	3%	1

Percentages may exceed 100% due to multiple responses by a single participant.

Discussion

MAJOR THEMES

Whether telemental health can achieve its promise of increasing access to healthcare in rural American Indian communities will be partially decided by the success and failures of specific programs. To this end, Roger's *Diffusion Theory* was a particularly valuable tool for understanding the adoption of telemental health services because it stresses a multifaceted approach in the areas of knowledge, persuasion, decision making, implementation, and confirmation. Similar to other research¹⁹ respondents reported that the use of external information guided their knowledge about telehealth and helped them to develop clear, precise procedures for implementing new clinics. Perhaps one of the most influential predictors of successful telehealth diffusion was recognizing the need for services and understanding how telehealth can overcome existing barriers. Participants overwhelmingly believed that PTSD was a problem in their communities. The perception of need in the community served as a driving force toward the establishment of the telehealth clinics and may have inspired greater cooperation among multiple agencies to serve the community as indicated by other research.¹⁸

Despite the widespread acknowledgement of need, many were initially skeptical about telehealth. When we asked participants why their attitudes changed, they cited the influence of patient and staff feedback, which was predominantly supportive. Respondents further noted that feedback was often used to improve existing telehealth services. Such modifications highlighted the flexibility of the clinics and demonstrated a general willingness to change on the part of the cooperating organizations. The need for flexibility appears critical for the successful implementation of telehealth.^{20,21}

The adoption of telehealth was largely influenced by patient and community acceptance of the programs. Many respondents credited the unique role and influence of the TOW for making this objective

Table 5. Respondent Themes

Recognition of patient needs
Perceived need for services high
Drove motivation to try new services
Inspired cooperation
Outside information
Garnered support for services
Perceived as highly useful
Attitude shift over time
Initial negative/ambivalent feelings common
Attitudes became more positive over time
Attitude shift largely due to positive patient/staff feedback
Interorganizational collaboration
Presented bureaucratic and communication challenges
Perceived as necessary
The influence of local and clinical staff
Individual champions needed to influence others
Telehealth outreach worker helped patient outreach and built community trust
Cultural sensitivity
Key to community acceptance
Produce negative patient attitudes when not observed
Percentages may exceed 100% due to multiple responses by a single participant.

possible. The TOW, typically a veteran and a tribal member, is responsible for operating the telehealth equipment at the patient site, serving as a liaison between the clinic and the local tribe, and scheduling and outreaching to patients. Respondents emphasized that the trust TOWs built with patients greatly affected patients' overall perception of the clinic. The TOW lent credibility to the clinic and, often, patients' positive feelings toward the TOW are transferred to the services.²² Although other diffusion research demonstrates the use of personal advocates to promote adoption of telehealth within an organization,¹⁹ our research suggests that advocates can also increase the rate of telehealth diffusion within a community. See *Table 5* for additional themes that arose in this study.

REMAINING CHALLENGES

We were particularly interested to understand remaining challenges with the telehealth clinics; such challenges are important to address because they may limit the overall success, scope, and ultimate diffusion of the programs. We frequently heard that patients still had transportation difficulties. Although this could be considered a problem unique to American Indian reservations—where

poverty is high and roads are difficult to navigate—many rural areas share this fate. Transportation difficulties are particularly noteworthy because it demonstrates that access issues can still remain with traditional videoconferencing and suggest the need for home-based telehealth services.

Repeatedly, respondents noted the difficulty they experienced trying to communicate or receive information from multiple channels. Many also commented that rigid bureaucratic challenges slowed the progression of implementation of the clinics and remained complicated matters once the clinic was established. Despite this, it was generally acknowledged that collaboration was necessary to administer these particular clinics, especially considering their location in American Indian reservations, where the community support and input is a necessary component of success.

It appeared that these issues did not limit respondent support for telehealth. Despite the noted difficulties, many people spoke about the need for expanding services, particularly for family members. The need for increased family support is not new and is a frequent request to the VA.^{23,24} It may be particularly important in reservation communities, where families are traditionally close-knit and highly regarded.

LIMITATIONS AND FUTURE DIRECTIONS

This study is limited in that the clinics were established up to 3 years earlier and some participants had trouble recalling specific details. Additionally, the interview itself may not have captured information key to respondents' background and duties. For example, we asked some questions that everybody could not answer because they were unfamiliar with a particular event. We also did not ask patients about their experiences with Telehealth, which would have served as an additional means to understand the diffusion of telemental health services.

The results of this investigation demonstrated that telehealth has the potential to meet the needs of communities seeking specialized mental healthcare. We found that key personnel involved with the inner workings of the clinics reported a high level of support for the services and would like to see the program expanded, despite problems that remain. Information found in this investigation help us to understand factors that can hurt—and help—an organization to adopt and implement a new telemental health clinic, and may serve as a resource for future endeavors. The findings of this project addresses critical gaps in our understanding of the diffusion of this innovative mental health practice and informs research strategies regarding cultural issues and outcomes related to telemental health services. Finally, the findings serve as a long overdue guide for developing telemental health programs and policies among American Indians, specifically, and rural populations in general.

Acknowledgments

We would like to acknowledge the following sponsors and funding sources for this manuscript: (1) National Center on Minority Health

and Health Disparities, Application No. 1 P60 MD00507-01, Principal Investigator S.M. Manson and (2) Veterans Rural Health Resource Center—Western Region; Salt Lake City, Utah—Field Office for the Office of Rural Health.

Disclosure Statement

No competing financial interests exist.

REFERENCES

1. Beals J, Manson SM, Shore JH, et al. The prevalence of posttraumatic stress disorder among American Indian Vietnam veterans: Disparities and context. *J Trauma Stress* **2002**;15:89–97.
2. Duran B, Oetzel J, Lucero J, et al. Obstacles for rural American Indians seeking alcohol, drug, or mental health treatment. *J Consult Clin Psychol* **2005**;71:819–829.
3. U.S. Bureau of the Census. *We the...first Americans*. Washington, DC: U.S. Department of Commerce, **1993**.
4. Fannin JM, Barnes JN. Recruitment of physicians to rural America: A view through the lens of Transaction Cost Theory. *J Rural Health* **2007**;23: 141–149.
5. Brod RL, May PA, Stewart TJ. Recruitment and retention of federal physicians on the Navajo reservation. *Social Sci J* **1982**;19:47–66.
6. Hostetter CL, Felsen J. Multiple variable motivators involved in the recruitment of physicians for the Indian Health Service. *Public Health Rep* **1975**;90: 319–324.
7. Johnson JL, Cameron MC. Barriers to providing effective mental health services to American Indians. *Mental Health Services Res* **2001**;3:215–223.
8. Hailey D, Roine R, Ohinmaa A. Systematic review of evidence for the benefits of telemedicine. *J Telemed Telecare* **2002**;8(Suppl 1):1–30.
9. Hilty DM, Marks SL, Urness D, Yellowlees PM, Nesbitt TS. Clinical and educational telepsychiatry applications: A review. *Can J Psychiatry* **2004**;49:12–23.
10. Shore JH, Manson SM. Rural telepsychiatry: A developmental model. *Psychiatr Serv* **2005**;56:976–980.
11. Frueh BC, Deitsch SE, Santos AB, et al. Procedural and methodological issues in telepsychiatry and program development. *Psychiatric Serv* **2000**;51: 1522–1527.
12. Baer L, Roderick E, Cukor P. Telepsychiatry at forty: What have we learned? *Harvard Rev Psychiatry* **1997**;5:7–17.
13. Grigsby B, Brega AG, Bennett RE, et al. The slow pace of interactive video telemedicine adoption: The perspective of telemedicine program administrators on physician participation. *Telemed J E Health* **2007**;13:645–656.
14. Spaulding RJ, Russo T, Cook DJ, Doolittle GC. Diffusion theory and telemedicine adoption by Kansas health-care providers: Critical factors in telemedicine adoption for improved patient access. *J Telemed Telecare* **2005**;11(Suppl 1): 107–109.
15. Barton PL, Brega AG, Devore PA, et al. Specialist physicians' knowledge and beliefs about telemedicine: A comparison of users and nonusers of the technology. *Telemed J E Health* **2007**;13:487–499.
16. Rogers EM. *Diffusion of innovations*. New York: Free Press, **1964**.
17. Grigsby J, Rigby M, Hiemstra A, House M, Olsson S, Whitten P. Telemedicine/ telehealth: An international perspective. The diffusion of telemedicine. *Telemed J E Health* **2002**;8:79–94.
18. Helitzer D, Heath D, Maltrud K, Sullivan E, Alverson D. Assessing or predicting adoption of telehealth using the diffusion of innovations theory: A practical example from a rural program in New Mexico. *Telemed J E Health* **2003**;9: 179–187.

19. Walker J, Whetton S. The diffusion of innovation: Factors influencing the uptake of telehealth. *J Telemed Telecare* **2002**;8(Suppl 3):S3:73-75.
20. Broens TH, Huis in't Veld RM, Vollenbroek-Hutten MM, Hermens HJ, van Halteren AT, Nieuwenhuis LJ. Determinants of successful telemedicine implementations: A literature study. *J Telemed Telecare* **2007**;13:303-309.
21. Menachemi N, Burke DE, Ayers DJ. Factors affecting the adoption of telemedicine—A multiple adopter perspective. *J Med Syst* Dec **2004**;28: 617-632.
22. Shore JH, Savin DM, Novins D, Manson SM. Cultural aspects of telepsychiatry. *J Telemed Telecare* **2006**;12:116-121.
23. Jordan BK, Marmar CR, Fairbank JA, et al. Problems in families of male Vietnam veterans with posttraumatic stress disorder. *J Consult Clin Psychol* **1992**;60:916-926.
24. Goldman HH. Mental illness and family burden: A public health perspective. *Hosp Commun Psychiatry* **1982**;33:557-560.

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Received: April 18, 2011

Revised: May 13, 2011

Accepted: June 1, 2011