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Implementation and Institutionalization of a Telebehavioral Health Hub-and-Spoke Model in Rural Texas Counties

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ABSTRACT

Objective: This study assessed implementation and institutionalization of hub-and-spoke telehealth services in five rural and underserved communities. Results provide insights into the unique considerations for telebehavioral care in rural locations.

Methods: Telephone interviews were conducted with a purposive sample of rural spoke site coordinators (n=5) across 5 counties. Interviews were transcribed, then thematically analyzed using an open coding scheme.

Results: Five primary themes emerged regarding implementation, including (a) initial planning and implementation; (b) community factors; (c) internal process perceptions; (d) community perceptions of services; and (e) lessons learned. Historical changes in telehealth delivery and the likelihood of sustainability emerged as themes related to institutionalization. When comparing findings to domains in the Consolidated Framework for Implementation Research, key aspects of community buy-in, flexibility and tailoring of services, and collaboration between network partners were identified. Weaknesses in the production and support subsystems were identified using the Levels of Institutionalization Framework.

Conclusions: Key considerations for others looking to implement and institutionalize telebehavioral health interventions include a focus on relationship building, considering community context to ensure relevant setup of services, consistent communication and outreach with multiple levels of stakeholders, and adapting to changing technology and infrastructure.

Keywords: mental health, rural health, access to health care, program planning and evaluation, telehealth

Introduction

Telebehavioral health services are strongly supported by existing research as an acceptable and effective method of delivering mental health treatment via video or telephone.[1,2] The approach is especially relevant in the United States, where one in four adults live in rural areas and experience mental health issues (e.g., depression and anxiety disorders), but have limited access to in-person mental health providers.[3,4] Studies have also shown telebehavioral health to be comparable to in person care when looking at reduction in standardized assessment for depression and anxiety.[5]

In a review of Medicare data from 2010-2017, Patel et al.[6] found that telebehavioral services increased among beneficiaries overall, but the increase was greater in rural locations. However, Gurupur & Miao[7] summarized challenges to telehealth that are particularly relevant in rural locations including appropriate infrastructure in rural communities, a heightened digital divide, difficulty with complexity of telehealth systems, and anxiety around using the technology platforms. Even with improvements in internet access, rural communities still face challenges that are less prevalent in urban localities.[8] Therefore, while direct-to-consumer telehealth models are increasingly common, hub-and-spoke models are still needed in rural and low-resourced areas to overcome challenges with broadband access and lack of access to necessary technology.[9] This reality indicates a need to further study implementation factors that can improve hub-and-spoke telehealth utilization among those with the most need.

DESCRIPTION OF THE PROGRAM

In 2018, the Office for the Advancement of Telehealth (OAT) within the Health Resources and Services Administration (HRSA) awarded funding to Texas A&M Telebehavioral Care Program (now Texas A&M Health Telehealth Institute), part of an academic health science center, to provide telebehavioral services to underserved populations in the rural Brazos Valley region in Texas, through the Evidence-Based Telehealth Network Program (EBTNP). The project utilized a semiurban provider hub site as the provider hub and five rural, spoke sites, some of which were established prior to the project period and some that were newly established upon funding.

SERVICE DELIVERY

Behavioral health providers at the hub location hosted video conference counseling sessions (or telephone when videoconference is not possible). The spoke locations provided rural patients with a local connection point with a reliable internet connection. Spoke sites represent health resource centers managed by the county or local hospital systems, local non-profit health services agencies, or health clinics.

At the time of this study, partnerships between the semiurban hub and rural spoke sites had been in place for a period ranging from one to 10 years. Many factors affecting service delivery methods (i.e. types of technology used) and sustainability (i.e funding sources) have changed since establishing the first spoke site, but the innovation of telebehavioral health services has remained consistent throughout expansion to new rural counties. In 2016, Garney and colleagues[10] detailed a case study of the implementation process used to expand telebehavioral health services into its rural catchment area using the Interactive Systems Framework, which was developed by Wandersman et al.[11] The ISF provided a guide to assess necessary resources but was lacking in consideration of the importance of human capital and the many contextual factors that guide implementation and institutionalization. The current manuscript expands upon the previously reported data by conducting a qualitative study of key informants' perceptions of the implementation and institutionalization processes at their respective spoke sites. Findings may be used to gauge the delivery model's potential for translation.

PROGRAM IMPLEMENTATION

Research generates knowledge useful for developing public health programs, but findings are not always translated into practice.[12,13] Implementation science aims to address this disconnect, which impedes evidence-based decision-making and effective programming. The Consolidated Framework for Implementation Research (CFIR) provides a systematic guide for implementation evaluation.[14,15] The framework identifies theory-based constructs linked with effective implementation and arranges them across five domains: (a) intervention characteristics; (b) outer setting; (c) inner setting; (d) characteristics of individuals; (e) process.

PROGRAM INSTITUTIONALIZATION

Institutionalization is a critical factor to consider for the sustained impact of services. Institutionalization is the long-term integration of a new program within an organization.[16] This occurs through a series of adaptations and accommodations made to support, implement, and sustain the new program.[16] Sustainability can be viewed at the programmatic level through continuing activities or at the organizational level by embedding key elements of the program into organizational subsystems.[16–18] Sustainability frameworks have emerged within the social sciences that identify factors or intervention elements most likely linked with sustainability.[19–21] Collectively, this work provides a general direction for professionals to consider; however, there is a difference between planning for sustainability in theory and sustaining a program in practice.

Methods

STUDY DESIGN

A qualitative study, using key informant interviews, was designed to capture key aspects of implementation and institutionalization among spoke sites where telebehavioral health services were accessed by rural residents. A qualitative approach for this study was essential to understand the greater community context that contributed to the success of the program.

RECRUITMENT

Key informant interviews were conducted from May-August 2020 with coordinators at each of the five rural spoke sites receiving telebehavioral health services funded through the project. A purposive sample of spoke site coordinators was used for interviews because of the coordinators' in-depth knowledge of establishment and continuation of services. Additionally, site coordinators

had extensive experience due to their regular contact with residents accessing services and organizations coordinating complimentary community services. Evaluators had an existing working relationship with all participants based on the ongoing implementation of services.

To recruit site coordinators as participants, evaluators sent an explanatory email and information sheet describing the purpose of the interview and the role of the evaluators on the project, along with a link to register for an interview time. If individuals did not register upon first contact, evaluators sent a reminder email. All participants signed an informed consent form prior to the interview, including consent for audio recording.

INTERVIEW TOOL

Interview scripts included open-ended questions, separated into sections focused on (a) setup and implementation of services and (b) institutionalization. See Appendix 1 for interview questions.

Implementation questions were developed based on the Consolidated Framework for Implementation Research (CFIR)[14,15], which assesses implementation through five domains, defined for this study as follows:

1. Intervention characteristics: Factors pertaining to telehealth, counseling, and other service characteristics
2. Outer setting: Factors related to the external community
3. Inner setting: Factors related to the hub-and-spoke organizations
4. Characteristics of individuals: Characteristics of counselors, community implementers, and stakeholders
5. Implementation process: Factors related to implementing telebehavioral counseling

Institutionalization questions were based on the Social Psychology of Organizations[22] and Levels of Institutionalization (LoIn)[23] frameworks, which define institutionalization through four organizational subsystems:

1. Production: The provision of goods and services
2. Maintenance: Training people for roles that will maintain operations
3. Support: Creating knowledge and solutions to solve problems
4. Managerial: Coordinating and managing people and resources

Table 1: Interview Questions and the Basis of their Development

Developed using the Consolidated Framework for Implementation Research (CFIR) or Levels of Institutionalization (LoIn)		
Interview Question	**Basis of Development**	
	CFIR	LoIN
What is your role in implementing telebehavioral health services in X county?	X	
What were community factors/needs that contributed to starting telebehavioral health service delivery in X county?	X	
Other than telebehavioral health services offered by the Telebehavioral Health Counseling Clinic, where are residents able to access mental health services?	X	
Were you involved in the initial planning process for introducing telebehavioral health services in X county?	X	
Were the necessary stakeholders involved in establishing telebehavioral health services in X county?	X	
Do telebehavioral health services currently have the necessary support/buy-in from community leaders and stakeholders?	X	
Do you feel like telebehavioral health services fit within the scope and mission of your organization?	X	
How well do you believe telebehavioral health counseling in your county is functioning at this time? What do you expect in the future?	X	
Do you feel like the established telebehavioral health processes and coordination between your organization and the telebehavioral health counseling clinic are effective?	X	
Do people within your community know about the available telebehavioral health counseling services?	X	
Have you had any lessons learned throughout the telebehavioral health project? Have you had an opportunity to reflect upon those lessons learned and/or opportunities to improve the program?	X	
Do you think the availability of telebehavioral health counseling has benefitted your community? Do you think that people will/are accessing the telebehavioral health counseling services?	X	
How effective do you think telebehavioral health services are perceived to be in comparison to in person services?	X	
What could be done to improve coordination and delivery of telebehavioral health services?	X	
What suggestions would you give to a new location looking to establish telebehavioral health services?	X	
How long has your organization worked with Texas A&M specifically to provide		X

Developed using the Consolidated Framework for Implementation Research (CFIR) or Levels of Institutionalization (LoIn)		
Interview Question	**Basis of Development**	
	CFIR	LoIN
telebehavioral health counseling services in your community?		
How has the setup and delivery of services changed since it was first implemented in your county?		X
Does your facility have a strategic plan that includes activities needed to coordinate and sustain services provided by the TBC?		X
Does telehealth service delivery fit within the mission of your organization?		X
Before the telebehavioral health services were implemented at (location), was (location) involved in activities related to increasing access to mental/behavioral health services?		X
Have the telebehavioral health services been adapted to fit the needs of your specific community?		X
Has the telebehavioral health services ever been formally evaluated within your organization? If yes, was an evaluation report/annual report produced/disseminated?		X
Is there a staff member at your site who you would regard as a program champion?		X
Does telebehavioral health have a permanent space within your facility/organization?		X
Have local funds been allocated to support telebehavioral health services at the local level? If not, why?		X

The Texas A&M University Institutional Review Board provided approval prior to data collection. One evaluator with masters-level or higher training in public health and/or health education conducted each telephone interview. Interviewers completed mock interviews prior to interviewing. Each interview lasted between 30-60 minutes. Participants were informed of the premise of the interviews; however, they did not know the interview questions prior to the calls. An external transcription firm transcribed interviews.

DATA ANALYSIS

Three evaluators trained in qualitative data analysis conducted a thematic analysis of the transcriptions using an open coding scheme to identify emergent codes.[24] Evaluators used a systematic process in which they reviewed the transcriptions, individually identified units of data, coded the data, and came together to compare findings.[25,26] Discrepancies were resolved through group consensus. Evaluators identified themes from the coded data.

Results

Themes emerged related to implementation and institutionalization including initial planning and implementation, community factors contributing to setup, community perceptions of services, lessons learned and adaptations, improvements in telehealth delivery, and likelihood of sustainability. The results are organized according to factors of implementation and institutionalization and further connected to the implementation and institutionalization frameworks in the discussion section. Table 2 shows the key factors.

Table 2: Interview themes

Theme	Sub-Themes
Implementation of Services	
Initial planning and Implementation	Role in implementation: - Liaison or navigator with clients - Communication among stakeholders Involvement of stakeholders in initial set-up Importance of leadership Current support and perceptions
Community Factors Contributing to set-up	Lack of existing behavioral health services (prior to implementation) Limitations of existing services
Perception of Processes	Effective current processes Limitations of health system culture
Community perception of services	Varying community perceptions Need increased communication about services (availability, types, etc.)
Lessons learned and adaptations	Complexity of set-up process Communication of the importance of services Dedicated time and resources
Institutionalization of Services	

Theme	Sub-Themes
Improvements in telehealth delivery	Technological advances Hub and spoke sites adapted to changes in telehealth delivery Suggested adaptations
Likelihood of sustainability	Mixed likelihood of local financial support Strong support of spoke sites and personnel

IMPLEMENTATION OF TELEBEHAVIORAL HEALTH SERVICES

Initial Planning & Implementation

Participants held various roles in implementing telebehavioral health services in their respective counties. Some highlighted their main role as client liaisons, focused on communication and cooperation with clients and hub location personnel. Others noted their logistical role in preparing for clients, as part of day-to-day implementation. Total years of involvement ranged from two to seven years. Two participants reported involvement in the initial planning process for introducing telebehavioral health services in their respective counties, while others joined at a later point. When probed about the initial planning process, participants highlighted the importance of leadership and guidance, with one participant stating, "*...the leadership has been consistent, it's been responsive, and it's been innovative.*" Two participants noted understanding of local politics, networking capability, and proactive planning as critical to implementation.

All participants felt the necessary stakeholders were involved in establishing services. Participants described stakeholders as "*fully involved*," and "*engaged throughout*." However, responses were mixed when asked about current support and buy-in from community leaders. Some reported current buy-in and/or growth in support. One participant noted the community perception of telebehavioral health services "*grows stronger every year*."

Community Factors Contributing to Set Up

When asked about community factors that contributed to the establishment of services, participants detailed a strong need due to lack of available behavioral health services. One respondent reported a complete lack of counseling services in their area prior to implementation, saying, "*There has been dialogue for years about the biggest service gap with people struggling with severe mental illness and being able to have comprehensive treatment for them.*" Others emphasized limitations of the local services available (e.g., counseling services only available to specific subpopulations, limited reach, case management not sufficient to satisfy client needs). These limitations highlighted local gaps prior to implementing the services in this project, including a need for timely access to comprehensive counseling services to prevent more extreme issues stemming from individuals "*acting out,*" which might lead to legal consequences and criminalization.

Prior to their partnership with the hub site institution, spoke sites had no experience providing or facilitating mental health services in their communities. All participants thought the services fit within the scope and mission of their organizations and addressed a community need. One participant said, "*We know that there's definitely a need for mental health services... So, I definitely think there's an immense benefit to having behavioral health services.*"

Perception of Processes

Participants considered the established implementation processes to be effective. They also viewed coordination between their respective sites and the hub as effective. However, participants reported the need to further increase communication between the hub site and spoke sites, as well as the need to focus on external communication to spread information to county residents. Regarding current functioning, one participant described a struggle to operate at maximum capacity and reach potential clients because of the culture of the current health system (e.g., people not receiving treatment until a mental health crisis occurs).

Community Perceptions of Services

Participants reported varying perceptions and knowledge of hub site services within their communities. Two described negative initial perceptions of telehealth versus in-person care based on a lack of understanding about telebehavioral health services. Others reported positive perceptions about telehealth instead of in-person care because of accessibility and adaptability. For example, one respondent said, "*Everybody's got an iPhone… and now, if there's no digital divide, everybody's got access. If everyone has access, guess what happens? It becomes an elimination of excuses.*" However, participants felt barriers still exist and noted a need for increased awareness in communities. They identified stereotypes and stigma as barriers. For example, some clients assume they need to have severe symptoms to receive services. Respondents also emphasized a need for increased racial/ethnic cultural competence and counselors representative of client backgrounds. Regarding community awareness, one respondent reported the hub organization and services as the "*best-kept secret*" in the community.

Lessons Learned and Adaptations

Prior to implementation, establishing formal agreements between the primary site and satellite locations was highlighted as a lengthy process, indicating the need to plan realistically for set-up. Additionally, overcoming doubt and skepticism was important to implementation and continuation. Suggestions for improvement included rebranding project marketing so community members can better understand the services that are offered and differentiate between the telebehavioral health services versus other telehealth services such as primary care or urgent care.

Overall, most participants reported the need, importance, and benefit of telebehavioral health services

within their community. The most-reported advice for new locations was the need to dedicate specific program staff at the spoke site, time, and space for telehealth sessions. Additionally, building relationships with community members and other organizations, and identifying an anchor agency to lead the program was encouraged. Lastly, improving community recognition of the value of mental health services is important. One stated, "*we know that access to mental health services is hard... if someone has the opportunity to be able to provide that service and implement it within their organization or practice, I definitely think there is extreme benefit to it.*" Participants emphasized the importance of telebehavioral health and the desire to improve delivery, access, and utilization of services.

INSTITUTIONALIZATION OF TELEBEHAVIORAL HEALTH SERVICES

All participants reported that implementation and any additional workload fit into typical job duties, alongside their typical service coordination roles. Coordination of services resulted in minimal extra work. Other aspects of organizational fit and institutionalization are reported below.

Improvements in Telehealth Delivery

Participants felt services improved since the start of the telebehavioral health program. Technological advances have made telehealth much more cost-effective and accessible in rural communities, leading to increased ease of continuing services. Respondents felt the hub site responded well to feedback and had improved processes and services over the years for optimal collaboration with the sites. Suggested adaptations focused on increasing utilization of services, including allowing an option for an in-person visit to familiarize the client with the counselor and counseling processes prior to beginning telehealth services.

Likelihood of Sustainability

Responses were mixed regarding whether services were likely to be sustained. Two felt services would continue after grant funding, but another felt that sustaining services was solely in the hands of the hub site. Responses varied by county as to whether local leadership would support funding services. One respondent said, "*I don't know what they would—what their response would be should we were to go and say, you know, 'they need to pony up.'*" Another respondent whose site experienced a gap in service after county officials refused to provide financial support for services elaborated on this uncertainty and mentioned difficulty rebuilding clientele after their site's hiatus. Despite the uncertainty of funding allocations, there was consensus that space would remain available in the local spoke sites to continue services.

Discussion

This study provides insight into important implementation and institutionalization factors that can be translated to assist in the adoption of telebehavioral services in rural areas. First, the results address the limitation of appropriate infrastructure in rural communities and a heightened digital divide. Communication and community buy-in with decision makers, as well as implementation of a hub-and-spoke model in addition to direct-to-consumer modalities can address barriers. Specifically providing telebehaviroal health services through a hub-and-spoke model addresses transportation barriers through a closer connection point while also addressing the barrier of inadequate internet connection or technology infrastructure in rural areas through providing services at a reliable connection point.

Furthermore, challenges related to the complexity of telehealth systems and anxiety about using them can be mitigated by implementing patient navigator models and training staff at local spoke sites to help with connection issues if they arise. The role of the coordinators (participants in the interviews) is an additional component not present through direct-to-consumer telehealth that had the potential to further enhance initial and continued connection to telebehavioral health services, as well as connection to other important community resources.

INSIGHTS INTO IMPLEMENTATION

As detailed in the results, the first step to establishing services was engendering local community buy-in (e.g., desired accessibility of mental health services) and engaging the correct individuals within each community (e.g., local government officials). This approach required flexibility as each community is different with unique needs, residents, and community context. In relation to CFIR constructs, this aligns with the Characteristics of Individuals domain and highlights the importance of building community relationships.[15] Increasing individual- and community-level buy-in for implementing telebehavioral health services is congruent with the noted limitation of the previous ISF analysis in recognizing the importance of human capital.

The Intervention Characteristics domain was highlighted similarly in the initial set-up of telebehavioral health services, but also notable in how it changed over the course of implementation. In the beginning, technical aspects provided a major hurdle in establishing reliable internet connections at the spoke locations. Additionally, the intersection of Intervention Characteristics with the Implementation Process domain, as well as the Inner Setting and Outer Setting, proved important in establishing processes and procedures that were acceptable and efficient for both the semiurban hub and the rural spoke sites. Implementation processes were developed based on the intervention characteristics at a given time point but have adapted with community and technical changes. These process adaptations occurred through informal continuous quality improvement processes and "trial and error," with open communication and constructive feedback among the hub-and-spoke sites. As noted in the results, spoke sites referenced the support and responsiveness of the hub site in addressing requests and recognizing community factors and challenges.

Like the interaction between domains noted above, the Inner Setting (hub-and-spoke sites) and Outer Setting (community stakeholders) were intertwined through the process of establishing services. Community organizations, initially part of the Outer Setting, slowly became part of the Inner Setting through day-to-day implementation as spoke sites. With this, the Outer Setting

could expand to include a broader network of community leaders and organizations to build referrals and utilization of services. In addition to expansion, as the Outer Setting changed, the Inner Setting developed and refined the implementation process to meet those needs.

Regarding CFIR, Powell et al.[27] note that CFIR "captures the complex, multi-level nature of implementation, and suggests (implicitly) that successful implementation may necessitate the use of an array of strategies that exert their effects at multiple levels of the implementation context." This take on CFIR acknowledges the need to recognize and intervene through multiple levels but does not explicitly note the interaction and potential fluidity among levels. An expanded perspective of the framework may prove useful in the analysis of other implementation studies and also the application of insights into future work.

INSIGHTS INTO INSTITUTIONALIZATION

Perhaps more complex is the institutionalization of services. The levels of institutionalization (i.e., production, maintenance, support, managerial) were referenced in terms of institutionalization at the spoke sites.[23] Strategic alignment between programmatic outcomes and internal organizational objectives increases the likelihood of institutionalization.[28] Several indicators of institutionalization were identified within the maintenance subsystem, such as dedicated program staff and the identification of a program champion among spoke sites. Indicators of managerial subsystem processes included supervisory personnel at the spoke sites and their respective years of involvement in the program. Some progress within the production subsystem was indicated by the adaptation of telebehavioral health services to fit community needs. However, there were inconsistent responses regarding the existence of a strategic plan to coordinate and sustain services, demonstrating weakness pertaining to the level of institutionalization, specifically the production subsystem.

The most apparent concern for the institutionalization of telebehavioral health services remains within the support subsystem. As noted in the results, despite the buy-in of county leaders for telebehavioral health services, there was hesitation about whether each county would contribute local funds to sustain services if grant funding ended. As Goodman et al.[23] emphasize, the supportive subsystem is environmentally directed and stable funding for the program indicates organizational support.

Igalla et al.[29] assessed factors of institutionalization related to government support for community-based initiatives. They found that key factors related to government support included formalization, boundary spanning leadership, linking social capital, democratic decision making and organization size. While some of these factors were specifically referenced by participants positively, there is a need to emphasize the benefits of hub site services, particularly as it relates to social capital, the extent of connections expressing support, and the current scope of services (size of the organization) as this could increase support and perceptions of legitimacy among decision makers. Additional support from community stakeholders and financial planning (e.g., spoke site grant funding) to maintain services at the spoke sites long-term may lead to institutionalization within the supportive subsystem.

Conclusions

This study demonstrated the capacity of communities to implement and institutionalize telebehavioral health services in rural settings. This is important in establishing partnerships to reduce access disparities in rural settings using telebehavioral health innovations. Key recommendations are as follows:

- *Relationship building* is a key step in the set-up of services and should not be rushed. This sets the foundation for implementation and is crucial in moving to institutionalization of services.
- *Community context* necessitates adaptations to the approach within each community. Trust within the community and identifying the right individuals and partner organizations who can serve as program champions is important to ensuring the program is acceptable to community members. The partner organization will ideally provide local assistance including staff coordination of services, space for clients to connect to patients, and provide referral to services.
- *Communication and outreach* must occur at multiple levels including communication with stakeholders (bidirectional), community members, and community leaders.
- *Ever-changing technology* and improvements in systems will require willingness to adapt to new systems but also necessitate the need for training and communicating new systems to ensure continued accessibility of services.

Limitations

This study utilizes a small sample of sites involved with one regional hub-and-spoke model. While some factors may be consistent, it is likely that not all findings or experiences will translate to other sites. Additionally, this study focuses on coordinating site perspectives for a hub-and-spoke model and does not assess direct-to-consumer service provision.

Conflicts of Interest Statement

The authors have no conflicts of interest to declare.

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