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Exploring community members' perceptions to adopt a Tele-COPD program in rural counties

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ABSTRACT

Background: Patients diagnosed with COPD residing in rural areas report a lower quality of life. Telehealth addresses geographic barriers by offering routine, technology-based visits, and remote patient monitoring.
Objective: The study objective was to explore adoption perceptions of a tele-COPD program among community members in rural Western North Carolina (WNC) counties.
Methods: A convenience sample of 17 community members were recruited to participate in one of five 45-min focus groups. Before the focus group, all participants completed a brief demographic survey. Focus groups were digitally recorded, transcribed verbatim, imported into MAXQDA v10, and analyzed thematically using established qualitative coding procedures. SPSS v22 was used to calculate descriptive statistics.
Results: Participants were primarily Non-Hispanic White (100%), male (59%), insured (100%), and had at least a high school education (80%). Only 25% of participants had any prior knowledge of telehealth programs. The majority (94%) of participants expressed interest in receiving a tele-COPD program due to convenience factors. Yet, most participants expressed a lack of interest and comfort in using Internet-capable devices (e.g., mobile devices, tablets, computers). Participants noted that to be successful, telehealth visits must be described and shown to them by their own provider or other trusted individual(s), such as a pharmacist. Privacy and cost were also expressed as telehealth concerns.
Conclusion: Interest in a tele-COPD program was high among community residents in rural WNC. However, to increase patient willingness to adopt a tele-COPD program, patients' providers must overcome challenges, such as patients' awareness and knowledge of telehealth, privacy and cost concerns, and access to and comfort with using new technologies. Pharmacists may mitigate these challenges by increasing patients' trust and comfort with telehealth programs.

1. Introduction

Individuals residing in rural areas experience health disparities due to less access to primary and specialty care, longer travel commutes to health care providers, and higher rates of chronic conditions.[1] Telehealth is a health care delivery method that addresses geographic barriers associated with delivering care to patients through routine, technology-based visits and remote monitoring.[2] Consequently, telehealth can mitigate health care access disparities.[3] Prior evidence demonstrates that telemedicine and telehealth have been successfully implemented in rural settings without compromising patient or health care provider satisfaction.[3–5] Integrating pharmacists in telehealth efforts could address the needs of rural communities.[6–8] Nationally, pharmacists are implementing telemedicine programs for multiple health conditions, including chronic obstructive pulmonary disease (COPD).[9–11] Yet, managing patients with COPD continues to be a challenge for health care providers.

Within the United States, COPD is a common lung disease affecting 16 million Americans.[12] COPD prevalence, hospitalizations, and mortality rates are greater among rural patients compared to urban patients.[13] Additionally, rural COPD patients have higher health care utilization and report a lower quality of life than urban patients.[14] However, research has validated that tele-COPD efforts in rural communities can increase the quality of life among COPD patients.[15] The 16 counties encompassing Western North Carolina (WNC) are predominantly rural.[16] WNC residents' uptake of telehealth programs has been minimal and could be due to intrapersonal, interpersonal, and system-level factors.[17–19]

Little is known about how rural Appalachian residents perceive telehealth. A cultural belief referred to as "Appalachian pride," could be a barrier for telehealth adoption. Appalachian pride is comprised of multiple cultural values (e.g., privacy) that are upheld in tight-knit communities.[20–22] Appalachian pride may impact telehealth adoption and preferences. In addition to Appalachian pride, research findings suggest

system- and provider-level barriers (e.g. credibility, technical issues, and negative attitudes) also affect telehealth adoption. Most patient-centered work in Appalachia has focused on stigma-related barriers to accessing mental telehealth services.[14,15,17,23]

The use of telehealth in COPD prevention and management is complex; however, it has been delivered through patient education and counseling, medication adherence reminders, and remotely monitoring patients' vital signs.[24] Studies have indicated a range of services and models (e.g., integrated disease management model) that are coordinated and managed by health care providers and patients with COPD, reduce emergency room visits and prevent hospitalizations.[25,26]

The study objective was to explore community members' perceptions of a tele-COPD program in rural WNC. The authors specifically investigate how community members living with COPD perceive tele-COPD and what facilitators and barriers influence their ability to engage in a tele-COPD program.

2. Methods

2.1. Ethical considerations

Ethical review and approval for this study was granted by the UNC Chapel Hill Institutional Review Board. All participants provided written informed consent before participating in the study.

2.2. Study overview

The authors conducted a qualitative research design study. Given the paucity of existing data on rural COPD residents' perceptions about telehealth, focus groups were deemed optimal to provide an in-depth, contextualized depiction of telehealth perceptions. Data were collected from November 2016–January 2017.

2.3. Recruitment and sample

In partnership with the Center for Rural Health Innovation, the authors recruited a convenience sample of community members ($N = 17$) living with COPD in McDowell, Mitchell, and Yancey counties in WNC. These three counties are designated as Health Professional Shortage Areas for primary care and are predominantly rural.[27] Physicians who practiced in the aforementioned counties identified patients with a diagnosis of COPD in their medical record. To be eligible for the study, participants had to speak English, be older than 18 years of age, and have a clinical diagnosis of COPD. The physicians provided an overview of the study and collected the contact information of interested individuals. Subsequently, the study staff contacted the patients to assess study eligibility and scheduled attendance to a focus group.

2.4. Data collection procedures

In each county, authors conducted two 45–60-min focus groups with at least three participants. Transportation was provided as needed. Before the focus group, all participants were provided with a written informed consent and completed a brief demographic survey. Focus groups were audio-recorded and conducted in private rooms at locations, such as public libraries and community colleges. Participants received a $25 incentive for participation. Snacks and refreshments were provided at all focus groups.

2.4.1. Measures

2.4.1.1. Focus group discussion guide. The semi-structured focus group discussion guide was based on the Social Cognitive Theory and consisted of 21 questions. During focus groups, participants were asked to describe what telehealth means in their own words, barriers and facilitators of tele-COPD programs, and suggestions on how to improve tele-COPD programs. Some of the following questions were included on the focus group guide:

1) In your own words, how would you define telehealth; 2) How do you prefer to receive education about your COPD; 3) How supportive do you think your family members would be of you using the tele-COPD services; 4) What kinds of things would make you feel more comfortable using tele-COPD services; and 5) How would you make tele-COPD easy to use?

2.4.1.2. Telehealth attitudes. This 9-item survey assessed telehealth attitudes and telehealth-related stage of change.[28] For example, using a telehealth system to meet with my doctor would be better than traveling long distances to see my doctor. Response options included: 1 ='strongly disagree', 2 = 'disagree', 3 ='neither disagree nor agree', 4 = 'agree', and 5 = 'strongly agree'. Higher scores indicated more positive telehealth attitudes.

2.4.1.3. Socio-demographics and other measures. Authors also measured the following items: gender (male and female), age (in years), race/ethnicity, educational level (less than high school, high school graduate, some college or associate degree), health insurance, duration of COPD (in years), and COPD severity. Comfort with technology was assessed on a 4-point Likert scale (1 = not at all comfortable, 4 = very comfortable), whereas the frequency of internet usage was assessed on a 5-point Likert scale (1 = never, 3 = a few times per month, 5 = once or more per day).

2.5. Data analysis

Focus groups were digitally recorded, transcribed verbatim, imported into MAXQDA version 10, and analyzed thematically using established qualitative coding procedures by the first and second authors.[29] The authors discussed all focus group findings and reviewed any notes that were taken during the focus groups to determine emerging themes. After each focus group session, additional themes were added to the current list of generated themes. The authors modified the three-step coding and analysis approach (i.e., open coding, axial coding, and selective coding).[29] The first, second, and last authors independently read and re-read each transcript to assign codes to the selected texts. The authors then cross-checked their initial codes and then categorized overarching elements into themes. The study research questions and participants responses informed this process. The first, second, and last author discussed areas of discrepancy until they achieved 100% consensus on the themes present in each transcript. Analysis conducted by the first and second author identified relevant quotes that were aligned with the overarching themes. Statistical Package for the Social Sciences (SPSS) version 22 was used to calculate descriptive statistics to characterize the sample and participant's telehealth attitudes.

3. Results

3.1. Participants

Table 1 presents participant ($N = 17$) socio-demographic and clinical characteristics and technology use. All participants self-identified as Non-Hispanic White with an average age of 61 years (SD = 9.1). A majority (59%) of the participants were male. Approximately 47% of the sample reported obtaining a high school diploma or GED and 35% reported some college education or associate degree. On average, participants had lived with COPD for 10 years and perceived their COPD as severe (M = 2.6; SD = 0.7).

Participants also reported, on average, a moderate comfort level (M = 2.3; SD = 1.8) with using the internet and used the internet a few times a month (M = 2.9; SD = 1.8). Only 19% of participants reported using the internet to access COPD information. Although 88% of participants owned a cell phone, only 25% used their cell phone to access the internet.

Table 2 reflects the participants' telehealth attitudes. Participants indicated positive telehealth attitudes on the majority of the survey items. Participants reported feeling comfortable with having telehealth visits with their physicians (M = 3.7; SD = 1.14). On average, participants agreed that using a telehealth system to meet with their doctor would be better than commuting long distances (M = 3.9; SD = 0.88) and traveling during

Table 1

Participant characteristics and technology use (N = 17).

Demographic/clinical characteristics	Mean (SD)	n (%)
Gender		
Male		10 (59)
Female		7 (41)
Age (range: 44–75 years)	61 ± 9.1	
Race/Ethnicity		
Non- Hispanic White		17 (100%)
Education		
Less than high school		3 (18%)
High school graduate (includes GED)		8 (47%)
Some college or associate degree		6 (35%)
Health Insurance		17 (100%)
Disease duration (range: 0–31 years)	10.3 ± 9.4	
Perceived COPD Severity (range:1–3)	2.6 ± 0.7	
Not at all serious		
Somewhat serious		9 (53%)
Fairly serious		5 (29%)
Very serious		3 (18%)
Technology use items		
Comfort using the internet	2.3 ± 1.2	–
Not at all comfortable		5 (31%)
Not very comfortable		4 (25%)
Somewhat comfortable		4 (25%)
Very comfortable		3 (19%)
Frequency of internet usage	2.9 ± 1.8	
Never		6 (38%)
Hardly ever		1 (6%)
A few times per month		4 (25%)
A few times per week		0
Once or more per day		5 (31%)
Owns cell phone		14 (88%)
Uses cell phone to access internet		4 (25%)
Uses other internet-capable devices (e.g., tablet)		7 (44%)
Used internet for COPD information		3 (19%)

1 Comfort using the internet was assessed on a 4-point Likert scale (1 = not at all comfortable, 4 = very comfortable).
2 Frequency of internet usage was assessed on a 5-point Likert scale (1 = never, 3 = a few times per month, 5 = once or more per day).

bad weather conditions (M = 4.4; SD = 0.63). Participants agreed that having telehealth programs in their community could result in fewer missed appointments (M = 3.3; SD = 0.95). However, they also reported that people are likely to receive better quality care when they see their doctor in-person rather than a telehealth visit (M = 3.5; SD = 1.03). We identified four themes that reflected perceptions of tele-COPD adoption among community members.

Table 2

Participant's telehealth attitudes.

Telehealth attitudes items[a]	Mean ± SD
I prefer to see my doctor in-person rather than using a video system on the Internet [telehealth system]. (range: 1–5)	3.9 ± 0.77
Using a telehealth system to meet with my doctor would be better than traveling long distances to see my doctor. (range: 1–5)	3.9 ± 0.88
Using a telehealth system to meet with my doctor would be better than traveling during bad weather conditions to see my doctor. (range: 1–5)	4.4 ± 0.63
People are likely to receive better quality care when they see their doctor in-person rather than over an interactive video system [telehealth visit]. (range: 1–5)	3.5 ± 1.03
I would use telehealth if it allowed me to significantly reduce the time, I spend traveling to other communities to see my doctor. (range: 1–5)	3.9 ± 0.89
I would prefer a telehealth visit with my own doctor over an in-person visit with another doctor. (range: 1–5)	3.6 ± 1.09
Having telehealth services in my community would mean that I would miss fewer appointments. (range: 1–5)	3.3 ± 0.95
I would feel comfortable having telehealth visits with my doctor. (range: 1–5)	3.7 ± 1.14

[a] Telehealth attitudes were assessed on a 5-point Likert scale (1 = strongly disagree, 3 = neither disagree nor agree, 5 = strongly agree).

3.2. Telehealth knowledge

Three out of seventeen participants reported prior knowledge of telehealth. Although other participants were unfamiliar with the term "telehealth", they described what they thought the term meant.

Something that can be utilized by individuals who happen to own a computer and wish to be able to connect with those, reaching out, trying to assess our situation and potentially alter it.

Communicating with a doctor face-to-face, that's not your local doctor and you're doing it either on internet or a tablet.

3.3. Benefits of telehealth

Throughout the focus group discussions, there was a high interest in a tele-COPD program and participants articulated the benefits of telehealth. Participants stated that telehealth was convenient for rural residents and it offered increased access to health services by reducing travel distance.

For someone that had to drive like an hour or an hour and a half to a doctor, that'd be by far an issue for them.

If there were days that I'm unable to come to the doctor, I had an appointment and I couldn't, and I couldn't drive. I know when I can drive and when I can't, but uh, on those days like that, even though I do live 10 min away, it'd be very beneficial for me.

The ease of access to care for patients was an additional tele-COPD program benefit. Participants voiced telehealth would reduce hospital visits and canceled appointments.

This telehealth thing would be good because, I mean, if you have a doctor you could talk to every week, instead of every 3 months because you can't go. He would be able to be more one-on-one with you.

3.4. Barriers to telehealth

Participants expressed lack of internet access as a barrier to using tele-COPD programs in their county. Additionally, participants shared how their rural communities are disadvantaged in terms of access to health care.

I think our health care system's broke…because, as for myself, uh, I feel left out about a lot of things. You know, because we're country folk, and it's like, "uh, you know, ok, whatever."

I don't have internet, but I'm going to get it. It's in the plans to get. And I would use that. Uh, I know I would very much. I thought about to have someone to help me learn how to use it. I'm old school, you know…

Privacy and confidentiality using a telehealth platform were additional barriers reported by participants.

I've been a victim of identity theft, so I'm real skeptical about putting stuff on there and…not knowing where it's going to go. I think that your health through your doctor or through y 'all should be a very private thing.

Yeah, speaking to a person one-on-one whereas, you know, I think it frightens a lot of people to see about all the information that people's hacked into and it's all over the world and they don't know it 'til it's too late. I think that would be a concern, I mean to me.

The establishment of personal connections between patients and health care providers was shared as a barrier. Participants expressed that telehealth could reduce building trust and rapport in patient-provider relationships.

I feel like, that a lot of people would not feel comfortable unless it [doctor's visit] was face-to-face, looking a person in the eye, and talking to that person about their health.

Conversely, other participants believed that rapport with a health care provider could be maintained during telehealth visits if they had previously met the provider.

If it was someone who I'd met previously, who I had good rapport with, I would more than gladly speak with them.

Lastly, cost was discussed as a tele-COPD program barrier. Participants wanted more information on the cost of additional visits and how this program would financially impact their households.

Yeah when you get in these mountains, cost is always an issue. What I'm talking about for working place people.

Some people will tell you okay, that's no problem, bring it in, we don't care what it costs. But if you can't afford it, then you might need a little help with it.

3.5. Strategies to overcome telehealth barriers

Strategies were suggested to overcome telehealth barriers, including educating patients on telehealth technology. Participants expressed patients' providers specifically physicians and pharmacists who they trusted should describe and show patients how telehealth technology works to overcome telehealth barriers.

Well, I guess you just have to talk to people like we are, or their doctors have to explain to them. But better still, talk to someone that actually uses it, to me, to let the people know they feel and how it helps them. You know, that's how I feel about it. I mean hands-on is your best experience.

If you write me something, I will probably have trouble with it, or send me directions. If somebody would come to the house, show me how to set up the material, show me how to use it, show me how it works, stuff like that but person to person.

I say their doctor or their pharmacist, whoever their pharmacist is, if they've got a personal pharmacist. Uh, somebody they trust.

If you're a doctor or a pharmacist or whatever, you're gonna be able to explain to me.

4. Discussion

This formative, qualitative study contributes to the limited literature on tele-COPD programs in rural areas. The authors specifically explored perceptions on the interest of adopting a tele-COPD program among community members in rural WNC. Additionally, study findings highlight facilitators and barriers that may guide the future design of tele-COPD programs in rural counties. Overall, our study participants reported a positive attitude about tele-COPD programs and conveyed that uptake of tele-COPD programs may be greater if telehealth visits were described and demonstrated to patients by their own health care provider or other trusted individual(s).

Although many study participants confirmed an understanding of telehealth methodology, they were unfamiliar with the term "telehealth." This finding suggests that health care providers (e.g., pharmacists and physicians) and public health professionals should develop and implement strategies to increase patient's awareness, knowledge, and usage of telehealth services. Pharmacists could recruit key leaders and trusted community members within rural communities to test telehealth visits with patients. Subsequently, the leaders and community members could discuss their experiences to the broader community during a townhall meeting or health fair. Trusted community members (e.g., Community Health

Workers) could also be trained to set-up the telehealth equipment before the patient's first telehealth visit with their health care provider.

Participants expressed great interest in a tele-COPD program and believed their community would benefit from such a program. Interest in telehealth programs were related to convenience factors, including reducing travel distance. Previously reported literature[30,31] confirmed our study findings specifically the interest and convenience (e.g., decreased travel time) of telehealth. Emphasizing the benefits of telehealth and how it has been positively received in other rural communities might increase patient interest in telehealth programs. As a result of the COVID-19 pandemic, there has been approximately 60–70% decrease in health care office visits and an increase of telehealth utilization by health care providers, health insurers, and patients.[32]

Participants described several barriers that could affect their decision to use tele-COPD programs. It is vital that pharmacists collaborate with physicians to offer telehealth services in rural communities. Health care providers and organizations must help patients overcome challenges—specifically patients' access to and comfort using new technologies. Current study findings demonstrated that participants expressed both a lack of interest and comfort in using Internet-capable devices, such as mobile devices, tablets, computers, etc. Conversely, a pilot study indicated that rural patients were willing to receive m-health services (e.g., prerecorded messages for appointment reminders, disease information, medication use/self-care information, and symptom monitoring information) using a mobile phone.[33] Approximately 30% of adults who reside in rural communities own a computer, smartphone, and home broadband access.[34] Federal resources, such as the COVID-19 telehealth program, exist to increase broadband access in rural communities.[35] By utilizing these resources, health care providers may connect more patients to broadband support and telehealth services.

Participants also voiced multiple telehealth concerns, such as negative impact on patient-provider rapport and security and privacy of their health data. This finding was similar to previous study findings.[36–39] To address the privacy concerns, health care providers could discuss HIPAA rules and requirements and the data storage section of the consent and patient intake forms. Health care providers could also inform the patient about required staff trainings and procedures on documentation and data storage. To increase rapport with new and prior patients, pharmacist and health care providers could provide culturally responsive care to each patient, actively listen to the concerns of each patient, and learn each patient's communication preference.

Cost was reported as an additional barrier for community members. Increased cost of care has been reported as a barrier in prior studies.[15,40] Yet, there is a paucity of literature on the cost of the delivery method and how telehealth programs function operationally. Recent studies have published cost-effectiveness results for telehealth care including patients with COPD and all studies demonstrated a low probability of cost-effectiveness by their country standards.[40–42] More cost analysis studies are warranted to ensure health care providers and organizations can adequately address this patient-reported barrier.

4.1. Recommendations for future research

Future studies with more diverse samples should explore whether there are additional factors that could impact interest in and use of tele-COPD in other rural communities. Because social support is a significant facilitator in rural communities, it is worth examining how social support interplays with the adoption of tele-COPD programs. Specifically, informational social support could be addressed by rural stakeholders and partners co-creating tele-COPD educational materials with pharmacists and public health professionals.

More research is warranted to also assess health care providers (including pharmacists) perceptions of tele-COPD programs. This would be beneficial to explore the health care providers perspectives on patient challenges associated with tele-COPD interventions and support development of evidence-based practices recommendations. In this study, the identification

of perceptions demonstrated the importance of including these factors for successful design and implementation of tele-COPD programs. Lastly, process and outcome evaluations should be conducted on tele-COPD interventions to demonstrate the progress and success of the interventions.

4.2. Limitations

The current study includes a convenience sample of participants who self-identified as Non-Hispanic White males ($n = 10$) and females ($n = 7$). Thus, results do not include the perspectives of the rural North Carolina population (e.g., gender, age, race/ethnicity, and socioeconomic status) who are clinically-diagnosed with COPD, limiting the conformability of our results. Second, we achieved thematic saturation by our fifth focus group; however, it is possible that our focus groups did not capture all perceptions of tele-COPD program usage in WNC. Third, attitudes of our focus group participants may not be transferable to the larger population of COPD patients. Our participants were motivated to attend a focus group session because they had lived with COPD for 10 years and perceived their COPD as severe. Fourth, social desirability may have occurred while participants completed the telehealth attitudes survey. Lastly, the study was conducted prior to the COVID-19 pandemic. Telehealth utilization and satisfaction has increased among health care providers and patients during the COVID-19 pandemic; thus, attitudes toward telehealth may have shifted to be more positive since the start of the pandemic.[32,43]

4.3. Implications for practice

COPD results in adverse health complications that negatively impact the quality of life of COPD patients. Study findings provide insights into the factors to consider when pharmacists, public health, and health care professionals are developing and implementing new tele-COPD programs in rural areas. Notably, study results indicate pharmacists may be able to expand their scope by partnering with physicians to offer and bill for telehealth services. Although participants expressed a high interest in receiving tele-COPD services, they reported several barriers that affected their decision to use tele-COPD programs. However, these barriers have not been addressed to reduce the spread of SARS-CoV-2, the virus that has resulted in the COVID-19 pandemic. Due to the COVID-19 pandemic, these opportunities are greater. Our findings also demonstrate the importance of increasing the awareness, knowledge, skills, and resources of telehealth among patients with COPD who reside in rural areas. Additionally, the lack of internet limits access to telehealth programs; thus, this should be taken into consideration when measuring access to health resources in rural communities. Lessons from this study may also be applied to other chronic conditions and populations in rural areas.

5. Conclusions

Tele-COPD programs can address geographic barriers by offering video-based visits and remote patient monitoring. However, uptake and use of telehealth programs are affected by patients' access to and comfort with using new technologies, privacy concerns, costs, and preference for in-person visits. Examining and developing strategies to overcome telehealth barriers are important to ensure the adoption of tele-COPD programs in a rural setting. Uptake of tele-COPD programs may be greater if patients' health care providers demonstrate how the technology works. Pharmacists could bridge the gap between patient's desire for in-person visits with telehealth links to physicians. It is critically important that future research implement and evaluate tele-COPD programs among multiple populations and health care providers in rural communities to inform future evidence-based practice recommendations.

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Declaration of Competing Interest

All authors have no conflicts of interest.

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