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ORIGINAL PAPER

Rural Adult Perspectives on Impact of Hearing Loss and Barriers to Care

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Abstract

Adult hearing loss has a significant impact on communication and quality of life. In spite of effective methods of diagnosis and treatment, many rural adults face significant barriers and delays in accessing care. The purpose of this study is to characterize the impact of hearing loss and the barriers for hearing healthcare in rural adults. Using stratified purposeful sampling, the study design involved semi-structured phone interviews with adults in the Appalachian region of Kentucky between 2016 and 2017 to describe perceived susceptibility to hearing loss; knowledge of hearing loss; cues leading to help-seeking; barriers limited access to care; benefits of seeking help; and self-rated confidence in seeking treatment. Thematic qualitative analysis was performed to identify recurring content themes. Forty adults participated in the study. Participants reported susceptibility to noise induced hearing loss with infrequent hearing protection use. Participants described concern with hearing loss-related communication barriers that could affect compliance with medical care, employment performance, personal safety, and relationship communication. Rural adult expressed willingness to seek hearing healthcare but reported a lack of providers in rural areas. The cost and the lack of insurance coverage for hearing aids were the most clearly articulated obstacles influencing access to care. Hearing loss has a significant impact on adults in rural areas. A lack of providers and the overwhelming cost of treatment are barriers to care. Further research is needed to identify novel methods to support rural adults seeking affordable hearing healthcare.

Keywords Hearing loss · Rural healthcare · Barriers to healthcare access · Appalachia

Introduction

Hearing loss (HL) is a chronic condition that negatively affects the health and well-being of adults across the United States. In general, nearly 15% of the adult population age 18 and older report some form of hearing impairment, and with age, the prevalence and burden of HL increases as nearly 70% of adults over the age of 70 have some form of HL [1–3]. HL impacts numerous aspects of life, including social and familial relationships, employment, emotional and mental wellness, financial welfare, and general communication [4–9]. Issues with interpersonal communication associated with hearing impairment and HL undoubtedly precipitate difficulties in relationships with family members and friends, which can contribute to social withdrawal and feelings of depression in some adults [6, 8]. Beyond the psychosocial ramifications, hearing impairment and HL can give rise to occupational limitations, restricting career opportunities [6, 8]. Elderly adults with HL experience improved quality of life when treated with hearing aids as significant, positive changes in psychosocial function, communication, cognition, and depression occur in this patient population [9]. The notable burden of HL on many facets of livelihood and the efficacy of treatment on improving ones quality of life warrants prompt intervention and diagnosis for adults with

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suspected HL or hearing impairment. Unfortunately, many factors complicate the accessibility and utility of hearing healthcare services. Place of habitation, namely rural versus urban, has a marked influence on one's ability and decision to seek and utilize hearing healthcare services [10].

Hearing impairment has been shown to be more prevalent in rural adult populations than among adults in urban areas [3] due to the increased likelihood of participation in both occupational and recreational noise exposure activities [3, 11, 12]. HL progression has been associated with risk factors such as hypertension and diabetes, noise exposure, and smoking; such characteristics are more common among a rural population as compared to their urban counterparts [13]. Access to general healthcare in rural areas is also affected due to increased transportation difficulties, fewer providers, and financial constraints [14–17]. Delays in diagnosis and treatment of HL tend to be greater in rural communities as compared to urban communities [18]. There is a need to assess the perceptions of rural adults regarding the impact and causes of hearing loss along with the barriers that affect access to hearing healthcare. This study, therefore, seeks to gain a more thorough insight into hearing healthcare disparities for a rural population using a qualitative approach. By exploring the perspectives of rural inhabitants directly, targeted measures to improve access to hearing healthcare for adults in rural areas may be determined.

Methods

The institutional review board of the University of Kentucky approved this study. Participants were identified from a rural primary care research network facilitated by the University of Kentucky Center of Excellence in Rural Health (CERH). An interviewer trained in the protection of human subjects recruited participants seeking primary care from the waiting area of primary care clinics using the following inclusion criteria: (1) adults (≥ 50) residing the rural Appalachian region of Kentucky; (2) seeking primary care from a primary care provider; and (3) English speaking. Participants were eligible whether or not they had previously sought hearing healthcare services, including otolaryngology or audiological services. Informed consent was obtained from each participant, and face-to-face interviews took place in a private space at the clinic. Recruitment continued until theoretical saturation occurred.

This explorative qualitative study used a semi-structured interview guide to examine hearing healthcare disparities and attitudes towards hearing healthcare among rural primary care patients. We developed the semi-structured interview guide based on rural adult hearing loss research [10, 18]. Specifically, the interview guide was based on the Health Belief Model [19] and included probes for: perceived susceptibility to hearing loss; knowledge of the condition of hearing loss; cues leading to help-seeking for hearing loss; barriers causing limited access to hearing healthcare; benefits of seeking help; and self-rated confidence in seeking treatment for hearing loss. Interviews ($n = 40$) were conducted at primary care clinics in Appalachian Kentucky between September 2016 and April 2017.

Analysis

Interviews were audio-recorded, transcribed verbatim, and entered into the Atlas.ti data analysis software. Interview transcripts were first reviewed to identify preliminary themes related to the social and personal impacts of hearing loss. In an initial codebook, we defined specific codes, including exemplars and exceptions to clarify code definitions, using an iterative process to clarify code definitions and approximate fit to study data. The first author applied the codes line by line to the transcripts and a senior author checked a subset of transcripts to ensure consistent application of codes. Finally, we compared how codes appeared across participants to identify variations in their presentation, articulate relationships between codes, and discern which codes were less central in participants' experiences. Some quotes below have been lightly edited for ease of reading.

Results

Participant Background

Participants' mean age was 60.9 years with a range of 50 to 78 years (Table 1). The majority were female (83%) and 60% had an estimated family income of less than $50,000. Approximately 55% of participants had more than a high school education.

Knowledge and Beliefs About the Causes of Hearing Loss

Participants acknowledged that nerve damage, genetics, aging, and chronic childhood ear infections caused susceptibility to hearing loss. However, particularly in this rural area, where many recreational activities take place outside, participants identified numerous activities in their surrounding environment that heightened their risk for hearing loss. With many people owning housing that included outdoor space, participants recognized that mowing the lawn was a regular loud sound they encountered, even if they weren't operating the machinery themselves: "he gets that old lawn mower around the house and you can hear that thing running." Other activities that combined livelihood and recreation involved loud equipment as well, such as hunting,

Table 1 Demographic characteristics of participants in qualitative interviews

	Study participants (n = 40)
Age	
Mean age (SD)	60.9 (7.9)
Sex	
Male	7 (17.5%)
Female	33 (82.5%)
Family's est. annual income	
< $20,000/year	6 (15.0%)
$20,000–$49,999/year	18 (45.0%)
$50,000–$100,000/year	14 (35.0%)
> $100,000	2 (5.0%)
Highest level of education	
< High school/GED	5 (12.5%)
High school/GED	13 (32.5%)
Some college	15 (37.5%)
Technical school	4 (10.0%)
College graduate or more	3 (7.5%)

using ATVs or four-wheelers, and operating heavy power tools like saws.

Many participants described workplaces filled with constant loud noises that they knew had harmful impacts on their hearing: machine shops, coal mines, hauling materials, and past military experience. While some participants commented on their concern for children listening to loud music, participants of all ages admitted that the volume at which they listened to music might pose a risk. Many participants cited how they experienced multiple environmental factors, thereby multiplying their susceptibility to hearing loss: "We've got 4-wheelers. [My husband] hunts, when he can get around. We have campers. We have loud trucks. The yard… riding lawn mower. I like loud music myself."

As common as these loud sounds were in recreational and occupational settings, few people described access to hearing protection or concern about long-term exposures to loud sounds. "[I'm exposed to] high noisy equipment, music, listening to music real high. I was bad for that," noted one man reflectively. Several participants acknowledged that employers provided workers with little protection. Describing her husband, one participant noted, "he was supplied ear plugs when he was on the bolt machine… I don't think [the ear plugs] were really efficient because right now he can't hear thunder."

Implications of HL

Participants described how people suffering hearing loss suffered impacts on their day to day functionality, and social relationships. "You're missing out on so much of life from not being able to hear," summarized one participant. Participants outlined critical activities in daily life that required hearing, placing people with hearing loss at an enormous disadvantage: "you need to hear that smoke detector go off, you need to be able to hear your oven when it reaches the appropriate temperature—the ding—so that you know it's ready to bake your biscuits or whatever… and of course you won't be able to communicate by the telephone and you won't enjoy a television program without having it so loud that it's deafening everyone else."

Many participants commented on their intensified worry for elderly family members with comorbid hearing loss and other sicknesses due to the increased barriers they faced to phone communication, particularly when it might be urgent or when they needed to clarify medical details over the phone. "Sometimes it's difficult for [people with hearing loss] to understand what their provider is telling them," noted one participant, "so it really can affect how compliant they are with their medicines." For others, not being able to communicate by phone provoked confusion and frustration. Describing a relative, one participant explained, "he goes into panic mode if someone calls on the phone because he can't hear and the crickets [what he hears in place of sound]… he complains but the crickets are the worst."

For others daily communication with co-workers was impaired by hearing loss. "You could be missing very important details that you need to do your job cause you tend to somewhat give up and just kind of nod your head and smile and move on", said one participant, describing the way that the discouragement from hearing loss had its own reverberating impacts. Hearing loss made meetings less productive, noted several participants, potentially limiting job performance or resulting in eventual job loss.

Participants commented on the fear that hearing loss posed for safety. Hearing loss potentially prevented individuals from hearing warnings from others about risks in the immediate environment, whether in their homes, or especially as a driver or pedestrian.

However, participants commented most extensively on the impacts that hearing loss had on social relationships. Poor hearing often led to miscommunication, and with that, harms to relationships. One participant explained the frustration of people with hearing loss as they tried to make sense of the limited pieces they understood: "Well, they don't hear everything that's uh being said and sometimes they can uh misunderstand things and take it the wrong way… When you hear bits and pieces, then you try to put it together, and… you might come up with the right answer and you might not." Yet there were also some participants who expressed distrust of the extent of their family members' hearing loss, demonstrating how hearing loss was scrutinized to define whether it was a social choice or a "real" disability. Noted one participant, “He hears what he wants to hear. Sometimes I think he has choice hearing and he just makes words up.”

Missing out on communication had consequences for particular relationships. “Not hearing your grand babies holler at you… like simple things like that… that’s just unfair,” argued one participant. As people with hearing loss tried to make up for what they missed in communication, they relied on their family members to help them fill the gaps, sometimes putting strain on their relationships. “I’m constantly asking family to repeat what they’ve said or I may look at my husband and say, “What did they say?” explained one woman. Other participants revealed the perspective of the helping family member: “it’s aggravating because I have a spouse that is hard of hearing and I have to repeat myself.” Many participants described how particular social settings—church, funerals, family gatherings—had become too burdensome for their relatives with hearing loss to participate in. Describing her husband, one participant commented, “in a crowd he seems bewildered sometimes and he gets anxious…Like when he’s all bunched up at a Christmas party. Sometimes he just strays off and I know it’s because he can’t focus on this one talking or that one talking because it’s all running together.” In addition to his disorientation, she mentioned, “I think it bothers him a lot” because he ended up in isolation at this and other gatherings.

Outside of these barriers to communication, many participants commented on deeply personal impacts of hearing-loss related challenges in communication: “It’s embarrassing to go around saying ‘what’ all the time or ‘excuse me.’” Over time, such embarrassment, “would probably cause them to isolate you know their self… not wanting to go out in public, things of that nature.”

Health-Seeking Behavior

When participants were asked about when they would seek help for hearing healthcare, they first appeared to be unequivocal in stating the need to seek out care: “If I was having hearing problems, or any other medical condition, I would seek help.” As one participant put, “I mean I don’t need no encouragement in that regard.” Participants were clear that seeking hearing healthcare would enabled them to have “a better life and be able to communicate with people. Participants stated that deteriorating hearing would be a particularly pressing indication that they would need to seek out care.

Yet when it came to how they would know *when* hearing healthcare was needed and *how* they would access such care, there was much more confusion. Participants described how it was difficult to discern the difference between hearing difficulties and hearing loss. Many asserted hearing loss in straightforward terms. Describing her husband, one woman laughed, “my husband does [have hearing loss]. He says, ‘Huh?’ a lot.” But in other cases, participants admitted that it was difficult to tell whether their family members had hearing loss: “my husband cannot hear, I don’t think. I mean he’s got hard of hearing, so I talk to him and ask three times and have to scream. He says he can hear, but I don’t think he can.” Several participants pointed to the role of self-stigma or shame in limiting people’s ability to identify as having hearing loss. “They don’t wanna admit they can’t hear,” explained the participant, but “they want to think they can.” This reticence extended even to fear or hesitation to seek testing. “He should [have his hearing tested],” argued one participant about a relative, “but he won’t.” Some participants maintained that this reticence fit within an overall paradigm to avoid healthcare: “he uh believes in seeking the minimal amount of care to maintain his health as he sees it, being able to get by.” In other cases, participants described relatives who had clear needs but did not use the hearing aids that they had obtained. “He won’t wear his hearing aids half the time,” explained one participant, describing her husband, “That’s the main problem.”

Proximity and Accessibility of Hearing Healthcare

Several participants mentioned how access to hearing healthcare for themselves or their family members was granted through referrals from their primary care providers or their Veterans Administration providers. Several others pursued hearing healthcare after hearing exams required to receive a Commercial Driver’s License. Many others cited proximity and accessibility of hearing healthcare as a major barrier to getting care. “Help is not available in our area I don’t think,” commented one participant, “I’d have to travel 2 h to see a specialist.” This sentiment was echoed by many other providers who stated that their rural region lacked appropriate providers for hearing healthcare and that the distance to reach those providers that were available was prohibitive. Others were concerned about the quality of the providers in the region, “if there was a good doctor around I mean I don’t want to go to just any doctor.” For others, providers were not available outside of regular working hours, making it impossible to seek care.

The primary barrier to hearing healthcare raised by participants was affordability—with the point raised that, even for those who had coverage, insurance rarely covered the cost of hearing healthcare. “The expense of hearing aids is beyond most people’s [means] in this area,” stated one participant plainly. Yet even more, participants argued that even the cost of hearing tests would be prohibitive for most residents in the region. Though some participants held full awareness of their hearing loss, cost limited their ability to seek treatment: “I probably wouldn’t seek help because I know I need a hearing aid and insurance won't pay for it." This participant continued that should his condition increase in severity, he may seek care. These participants reasoned that they found ways to function with their hearing loss: "You know when you're working and paying bills, you know I can function, it's not life threatening necessarily, it's not like having had the pacemaker or the defibrillator which was life threatening. You know I can sort of compensate for the hearing loss. So ya know. I'm a used car." One participant pointed out the irrational nature of benefits provided by insurance. Initially apologizing, s/he explained, "it's kind of blunt and kind of crude, but I can get a skin repair if I'm fat, but I can't get a hearing aid if I can't hear- and I think that's wrong." Whether they had hearing loss or were projecting their needs as if they had hearing loss, participants were in agreement that, "If I can afford it, I'm going to get it."

Discussion

Adults of a rural population are impacted by HL, but tend to lack the access and financial means to seek care and treatment from providers at hearing healthcare facilities. Overall knowledge and beliefs regarding the causes of HL highlight a general understanding of how the rural environment, with its marked recreational and occupational noise exposures, contribute to the HL burden among this population. Implications of HL dictated by these rural adults unveiled a genuine concern for the impact HL has on social, occupational, and mental functionality. Particularly in a region where kin relationships are critical to both social identity and social support, the social consequences of hearing loss on maintaining relationships can be especially devastating [20]. Health-seeking behaviors did not unequivocally parallel the expressed conviction to seek care for a notable hearing issue since seeking care warrants the identity of a hearing problem, which not all rural community members notice in themselves. The findings of this study suggest the need to bridge the gap of prominent barriers, namely cost and proximity to care, for rural populations to facilitate early intervention and treatment for hearing impairment and HL. Additionally, the findings of this study highlight the need for health education among this community to promote the use of hearing protection and to educate this community about when and how to seek hearing healthcare services. Many rural adults have a self-reliance regarding their healthcare and may not seek care [21, 22]. Furthermore, they may face a hierarchy of needs and may not be able to seek care for non-life threatening conditions [23]. Considering the competing health, financial, and social demands that are faced by many in this underserved region with multiple health disparities, integrating hearing healthcare more seamlessly into primary care and into standard insurance coverage could hold enormous potential for expanding access to needed care.

The higher prevalence of HL and hearing impairment in rural populations as compared to urban communities emanated from reports demonstrating the increased likelihood of participation in both occupational and recreational noise exposure activities among rural habitants [3, 12]. These reports match the findings of this study, which demonstrate an increased risk for exposure to loud noises and lack of workplace protection among rural residents. Participants were able to describe multiple environmental factors that influenced their susceptibility to hearing impairment and HL. Even more, participants voiced concerns about how employers typically do not provide adequate means of hearing protection in the workplace. Given the various sources of loud noise exposure in both recreational and occupational settings among rural habitants, educating community members and employers about proper hearing protector devices and providing such devices to rural community members might attenuate the prevalence of hearing impairment and HL in this community [24].

Proximity and general accessibility to hearing healthcare arose as a major barrier among this rural study sample. It is curious to assess whether accessibility of care is a perception held by rural residents or whether this is a tangible barrier that warrants intervention. Rural adults in this study expressed that hearing healthcare resources were sparse in their area or that distance to such resources impeded their ability to seek care. The sentiments expressed by participants in this study are validated by other studies. Previous reports demonstrated longer commutes, lack of local healthcare resources, and underdeveloped transportation infrastructure as significant barriers to accessing care among rural residents [18, 25]. Future studies and interventions should focus on how to attenuate these barriers, namely how to ensure local availability of resources and how to establish adequate means of transportation for isolated geographic rural communities.

While access to care is a major barrier for this rural population, the primary barrier is the cost of hearing healthcare. Compared to urban counterparts, rural community members are more likely to rely on Medicaid coverage and to experience insurance-related healthcare delays [3, 26]. There is a lack of Medicaid and/or Medicare coverage of hearing aids to treat HL. Twenty-two states offer no coverage via Medicaid while the other twenty-eight states offer some form of coverage, though this coverage varies widely [27]. The lack of Medicaid coverage makes affordability a huge barrier for rural residents, which was underscored by the participants in this study. For the rural adults of this study, seeking treatment was attenuated by the fact that insurance rarely covered the cost of devices needed to treat age-related HL. This barrier to seeking healthcare services could be overturned, however, if the means for cost coverage arose within this rural community as many participants within this study expressed that with enough money they would seek help. Together, our findings suggest the need for a community-centered program focused on attenuating the cost and accessibility barriers that rural residents face.

There are several notable limitations to this study. The first limitation includes the sample population recruited for this study. While this sample does represent our target community group (i.e. adults of a rural residence), the sample size is small and particular to rural Kentucky. Based on recurrent themes presented by participants, we assumed saturation was reached. Data collected from a larger sample size could further validate the findings of this study. Additionally, data collected from various rural communities could further validate our findings and perhaps highlight both similarities and differences experienced across rural communities in America regarding hearing health and hearing healthcare utility. Another limitation includes the questions asked during the interviews for this study. The questions certainly permitted a thorough evaluation of knowledge and beliefs, implications, and barriers for this rural population; however, future studies might benefit from asking questions with a broader scope in order to extract a deeper understanding of the experiences of rural adults.

Even with the significant impact of HL in the lives of rural adults, many do not seek care from hearing healthcare providers. This study illustrates the need to eradicate the barriers faced by this population in order to facilitate access to hearing healthcare for this community of rural adults. This study also sheds light on the personal implications of HL among this community, which will hopefully inspire future interventions to target this population with the preventative measures and education needed to combat the burden of HL faced by these adults. Moving forward, the findings of this study can hopefully serve as a basis for future studies in understanding and combating the barriers and health-seeking behaviors of this particular population across the United States.

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Compliance with Ethical Standards

Conflict of interest MLB is a consultant for MED-EL and Stryker and has received research funding from Advanced Bionics (unrelated to this research). There are no conflict of interest with the content of this manuscript. The authors have no other financial relationships or conflicts of interest to disclose pertaining to the manuscript.

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