

COMMENTARY

## Rural residence and adherence to continuous positive airway pressure therapy: have we overcome a barrier?

Commentary on Corrigan J, Tsai WH, Ip-Buting A, et al. Treatment outcomes among rural and urban patients with obstructive sleep apnea: a prospective cohort study. *J Clin Sleep Med.* 2022;18(4):1013–1020. doi: [10.5664/jcsm.9776](https://doi.org/10.5664/jcsm.9776)

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The management of obstructive sleep apnea (OSA) presents a major challenge to health systems due to the high prevalence of disease and complexities in service coordination.<sup>1,2</sup> These challenges lead to widespread access limitations, which are not distributed equally. Patients in rural areas face particular access barriers due to the urban-based distribution of specialized personnel and equipment.<sup>3,4</sup> Reflecting these barriers, patients in rural areas who have symptoms of OSA are less likely to be diagnosed, and those who are able to complete testing tend to be patients with more severe disease.<sup>3,5</sup> While there appears to be a relationship between rurality and underdiagnosed OSA, the implications of rural residence on subsequent treatment outcomes are unclear. Specifically, there is a lack of information around the impact of rurality on adherence to continuous positive airway pressure (CPAP) treatment and other treatment outcomes.

It is reasonable to suspect that rural residence could impact adherence. CPAP is often challenging to use, but there are actions that providers and health systems can take to support patients. These steps include education, behavioral interventions, and troubleshooting aimed at supporting patients' self-efficacy and reducing side effects.<sup>6</sup> These interventions historically relied on in-person visits with specialists,<sup>7–9</sup> complicating access among rural patients. While virtual adherence interventions are increasingly adopted that can reach patients remotely (eg, video-based follow-up, telemonitoring),<sup>6,10,11</sup> rural areas often lag behind urban ones in internet connectivity and access.<sup>12</sup> Additionally, patients in rural areas also tend to have other risk factors for poor adherence to CPAP, including lower income and fewer years of education.<sup>13–16</sup>

In the present issue of the *Journal of Clinical Sleep Medicine*, Dr. Corrigan and colleagues present analyses to assess the impact of rurality on adherence to CPAP and improvement in OSA symptoms.<sup>17</sup> The authors established a prospective cohort of patients from rural and urban areas who were starting CPAP therapy for the first time from December 2018 to November 2020. To do so, the authors partnered with respiratory home-care providers across the province of Alberta to help identify and recruit eligible patients. Patients consenting to take part in this cohort completed surveys at baseline and after 3 months to

assess sleepiness, visit satisfaction, and quality of life. The authors also had access to baseline diagnostic testing results and CPAP usage for each participant. The authors compared CPAP usage and patient-reported outcomes between those defined as rural or urban according to standards defined federally by the Canadian government.<sup>18</sup>

Ultimately, the authors recruited 242 eligible patients, 100 rural and 142 urban patients. Aligning with prior observations, individuals in the rural group had a lower median household income, longer driving distance to a CPAP provider, and experienced longer delays in diagnosis and treatment. Overall, the authors did not detect a difference in adherence between rural and urban patients, and the mean difference in nightly CPAP use for rural vs urban patients was 0.17 hours (95% confidence interval: -0.62 to 0.96). The authors also did not detect differences with regard to improvements in sleepiness or satisfaction. However, the authors did observe a significantly greater improvement in quality of life among rural patients relative to urban: +5.1 EuroQOL-5D visual analog scale score (95% confidence interval: 0.2–10.0).

These findings provide some reassurance that patients in rural areas can achieve comparable outcomes with CPAP. However, we must consider several factors before generalizing these results to other rural settings and populations. First, the authors' analyses only include patients consenting to a research study. Those consenting for research studies often differ from those who do not consent.<sup>19,20</sup> Importantly, the characteristics where research participants often differ from nonparticipants (higher income, greater education) are themselves associated with greater adherence.<sup>15</sup> Second, the authors' reported overall adherence appears to be lower than other cohorts,<sup>11,21</sup> raising concerns that floor effects may have masked a true effect between urban and rural individuals. Finally, the nature of care delivery for this sample may not be generalizable to what is currently done in other settings. While all sleep testing was interpreted by sleep specialists, it is notable that only 8% of individuals in this study followed the specialist pathway. In other words, 92% of patients received OSA-related counseling and CPAP instruction from respiratory homecare providers without interacting with a specialist. Many health systems,

particularly those in the United States, rely much more heavily on specialist consultation.<sup>22</sup> As specialists are more likely to be isolated to urban areas,<sup>3,4,17</sup> it is possible that a more specialist-dependent model could lead to worse adherence for patients in rural areas.

Patients in rural areas face numerous barriers that limit access to services. However, the findings of Dr. Corrigan and colleagues provide some reassurance that these barriers do not necessarily translate to lower success with CPAP. Their results should give us some hope that barriers are not insurmountable. While causation cannot be directly inferred, it is important to contextualize these findings in the setting of modern technologies and systems of care that promote geographic reach.<sup>23</sup> Innovations in remote care (eg, telemonitoring) emerged after decades of work and reinforce that, with concerted effort, creativity, and research, our field can adapt pathways to overcome access barriers. We should keep this in mind as we strive for equitable delivery of care in other areas, including addressing persistent racial, ethnic, and socioeconomic disparities in adherence.<sup>24,25</sup>

## CITATION

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