

Telemedicine Referral to Improve Access to Specialty Care for Preschool Children in Rural Alaska: A Cluster-Randomized Controlled Trial

Abstract

Objectives: Preschool programs provide essential preventive services, such as hearing screening, but in rural regions, limited access to specialists and loss to follow-up compound rural health disparities. We conducted a parallel-arm cluster-randomized controlled trial to evaluate telemedicine specialty referral for preschool hearing screening. The goal of this trial was to improve timely identification and treatment of early childhood infection-related hearing loss, a preventable condition with lifelong implications. We hypothesized that telemedicine specialty referral would improve time to follow-up and the number of children receiving follow-up compared with the standard primary care referral.

Design: We conducted a cluster-randomized controlled trial in K-12 schools in 15 communities over two academic years. Community randomization occurred within four strata using location and school size. In the second academic year (2018–2019), an ancillary trial was performed in the 14 communities that had preschools to compare telemedicine specialty referral (intervention) to standard primary care referral (comparison) for preschool hearing screening. Randomization of communities from the main trial was used for this ancillary trial. All children enrolled in preschool were eligible. Masking was not possible because of timing in the second year of the main trial, but referral assignment was not openly disclosed. Study team members and school staff were masked

throughout data collection, and statisticians were blinded to allocation during analysis. Preschool screening occurred once, and children who were referred for possible hearing loss or ear disease were monitored for follow-up for 9 months from the screening date. The primary outcome was time to ear/hearing-related follow-up from the date of screening. The secondary outcome was any ear/hearing follow-up from screening to 9 months. Analyses were conducted using an intention-to-treat approach.

Results: A total of 153 children were screened between September 2018 and March 2019. Of the 14 communities, 8 were assigned to the telemedicine specialty referral pathway (90 children), and 6 to the standard primary care referral pathway (63 children). Seventy-one children (46.4%) were referred for follow-up: 39 (43.3%) in the telemedicine specialty referral communities and 32 (50.8%) in the standard primary care referral communities. Of children referred, 30 (76.9%) children in telemedicine specialty referral communities and 16 (50.0%) children in standard primary care referral communities received follow-up within 9 months (Risk Ratio = 1.57; 95% confidence interval [CI], 1.22 to 2.01). Among children who received follow-up, median time to follow-up was 28 days (interquartile range [IQR]: 15 to 71) in telemedicine specialty referral communities compared with 85 days (IQR: 26 to 129) in standard primary care referral communities. Mean time to follow-up for all referred children was 4.5 (event time ratio = 4.5; 95% CI, 1.8 to 11.4; $p = 0.045$) times faster in telemedicine specialty referral communities compared with standard primary care referral communities in the 9-month follow-up time frame.

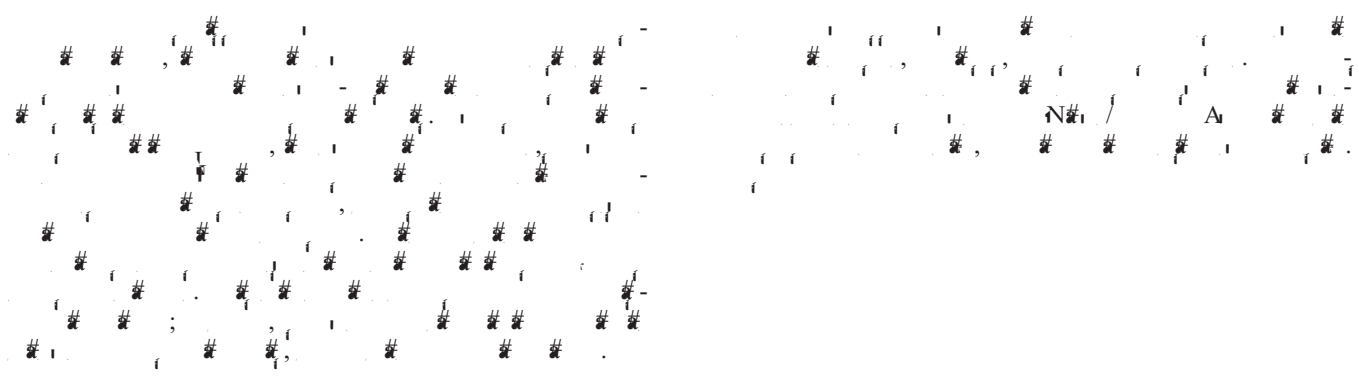
Conclusions: Telemedicine specialty referral significantly improved follow-up and reduced time to follow-up after preschool hearing screening in rural Alaska. Telemedicine referrals could extend to other preventive school-based services to improve access to specialty care for rural preschool children.

Key words: Child health, Hearing loss, Healthcare disparities, Mobile health, Rural health, School hearing screening, Telemedicine, telehealth.

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INTRODUCTION

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Procedures

The magnitude spectrum of the signal was calculated using the fast Fourier transform (FFT) method (Oppenheim and Schaffer, 2019).

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