

OR = 1.53; 95% CI, 1.03–2.27).
OR = 1.38; 95% CI, 0.80–2.39).
OR = 1.33; 95% CI, 0.75–2.35).
OR = 1.22; 95% CI, 0.75–1.98).
OR = 1.06; 95% CI, 0.68–1.66).
OR = 2.27; 95% CI, 1.33–3.86).

Conclusions: Lack of access to running water in the home was associated with increased prevalence of middle ear disease in this rural, Alaska Native population, particularly among younger children (aged 3 to 6 years). There was little evidence in this study that cigarette smoke, wood-burning stoves, and greater numbers of persons in the household were associated with infection-mediated hearing loss or middle ear disease. Future research with larger sample sizes and more sensitive measures of environmental exposure is necessary to further evaluate these relationships. Children who live in homes without access to running water may benefit from earlier and more frequent hearing health visits.

Key words: Alaska, Childhood hearing loss, Environmental risk factors, Household crowding, Infection-related hearing loss, Middle ear disease, Running water, Rural healthcare, Smoke exposure, Water wash infection.

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INTRODUCTION

Childhood hearing loss (CHL) is a significant public health problem, affecting approximately 1 in 10 children in the United States.¹ CHL is associated with academic and social difficulties, and can lead to long-term disability.² In Alaska, the prevalence of CHL is higher than in the United States, with approximately 1 in 5 children having CHL.³ The majority of CHL in Alaska is caused by infection-mediated hearing loss (IMHL), which is often associated with middle ear disease (MED).⁴ MED is a common condition in Alaska Native children, and is often associated with environmental risk factors such as household crowding, cigarette smoke, and wood-burning stoves.⁵ However, the role of running water in the home in the development of MED and CHL is not well understood.⁶ Running water is essential for hygiene and infection control, and is a key component of a healthy home environment.⁷ In rural Alaska, access to running water is often limited, and this may contribute to the high prevalence of MED and CHL.⁸ This study was designed to evaluate the association between access to running water in the home and the prevalence of MED and CHL in a rural Alaska Native population.

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15 (2019); (2022; 2019).

(3)

21 (2005; 2016; 2017; 2018).

(A 2005).

(A A 2004).

(2014),

(2000) (2012).

(2008; & 2016),

A (2021).

N

A

Definition of Infection-Related Hearing Loss and Middle Ear Disease

(N / % A)

A

A

A

2, 3, 4, 5

(65/55 % 1/2)

(6 %)

(1997).

A

0.5, 1, 2, 4

(25)

2016). A

(3 6)

100,

(< 200)

& 1984).

MATERIALS AND METHODS

Study Overview

N

(12)

(2017 2019)

12 A

(2018 2019)

A),

(2019; 2019).

(1, // AN / 48)

Definition of Potential Factors of Hearing Loss and Middle Ear Disease

(1 2,

3+)

$OR = 1.38; 95\% CI (0.80, 2.39)$,
 $OR = 1.01; 95\% CI (0.48, 2.38)$,
 $OR = 0.85; 95\% CI (0.55, 1.32)$.
 $OR = 1.11; 95\% CI (0.86, 1.44)$.
 A- ... (... 1 ...)
 AN / 48) ... 1, ... / ...
 A- ...

Associations With Middle Ear Disease

(... 3) ... 53%
 $OR = 1.53; 95\% CI (1.03, 2.27)$

Heterogeneity

3 6 ... AN / 48; ... 3 4 ... 5 6 ... 1 2 ...

A- # A- #
() 3 6
A- # A- #
7
2/ 3 6 N
3 6 7

Missing Data

A # 65 (3.98%)
(A- #), 96 (5.9%)
A- # # 34 (2.08%)
3
6 # (7
1, :// AN / 48).
8
1, :// AN / 48.
9
:// AN / 48
(# 3 6 # 7 # #);

DISCUSSION

A #
61

3 6 # (#
= 12.2%; 95% #, 9.3 15.7; # # = 22.7%;
95% #, 18.9 26.9) # # 7 # #
(# # = 10.6%; 95% #, 8.9 12.6;
= 15.3%; 95% #, 13.3 17.5). A
17%
= 1.17; 95% #, 1.05 1.31) # # 11%
1.03 (1.21) # # 3 6 # # #

TABLE 2. Regression estimated prevalence ratios and prevalence differences for environmental associations with hearing loss*

Variable	Sample prevalence	Number of observations used†	Prevalence ratio‡ (95% CI)	Prevalence difference§ (95% CI)
How many people currently live in the household?		1533	1.06 (0.97 to 1.16)	0.7 (-0.5 to 1.9)
Do you have running (plumbed) water in your house?		1533		
Water in house	9.7 (8.0, 11.6)		(ref)	(ref)
No water in house	13.5 (10.6, 16.9)		1.38 (0.80 to 2.39)	3.7 (-2.7 to 10.1)
Do you use a wood-burning stove or replace to cook or help heat the house?		1526		
No	11.6 (9.6, 13.8)		(ref)	(ref)
Yes	9.9 (7.6, 12.7)		0.85 (0.55 to 1.32)	-1.7 (-6.5 to 3.0)
Number of smokers in the house?		1532		
None	11.3 (8.7, 14.3)		(ref)	(ref)
1-2 Smokers	10.4 (8.4, 12.7)		0.92 (0.53 to 1.58)	-0.9 (-7.0 to 5.2)
3 or more smokers	12.1 (8.0, 17.4)		1.07 (0.48 to 2.38)	0.8 (-8.5 to 10.1)
Count of risk factors¶		1525	1.11 (0.86 to 1.44)	1.2 (-1.6 to 3.9)
Overall prevalence of Hearing Loss	11.1 (9.6, 12.7)			



2001; A (2005).
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 2004).
 (1995; 2000),
 21 (2014).
 (2000;
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