Description of Otolaryngology (OTO) Disease in Houseless Patients on Oʻahu, Hawaiʻi

Enze Ma BS; Rylie M. Wada BS; Brendan K. Seto BA; Dylan S. Singh BS; Teresa L. Schiff-Elfalan MD; Lawrence Burgess MD

Abstract

This retrospective study assesses the prevalence of otolaryngology (OTO) disease in houseless patients on Oʻahu based on data from the Houseless Outreach and Medical Education (HOME) clinics, a medical student-run, primary health care service. It is important to note that this data represents only a snapshot in time of the OTO diseases present in this population. Records were examined from September 3, 2020 to September 30, 2021. Patients with at least 1 OTO disease were included in this study. A total of 597 patient records were reviewed; a total of 58 patients were included in this study. The most common OTO diagnoses in this sample were facial trauma (n = 12, 21%), dental caries (n = 7, 12%), cerumen impaction (n = 6, 10%), viral upper respiratory infection (n = 5, 9%), otitis media (n = 4, 7%), and allergic conjunctivitis (n = 3, 5%). Roughly 10% of patients seen in HOME clinics between September 2020 and September 2021 were seen for OTO disease.

Keywords

Houseless care, Otolaryngology, Student-run free clinic

Abbreviations

CAGE = Cut down, Annoyed, Guilty, Eye-opener substance abuse screening tool
HNSCC = head and neck squamous cell carcinoma
HOME = Houseless Outreach and Medical Education
OTO = otolaryngology
PHQ-2/PHQ-9 = Patient Health Questionnaires screeners for major depressive disorder

Introduction

Hawaiʻi has one of the highest rates of houselessness in the nation, just behind the District of Columbia and New York City, with an estimated 6458 houseless people on a given night in 2020.[1,2] Multiple studies have shown that houselessness increases the likelihood of chronic diseases and other health problems.[3–5] Among the houseless, there is a higher prevalence of unmet basic human needs, healthcare needs, and social needs. Taken together, these barriers often lead to a delay in or missed diagnoses, leading to worsening clinical presentations and increasing rates of mortality, morbidity, and hospitalizations.[6]

This study reviews data from the Hawaiʻi Houseless Outreach and Medical Education (HOME) Project clinics, a primary-care medical service provided by students and faculty of the John A. Burns School of Medicine in Honolulu, Hawaiʻi. The HOME Project is a mobile clinic, conducted via mobile van, that provides free medical care across the island of Oʻahu in multiple locations, 6 days a week. From September 3, 2020 to September 30, 2021, the HOME Project saw a total of 596 patients. The aim of this study is to describe otolaryngology (OTO) diseases in patients who seek care at the HOME project as it may provide some insight into the needs of patients at HOME clinic, especially as it pertains to OTO care. Although similar studies are available in other areas of the world,[7–10] to date, there has been no report on the state of OTO diseases in houseless patients on Oʻahu.

Materials and Methods

The study was approved by University of Hawaiʻi Institutional Review Board. Medical records of patients presenting to HOME Project Clinics between September 3, 2020 and September 30, 2021 were retrospectively reviewed and compiled into a dataset. Records with at least 1 OTO disorder in clinics across the island of Oʻahu were included in the study. OTO disorders were defined as an OTO chief complaint, ie, a chief complaint relating to ears, face (orbits, nose), oral cavity, neck, or upper airway that appeared as free text in the chief complaint section of the electronic medical record. There were no exclusion criteria in terms of age or comorbidities. Patients who returned for follow-up visit were only counted once. Diseases of the teeth and the gums were included as these conditions are often precursors for odontogenic diseases that may require evaluation and treatment by otolaryngologists. Specific diseases of the eye (ie, allergic conjunctivitis and dry eyes) were included as allergy falls within the scope of OTO.

The following information was drawn from each medical record: first and last name, age, sex, chief complaint, results of CAGE and PHQ-2/PHQ-9 questionnaires, smoking and drinking habits, and comorbid conditions. CAGE (Cut down, Annoyed, Guilty, Eye-opener) is a substance abuse screening tool, and PHQ-2/PHQ-9 are Patient Health Questionnaires designed to screen for major depressive disorder.[11,12] Data were manually entered into Microsoft Excel 2022 (Microsoft Corporation, Redmond, WA).

Outcome Measures

Primary outcome measures included number and types of OTO chief complaints and OTO diagnoses. Secondary outcome measures included comorbidities, risk factors, and demographic data.

Statistical Analysis

This is a descriptive study, and no statistical analysis was utilized to interpret these data.

Results

A total of 597 patient records from September 2020 to September 2021 were reviewed. Overall, 58 patients (10%) matched the inclusion criteria and were included in the study. Characteristics of the sample are detailed in **Table 1**. There were 36 males (62%) and 22 females (38%) in the study. The average age was 47.9 years old (range = 18-85, SD = 13.01). Tobacco use was reported in a little over half of patients (n = 33, 57%), with 23 (40%) smoking >10 cigarettes/day. Alcohol use was cited in a total of 17 (29%) patients, with only 1 of those being female. Of the male patients, twelve (33%) reported heavy drinking, defined as >14 standard drinks/week.

The most common OTO diagnoses in this sample were facial trauma (n = 12, 21%), dental caries (n = 7, 12%), cerumen impaction (n = 6, 10%), viral upper respiratory infection (n = 5, 9%), otitis media (n = 4, 7%), and allergic conjunctivitis (n = 3, 5%). Tooth fractures secondary to trauma were counted as trauma. Tooth fractures secondary to dental disease were counted as dental caries. The full list of OTO diagnoses in the sample is detailed in **Table 2**.

The sample also had a wide range of comorbidities, with 53% of patients (n = 31) reporting at least 1 active comorbid condition and about 22% (n = 13) reporting 3 or more comorbid conditions. The most common comorbidities in the sample were active cardiovascular conditions and risk factors (n = 15, 26%), psychiatric conditions (n = 10, 17%), and dermatologic issues (n = 5, 9%). Six (10%) patients also reported experiencing domestic violence and 5 (9%) patients had a history of traumatic injury. Of note, some patients had more than 1 OTO disorder. Five (9%) patients reported comorbid active or previous OTO disease, including allergic rhinitis, dental issues, hearing loss, tinnitus, and tympanic membrane repair, but only the primary presenting complaint was recorded. The summative list of comorbidities in this sample is detailed in **Table 3**.

Table 1. Demographic Characteristics of Otolaryngology Patients Seen at the Houseless Outreach and Medical Education Clinics on O'ahu, September 3, 2020 and September 30, 2021

Category	No. Patients (n=58)	% Total
Sex		
Male	36	62%
Female	22	38%
Age		
Average	47.9	
18-29	4	7%
30-39	12	21%
40-49	10	17%
50-59	26	45%
60-69	4	7%
>= 70	2	3%
Alcohol Abuse (CAGE[a])		
CAGE 1	8	14%
CAGE 2	1	2%
CAGE 3	1	2%
CAGE 4	2	3%
Positive CAGE (2+)	4	7%
Alcohol Use (Chart)		
<7/week (F)	0	0%
>7/week (F)	1	5%
<14/week (M)	4	11%
>14/week (M)	12	33%
Smoking		
<10 cigarettes/day	10	17%
>10 cigarettes/day	23	40%
PHQ-9[b]		
Mild (5-9)	1	2%
Mod (10-14)	4	7%
Mod/Sev (15-19)	4	7%
Severe (20-27)	2	3%

a CAGE (Cut down, Annoyed, Guilty, Eye-opener) substance abuse screening tool[12]
b PHQ-2/PHQ-9 Patient Health Questionnaires designed to screen for major depressive disorder[11]

Table 2. Summary of Otolaryngology Disorders Identified Among Patients Seen at the Houseless Outreach and Medical Education Clinics on O'ahu, September 3, 2020 and September 30, 2021

Otolaryngology Disorder	No. Patients (n=58)	%Total
Ear		
Hearing loss	1	2%
Otitis		
Externa	2	3%
Media	4	7%
Cerumen	6	10%
Vertigo	1	2%
Nose		
Fracture	1	2%
Allergic rhinitis	2	3%
Sinusitis	1	2%
Oral Cavity		
Gingivitis	2	3%
Dental caries	7	12%
Herpes labialis	2	3%
Jaw fracture	1	2%
Palatal fracture	1	2%
Tooth fracture	1	2%
Eyes		
Allergic conjunctivitis	3	5%
Dry eyes	2	3%
Orbital trauma	5	9%
Upper airway		
Bronchitis	2	3%
Viral upper respiratory infection	5	9%
Neck		
Cervical stenosis	1	2%
Goiter	1	2%
Trauma	1	2%
Other		
Allergic reaction	1	2%
Folliculitis	1	2%
Forehead laceration	2	3%
Tinea capitis	1	2%
Post-operative pain	1	2%

Table 3. Summary of Comorbidities Among Otolaryngology Patients Seen at the Houseless Outreach and Medical Education Clinics on O'ahu, September 3, 2020 and September 30, 2021

Comorbidity Type	No. Patients (n=58)	%Total
Cardiovascular disorder	15	26%
Psychiatric disorder	10	17%
Domestic abuse	6	10%
HEENT disorders	5	9%
Dermatologic disorder	5	9%
Traumatic injury	5	9%
Respiratory disorder	4	7%
Gastrointestinal disorder	3	5%
Migraine	3	5%
Glaucoma	2	3%
Arthritis	2	3%
Thyroid dysfunction	1	2%

Discussion

This study retrospectively analyzed data from multiple HOME clinics across the island of O'ahu. Analysis showed that roughly 10% of the population at HOME clinics were seen for otolaryngologic reasons. The most common conditions presented were trauma, followed by dental problems, cerumen impaction, viral upper respiratory infections, and otitis media, and allergic conjunctivitis. These are similar to some of the common conditions seen by primary care physicians.[13]

Some studies have reviewed the results of OTO associated diseases within the houseless population in multiple locations. Ralli et al conducted a retrospective study in Rome which reviewed 2516 houseless patients and found that many of them suffered from OTO-related issues, the most common being pharyngotonsillitis, rhinitis, and hearing loss.[7] Importantly, precancerous or cancerous lesions were reported in 7%. Noel et al conducted a cross-sectional study of 100 houseless patients in Toronto and found that there was a significantly higher rate of speech-frequency hearing loss in one ear (40%) and high-frequency hearing loss (52%) in the houseless population when compared to the general Canadian public (19% and 36%, respectively).[8] Only 28% of those patients were aware that hearing tests and hearing aids were covered through social assistance programs. This may contribute to the lack of significant hearing loss patients in the data from this study (n = 1) since few may be aware that hearing tests and hearing aids are available through social assistance programs and thus may neglect to bring this to the attention of the clinic. Age may also be a factor, as the average age of the patients in this study was around 48 years old, whereas hearing loss usually has a later onset. Moore and Durden analyzed 325 houseless patients in Atlanta, Georgia

over a 3-year period and found that 41% reported at least 1 otolaryngologic sign or symptom, with 9% having histologically confirmed head and neck cancers.[9] Interestingly, while 72% of participants in this study knew that tobacco use is a risk factor for lung cancer, 79% were not aware that it is a risk factor for head and neck cancers. Wu et al examined 100 houseless adult patients in Toronto, Canada and found 22 patients with OTO needs, including 2 with head and neck cancers.[10]

One particularly interesting finding in this research study was the relative lack of infectious processes, such as upper respiratory infections, pharyngitis, tonsillitis, and sinusitis. In other similar studies, upper respiratory infections accounted for 22% of their patient population, whereas in this study, they accounted for only 9%.[10] This may be explained by HOME's COVID-19 pandemic protocols at the time this study was conducted. It is possible that patients with infectious processes may have been sent straight to an urgent care or alternative primary care provider, as HOME clinics were sending some patients with COVID-19 symptoms, such as fever and cough, to other facilities, in accordance with the medical school policy for minimizing risk of exposure to students. Because infectious processes may present similarly to COVID-19, some of these patients may have been missed in this data. Of note, the HOME Project has liberalized its COVID-19 protocols since then and is now able to see patients with COVID-like symptoms.

Another point to consider is the lack of potential diagnoses for head and neck malignancies, particularly head and neck squamous cell carcinoma (HNSCC). Roughly 57% of the patients in this data set were smokers, and 40% used more than 10 cigarettes (0.5 packs) per day. About 29% of the patients use alcohol, and more notably, 33% of male patients had more than 14 drinks per week. Although there was no reported instance of cancerous or precancerous lesions in the data, these patients are indeed at an increased risk for HNSCC due to increased exposure to smoking and alcohol.[14] In the United States general population, the incidence of HNSCC is 11.2 per 100 000 (0.012%).[15] As stated previously, current literature reports a higher incidence of HNSCC in houseless populations. Ralli et al reported 7% of patients in their study population had cancerous or precancerous lesions.[7]

There are multiple reasons that may explain the lack of malignancies identified in the HOME Project population. Moore and Durden found 256 of 325 patients who reported at least 1 sign or symptom of head and neck malignancy, and they subsequently referred 28 of those for further OTO evaluation. The study also found that while over 70% of houseless patients knew of the connection between tobacco use and lung cancer, only 19.9% were aware that smoking is a risk factor for HNSCC.[9] Given that HNSCC usually presents asymptomatically in the early stages of the disease as small solitary lesions, patients may not discuss subtle changes in swallowing, taste, throat or ear pain, speech, and skin with the provider. It has also been speculated that medical students do not have much exposure to OTO in their clinical years, and this may contribute to a lack of recognition for HNSCC, especially if it presents early in the oral cavity or oropharynx.[16] It may also be the case that HOME clinic is dominated by the acute concerns of patients and that a thorough examination of other areas is not a priority during patient encounters. Additionally, HNSCC is a diagnosis that requires biopsy and microscopic analysis, and houseless patients may have difficulty finding access to these kinds of services. Taken together, these factors may contribute to the lack of HNSCC in the data.

Although head and neck cancer screening has been largely abandoned due to lack of efficacy in the general population, targeted screening for at-risk populations, such as houseless populations, may be effective.[17,18] Providing education about risk factors and early signs and symptoms may prompt individuals to seek health care earlier and prevent complications of late-stage disease.

It is also worth noting that there are considerable barriers to health care for houseless populations, particularly with insurance coverage, transportation, and other individual and environmental factors.[19–21] The HOME Project seeks to address these issues by providing free, mobile care. However, without an OTO consultation, it is often difficult to formally diagnose complex diseases of the head and neck, which requires biopsy and microscopic analysis, such as for HNSCC. Therefore, it may be helpful in clinics that provide care primarily for houseless patients to have an otolaryngologist who would accept referrals for complex problems. According to one study, OTO consultation in houseless clinics were only required for 6% of all patients with OTO problems.[22] The other 94% of OTO problems were addressed by primary care. Having readily available OTO consultation for the 6% of patients could prove to be crucial in diagnosing more serious disorders and providing appropriate early treatment or prevention. In this study, the most common OTO complaints were facial trauma, dental caries, cerumen impaction, viral upper respiratory infection, otitis media, and allergic conjunctivitis. Although many of these are adequately treated with primary care providers, some conditions, particularly complex facial trauma or serious cerumen impaction, may require OTO consultation. Currently, the HOME Project does not have an otolaryngologist who takes referrals for possible patients, but this may be something that may be addressed in the future.

Houseless patients are at risk for multiple medical conditions, such as heart disease, diabetes, hypertension, chronic obstructive pulmonary disease, which often require extended time for recovery and increased length of hospital stays.[23] It has also been shown that patients with certain comorbid conditions, such as congestive heart disease, peripheral vascular disease, etc., have decreased chance of survival for head and neck cancers.[24] This dataset of OTO patients demonstrated similar comorbidities, with hypertension and psychiatric disorders being the most

prevalent. In fact, at least 50% of the population had 1 or more comorbidities, and 22% of patients had 3 or more. The 2022 Point in Time Count for O'ahu revealed similar comorbid conditions and risk factors, with 22% of houseless individuals reported a mental illness and 18% reported substance use problems.[25] Furthermore, Hawaii's finite land space and high cost of living without relative increase in compensation greatly increases financial burden, posing another barrier to healthcare access and delivery.[19] Taken together, these data demonstrate the complexity of houseless patient care in Hawai'i and the importance of regular follow-up with these patients to avoid complications for their multiple health problems, particularly in the setting of complex OTO diseases.

Limitations

Given that these data were collected during peak COVID-19 pandemic years, the data may not capture an accurate representation of the population, as patients may have been unwilling to visit the clinic or patients may have been referred to other facilities with more resources at that time to handle possible COVID-19 exposure. Researchers were unable to extract data from previous years for 2 reasons. First, the authors are also most familiar with the clinic as it operated in the past couple years and thus, using data from recent years allowed authors to ensure data quality and completeness. Second, because of the expanding nature of HOME clinics, the electronic medical record system was changed to fit the needs of the clinic better, and data from the previous electronic medical record was unable to be obtained.

Conclusion

This study showed that roughly 10% of patients seen at HOME clinics were due to otolaryngologic conditions. It is important to note that this data serves only as a snapshot in time that describes OTO disease amongst HOME project's patients during the COVID-19 pandemic. Given the limitations stated in the discussion, these data cannot be used to compare incidence or prevalence of OTO disease with other similar types of studies in the literature. The data showed that the most common OTO problems that was seen at HOME clinics were facial trauma, dental caries, cerumen impaction, viral upper respiratory infection, otitis media, and allergic conjunctivitis. An interesting further study may be to implement a screening process for head and neck cancers specifically for HOME clinics to see if any patients would be referred for further OTO evaluation. Future studies may also investigate the rate of follow-up for patients at HOME clinic for complex OTO disease.

Conflict of Interest

None of the authors identify a conflict of interest.

Acknowledgements

The authors would like to acknowledge Dr. Jill Omori, Jason Seto, and Nicholas Liu for the original data collection as well as all of the HOME staff and volunteers.

Authors' Affiliation:
- John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, HI

Corresponding Author:
Lawrence Burgess MD; lburgess@hawaii.edu

References

1. US Department of Housing. *HUD 2020 Continuum of Care Homeless Assistance Programs Homeless Populations and Subpopulations*. 2020. Accessed January 3, 2023. https://files.hudexchange.info/reports/published/CoC_PopSub_State_HI_2020.pdf
2. State of Homelessness: 2022 Edition. National Alliance to End Homelessness. Accessed January 3, 2023. https://endhomelessness.org/homelessness-in-america/homelessness-statistics/state-of-homelessness/
3. van Dongen SI, van Straaten B, Wolf JRLM, et al. Self-reported health, healthcare service use and health-related needs: A comparison of older and younger homeless people. *Health Soc Care Community*. 2019;27(4):e379-e388. doi:10.1111/hsc.12739
4. Omerov P, Craftman ÅG, Mattsson E, Klarare A. Homeless persons' experiences of health- and social care: A systematic integrative review. *Health Soc Care Community*. 2020;28(1):1-11. doi:10.1111/hsc.12857
5. Aldridge RW, Menezes D, Lewer D, et al. Causes of death among homeless people: a population-based cross-sectional study of linked hospitalisation and mortality data in England. *Wellcome Open Res*. 2019;4:49. doi:10.12688/wellcomeopenres.15151.1
6. Biedrzycki B. Homeless With Cancer: An Unrecognized Problem in the United States. *Clin J Oncol Nurs*. 2018;22(6):676-679. doi:10.1188/18.CJON.676-679
7. Ralli M, Marinelli A, De-Giorgio F, et al. Prevalence of Otolaryngology Diseases in an Urban Homeless Population. *Otolaryngol--Head Neck Surg*. 2022;166(6):1022-1027. doi:10.1177/01945998211060699
8. Noel CW, Mok F, Wu V, et al. Hearing loss and hearing needs in an adult homeless population: a prospective cross-sectional study. *CMAJ Open*. 2020;8(1):E199-E204. doi:10.9778/cmajo.20190220
9. Moore CE, Durden F. Head and neck cancer screening in homeless communities: HEAL (Health Education, Assessment, and Leadership). *J Natl Med Assoc*. 2010;102(9):811-816. doi:10.1016/s0027-9684(15)30678-7
10. Wu V, Noel CW, Forner D, et al. Otolaryngology needs among an adult homeless population: a prospective study. *Otolaryngol - Head Neck Surg*. 2020;49(1):47. doi:10.1186/s40463-020-00445-2
11. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606-613. doi:10.1046/j.1525-1497.2001.016009606.x
12. Ewing JA. Detecting alcoholism. The CAGE questionnaire. *JAMA*. 1984;252(14):1905-1907. doi:10.1001/jama.252.14.1905
13. Emerick KS, Deschler DG. Common ENT disorders. *South Med J*. 2006;99(10):1090-1099; quiz 1100-1102, 1126. doi:10.1097/01.smj.0000233214.49561.c1
14. Lewin F, Norell SE, Johansson H, et al. Smoking tobacco, oral snuff, and alcohol in the etiology of squamous cell carcinoma of the head and neck: a population-based case-referent study in Sweden. *Cancer*. 1998;82(7):1367-1375. doi:10.1002/(sici)1097-0142(19980401)82:7<1367::aid-cncr21>3.0.co;2-3
15. Fakhry C, Krapcho M, Eisele DW, D'Souza G. Head and Neck Squamous Cell Cancers in the United States are Rare and Risk is Now Higher Among Whites than Blacks for the First Time. *Cancer*. 2018;124(10):2125-2133. doi:10.1002/cncr.31322
16. Sorichetti BD, Pauwels J, Jacobs TB, Chadha NK, Kozak EL, Kozak FK. High frequency of otolaryngology/ENT encounters in Canadian primary care despite low medical undergraduate experiences. *Can Med Educ J*. 2022;13(1):86-89. doi:10.36834/cmej.72328
17. Kujan O, Glenny AM, Oliver RJ, Thakker N, Sloan P. Screening programmes for the early detection and prevention of oral cancer. *Cochrane Database Syst Rev*. 2006;(3):CD004150. doi:10.1002/14651858.CD004150.pub2
18. Carter JM, Winters RD, Lipin R, Lookabaugh S, Cai D, Friedlander PL. A faith- and community-based approach to identifying the individual at risk for head and neck cancer in an inner city. *The Laryngoscope*. 2013;123(6):1439-1443. doi:10.1002/lary.23981

19. Ambrose AJH, Hixon A, Omori J. Medical school hotline: Homelessness in Hawai'i: challenges, progress, and prospects. *Hawaii J Med Public Health*. 2013;72(8):282-285.
20. Armstrong M, Shulman C, Hudson B, Stone P, Hewett N. Barriers and facilitators to accessing health and social care services for people living in homeless hostels: a qualitative study of the experiences of hostel staff and residents in UK hostels. *BMJ Open*. 2021;11(10):e053185. doi:10.1136/bmjopen-2021-053185
21. Purkey E, MacKenzie M. Experience of healthcare among the homeless and vulnerably housed a qualitative study: opportunities for equity-oriented health care. *Int J Equity Health*. 2019;18(1):101. doi:10.1186/s12939-019-1004-4
22. Gurgel RK, Lund G, Gundlapalli AV. Role of otolaryngologists in health care for the homeless. *Ann Otol Rhinol Laryngol*. 2009;118(7):471-474. doi:10.1177/000348940911800701
23. Kushel MB, Vittinghoff E, Haas JS. Factors associated with the health care utilization of homeless persons. *JAMA*. 2001;285(2):200-206. doi:10.1001/jama.285.2.200
24. Piccirillo JF, Lacy PD, Basu A, Spitznagel EL. Development of a new head and neck cancer-specific comorbidity index. *Arch Otolaryngol Head Neck Surg*. 2002;128(10):1172-1179. doi:10.1001/archotol.128.10.1172
25. Partners in Care, Oahu Continuum of Care. *2022 Point in Time Count Comprehensive Report*. 2022.