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RESEARCH ARTICLE

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Testing the reliability and validity of the modified Amsterdam Inventory for Auditory Disability and Handicap in career firefighters in the United States

Minjung Kyung RN, MPH | Dal Lae Chin RN, PhD | Stephanie Phelps RN, PhD | OiSaeng Hong RN, PhD, FAAN, FAAOHN

Department of Community Health Systems, School of Nursing, University of California, San Francisco, San Francisco, California, USA

Correspondence
OiSaeng Hong, RN, PhD, FAAN, FAAOHN, School of Nursing, University of California San Francisco, 2 Koret Way, N-513D, San Francisco, CA 94143, USA.
Email: OiSaeng.Hong@ucsf.edu

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Abstract

Background: Firefighters are routinely exposed to loud noise that put them at risk for hearing loss. A reliable and valid measure to assess firefighters' hearing function is important. This study aims to test the reliability and validity of the modified Amsterdam Inventory for Auditory Disability and Handicap ((m)AIADH) in firefighters.

Method: A cross-sectional study was conducted using a convenience sample of 239 career firefighters from six partnered fire departments in Central Texas and Northern California. The internal consistency, convergent and criterion validity, and the ability to discriminate groups by measured hearing, perceived hearing, and a combination of measured and perceived hearing, were examined using the total score and score for each of the five subscales of the (m)AIADH.

Results: The study participants were primarily men (93%). Satisfactory internal consistency was revealed for the (m)AIADH with Cronbach's alpha above 0.80 for all five subscales. Criterion analysis presented a moderate correlation between the (m)AIADH and the average of hearing threshold at high frequencies (4, 6, and 8 kHz). For convergent validity, the (m)AIADH was moderately to highly related with perceived hearing. There were statistically significant differences in the total (m)AIADH score and the five subscales for measured hearing thresholds except for "intelligibility in quiet." The (m)AIADH also showed a discriminative ability to distinguish between the group with good perceived hearing and the group with bad perceived hearing.

Conclusion: The (m)AIADH is a reliable and valid measure to assess various dimensions of hearing function among firefighters.

KEYWORDS
Amsterdam Inventory for Auditory Disability and Handicap, firefighters, hearing function, reliability, validity

1 | INTRODUCTION

Hearing loss is one of the most prevalent chronic physical conditions in the United States (U.S.).[1] It is estimated that about 12% of U.S. workers have hearing disability and 24% of those are caused by occupational exposures.[1] Firefighters are at elevated risk of hearing impairment which can lead to work safety concerns.[2,3] Using the data from the International Standard Organization, a previous study reported that after adjusting for age, hearing loss among firefighters occurred sooner than the general population.[3] Firefighters are exposed to occupational noise from sirens, emergency alarms, water pumps, saws, and other equipment that produce excess noise.[4] They also engage in job tasks where they are exposed to oto-traumatic agents such as vibration, benzene, carbon monoxide, and arsenic.[5] According to the U.S. Occupational Safety and Health Administration standard, hearing conservation programs and hearing protectors are required for workers exposed to an 8-h time-weighted average of 85 dBA or more.[6] Nevertheless, Hong et al.[2] indicated that firefighters used hearing protection devices only 34% of the time when exposed to loud noise.

The degree of hearing loss is generally measured using pure-tone audiometry.[7] However, many researchers opine that audiometry alone is insufficient to reflect hearing difficulties in daily life.[8,9] The ability to communicate can be determined by sensory and nonsensory factors, whereas audiometric testing does not take into account nonsensory aspects of hearing.[8] Patient-reported measures can be used to supplement this gap. Several hearing questionnaires have been developed and the focus of these instruments has varied. The Amsterdam Inventory for Auditory Disability and Handicap (AIADH) was developed by Kramer et al.[10] to assess comprehensive aspects of hearing disability. The original version of AIADH consists of 30 items with five hearing function subscales defined by the World Health Organization (WHO): distinction of sounds, localization of sounds, speech intelligibility in quiet, speech intelligibility in noise, and detection of sounds.[10] After psychometric testing, Kramer et al.[11] modified the AIADH (denoted as (m)AIADH) and excluded two items to enhance reliability and validity. The (m)AIADH has been tested in many research studies and validated in various languages, including Swedish, Spanish, Turkish, Portuguese, and Cantonese,[12–16] but not in English. It has also not been applied and tested for the firefighter population in any earlier studies. Therefore, the aim of this study was to test the validity and reliability of the (m)AIADH in firefighters, with the goal of using this tool to easily assess their functional hearing.

2 | METHODS

2.1 | Study design and participants

A cross-sectional internet-based survey study was conducted using a convenience sample of 239 career firefighters from six partnered fire departments in Central Texas and Northern California. To recruit participants, the research team visited fire stations and attended fire department trainings, and provided study flyers. Study information was also disseminated via email.

2.2 | Reliability and validity

Internal consistency—a measure of the extent to which items are cohesive and inter-related—was used to measure reliability.[17] Validity was tested by measuring convergent and criterion validity. Convergent validity refers to how closely measures are related to other measures with similar construct.[17] Criterion validity is used to assess if a particular instrument score is correlated with an external criterion that claims to capture a similar concept, ideally a gold standard.[17] For the criterion validity, the average of hearing thresholds at high frequencies (4, 6, and 8 kHz) in the worst ear was used.

2.3 | Measures

2.3.1 | Demographic and job characteristics

The survey included age (years), sex, race/ethnicity, employment position (firefighter, firefighter paramedic, apparatus operator/engineer/driver, company officer, and battalion chief), work location (Northern California and Central Texas), and years of work in fire services.

2.3.2 | Measured hearing-audiometric tests

All participants underwent audiometric tests performed by trained technicians in an occupational health clinic. The most recent test results, conducted within the past 12 months, were obtained for the study. The measured hearing loss was defined using the mean of hearing threshold levels at high frequencies (4, 6, and 8 kHz) in the worst ear. Hearing threshold at higher frequencies (4–8 kHz) are more sensitive to noise-induced hearing loss.[18,19] By applying International Classification of Impairments, Disabilities and Handicaps by the WHO, the participants were then divided into two groups: (1) normal group (<25 dB HL) and (2) hearing loss group (≥25 dB HL).[20]

2.3.3 | Hearing disability

Self-reported hearing disability was measured using the (m)AIADH.[10] The 28 item- (m)AIADH consists of five subscales; *discrimination of sounds* [items 4, 5, 6, 17, 23, 24, 26, 29], *auditory localization* [items 3, 9, 15, 21, 27], *speech intelligibility in quiet* [items 8, 11, 12, 14, 20], *speech intelligibility in noise* [items 1, 7, 13, 19, 25], and *detection of sounds* [items 2, 10, 22, 28, 16]. Example questions for the various subscales are: "*Do you recognize members of your family by their voices?*" (*discrimination of sound*); "*Do you immediately hear from what direction a car is approaching when you are outside?*" (*auditory localization*); "*Can you understand a shop assistant in crowded shop*" (*speech intelligibility in noise*); "*Can you understand the presenter of the news on TV?*" (*speech intelligibility in quiet*); and "*Can you hear the doorbell at home?*" (*detection of sounds*). Responses to each question ranged from 0 to 3 (almost always = 0, frequently = 1, occasionally = 2, and almost never = 3). The total score and five subscales were obtained by summing the scores for each question.[8,12] The range of scores are 0–84 for the total score of (m)AIADH, 0–24 for "discrimination of sound" and 0–15 for "auditory localization," "intelligibility in noise," "intelligibility in quiet," and "detection of sounds." The scale was recoded to reflect the higher the score, the higher the perceived hearing difficulties.[14]

2.3.4 | Perceived hearing

Perceived hearing was measured by the question, "How good is your hearing?" on a 5-point Likert scale (1 = *poor*, 2 = *fair*, 3 = *good*, 4 = *very good*, and 5 = *excellent*). The higher score indicates better perceived hearing. Perceived hearing level was dichotomized as good (excellent, very good, good) and bad (fair, poor). This method was used in earlier studies with factory workers[21] and construction workers.[22] Both studies reported that this single-item question was useful and valid to assess hearing loss and recommended this application for a population-based study when audiometric tests are not available.

2.4 | Data analysis

Statistical analyses were performed with STATA version 16.0 (Stata Corperation). Reliability was measured by internal consistency (Cronbach's alpha coefficient) for 28 items and five subscales. Independent sample *t*-tests were used to compare the mean scores of the subscales between the group with normal hearing group and the group with hearing loss to test the ability of the survey questionnaire to differentiate between the groups. The differences in (m)AIADH scores by perceived hearing were also examined employing *t*-test analysis. Analysis of variance was applied to compare the scores of the total (m)AIADH and subscales by measured hearing thresholds and perceived hearing. To measure convergent and criterion validity, Spearman correlation analyses of the (m)AIADH with the average high frequency hearing thresholds (4, 6, and 8 kHz) and perceived hearing were conducted.

3 | RESULTS

3.1 | Characteristics of study participants

Table 1 shows characteristics of the participants. The majority were male (92.9%) and White (76.7%). The mean age was 41.5 years and the mean duration of work in the fire service was 15.0 years. The group consisted of 30 firefighters, 85 firefighter paramedics, 48 apparatus operators/engineers/drivers, 73 company officers, and 3 battalion chiefs. Approximately one-fourth of the participants (25.1%) perceived their hearing as fair or poor. Of 65 participants with hearing loss at high frequencies (4, 6, and 8 kHz) in the worst ear with the cutoff of 25 dB HL, 24 showed unilateral hearing loss. The average of hearing threshold levels of the worst ear at high frequencies was 12.7 dB HL in the normal hearing group, versus 38.8 dB HL in the hearing loss group. Figure 1 shows mean hearing thresholds between the group with hearing loss and the group with normal hearing.

TABLE 1 Characteristics of the participants (*N* = 239).

Variables	*N* (%)
Age, years (mean, *SD*)	41.5 (8.3)
Sex	
Male	222 (92.9)
Female	17 (7.1)
Race/ethnicity	
White	178 (76.7)
African American	11 (4.8)
Asian	10 (4.3)
Hispanic	27 (11.6)
Other[a]	6 (2.6)
Employment position[b]	
Firefighter	30 (12.5)
Firefighter paramedic	85 (35.6)
Apparatus operator/engineer/driver	48 (20.1)
Company officer (lieutenant, captain)	73 (30.5)
Battalion chief	3 (1.3)
Work location	
Central Texas	21 (8.8)
Northern California	218 (91.2)
Years of work in fire services (mean, *SD*)	15.0 (8.9)
Perceived hearing	
Poor	8 (3.3)
Fair	52 (21.8)
Good	107 (44.8)
Very good	64 (26.8)
Excellent	8 (3.3)
Hearing threshold level[c] (mean, *SD*)	
Normal hearing group (0–23.3 dB HL)	12.7 (5.8)
Hearing loss group (0–71.6 dB HL)	38.8 (12.8)

[a]American Indian/Alaska native (*n* = 2), Pacific Islander/native Hawaiian (*n* = 1), and unknown (*n* = 1).
[b]Seven did not respond to the question.
[c]Average of hearing threshold levels of the worst ear at high frequencies (4, 6, and 8 kHz).

3.2 | Reliability

The results of internal consistency for the (m)AIADH are summarized in Table 2. Reliability analysis for overall (m)AIADH yielded a

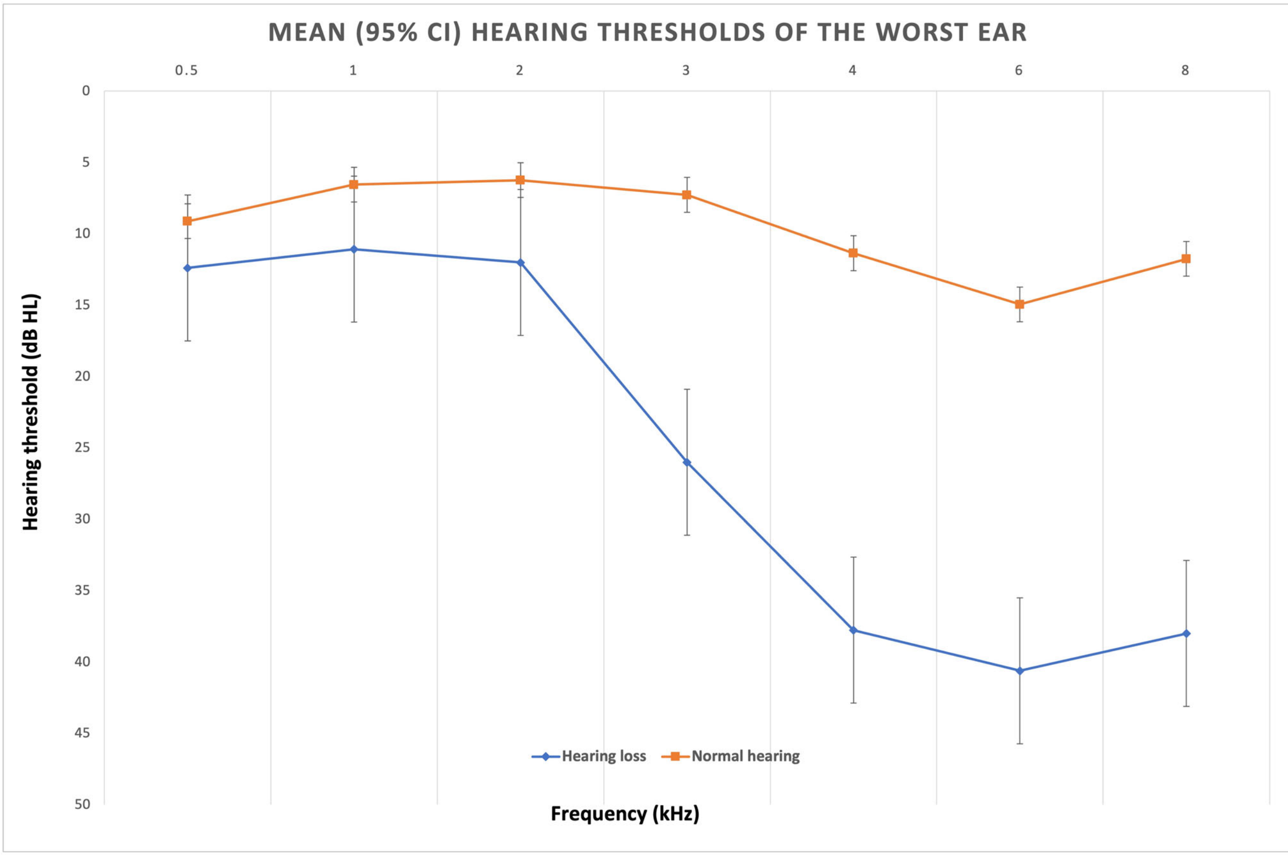

FIGURE 1 Mean hearing thresholds of the group with normal hearing and the group with hearing loss.

Cronbach's alpha of 0.92 and for the five subscales yielded Cronbach's alpha ranging from 0.80 to 0.92: Specifically, Cronbach's alpha of 0.89, 0.90, 0.92, 0.90, and 0.90 for the subscales, "discrimination of sounds," "auditory localization," "intelligibility in noise," "intelligibility in quiet," "detection of sounds," respectively.

TABLE 2 Measures of internal consistency for the items of (m) AIADH.

Item factor	Cronbach alpha
Discrimination of sounds	0.89
Auditory localization	0.90
Intelligibility in noise	0.92
Intelligibility in quiet	0.90
Detection of sounds	0.90
Total (m)AIADH	0.92

Abbreviation: (m)AIADH, modified Amsterdam Inventory for Auditory Disability and Handicap.

3.3 | Differences between groups

Table 3 presents the comparisons of the scores of the (m)AIADH and subscales between the group with normal hearing and the group with hearing loss. 27.2% of the participants had hearing loss based on WHO guideline of 25 dB HL average thresholds at high frequencies in the worst ear.[20] The group with hearing loss had higher total and five subscale scores of the (m)AIADH than the group with normal hearing. The differences between the group with normal hearing and the group with hearing loss were statistically significant in the four subscales ("discrimination of sounds," "auditory localization," "intelligibility in noise," and "detection of sounds"), while a marginal difference was observed in the subscale "intelligibility in quiet" ($p = 0.055$) between the two groups.

Table 4 shows the comparisons of the scores of the (m)AIADH and subscales between the groups with good and bad perceived hearing. Of the participants, 25.1% had bad perceived hearing. Compared to the group with good perceived hearing, the group with bad perceived hearing showed significantly higher scores on the (m) AIADH and all the subscales ($p \le 0.001$).

Table 5 provides the comparisons of the scores of the (m)AIADH and subscales by measured hearing thresholds and perceived hearing. Of 239 participants, 149 (62.3%) had normal hearing and good perceived hearing, 25 (10.5%) had normal hearing but bad perceived hearing, 30 (12.6%) had hearing loss but good perceived hearing, and 35 (14.6%) had hearing loss and bad perceived hearing. The scores of

TABLE 3 Comparison of the scores of (m)AIADH and the five subscales between the group with normal hearing and the group with hearing loss.

Items of AIADH	Mean (*SD*) Normal hearing (*n* = 174)	Mean (*SD*) Hearing loss[a] (*n* = 65)	*p* value
Discrimination of sounds (0–24)	5.0 (4.69)	7.57 (5.09)	**<0.001**
Auditory localization (0–15)	1.73 (2.16)	2.56 (2.69)	**0.014**
Intelligibility in noise (0–15)	3.06 (3.02)	5.01 (3.43)	**<0.001**
Intelligibility in quiet (0–15)	1.94 (2.1)	2.55 (2.4)	0.055
Detection of sounds (0–15)	1.27 (1.64)	2.2 (2.08)	**<0.001**
Total (0–84)	9.59 (9.74)	14.8 (11.6)	**<0.001**

Note: Numbers in **bold** indicate significant at $p < 0.05$.
Abbreviation: (m)AIADH, modified Amsterdam Inventory for Auditory Disability and Handicap.
[a]Hearing loss was determined based on hearing threshold levels in the worst ear at high frequencies (4, 6, and 8 kHz) with the cutoff of 25 dB HL.

TABLE 4 Comparison of the scores of (m)AIADH and the five subscales between the group with good perceived hearing and the group with bad perceived hearing.

Items of AIADH	Mean (*SD*) Good perceived hearing[a] (*n* = 179)	Mean (*SD*) Bad perceived hearing[b] (*n* = 60)	*p* value
Discrimination of sounds (0–24)	4.72 (4.61)	8.62 (4.73)	**<0.001**
Auditory localization (0–15)	1.62 (2.16)	2.98 (2.58)	**0.001**
Intelligibility in noise (0–15)	2.88 (3.01)	5.7 (3.05)	**<0.001**
Intelligibility in quiet (0–15)	1.84 (2.07)	2.92 (2.39)	**<0.001**
Detection of sounds (0–15)	1.16 (1.62)	2.62 (1.93)	**<0.001**
Total (0–84)	9.0 (9.7)	16.98 (10.66)	**<0.001**

Note: Numbers in **bold** indicate significant at $p < 0.05$.
Abbreviation: (m)AIADH, modified Amsterdam Inventory for Auditory Disability and Handicap.
[a]Perceived hearing as excellent, very good, or good.
[b]Perceived hearing as fair or poor.

TABLE 5 Comparison of the scores of (m)AIADH and the five subscales by measured hearing thresholds and perceived hearing.

Items of AIADH	Mean (*SD*) Normal hearing & good perceived hearing (*n* = 149)	Mean (*SD*) Normal hearing & bad perceived hearing (*n* = 25)	Mean (*SD*) Hearing loss & good perceived hearing (*n* = 30)	Mean (*SD*) Hearing loss & bad perceived hearing (*n* = 35)	*F*	*p* value
Discrimination of sounds (0–24)	4.62 (4.59)	7.28 (4.76)	5.23 (4.76)	9.57 (4.54)	12.0	**<0.001**
Auditory localization (0–15)	1.55 (2.02)	2.84 (2.64)	1.97 (2.75)	3.08 (2.57)	5.71	**<0.001**
Intelligibility in noise (0–15)	2.77 (2.95)	4.76 (2.95)	3.43 (3.28)	6.37 (2.98)	15.07	**<0.001**
Intelligibility in quiet (0–15)	1.84 (2.07)	2.52 (2.22)	1.8 (2.09)	3.2 (2.49)	4.25	**0.006**
Detection of sounds (0–15)	1.09 (1.53)	2.32 (1.93)	1.47 (2.03)	2.83 (1.93)	11.83	**<0.001**
Total (0–84)	8.73 (9.35)	14.68 (10.65)	10.33 (11.35)	18.63 (10.52)	10.68	**<0.001**

Note: Numbers in **bold** indicate significant at $p < 0.05$.
Abbreviation: (m)AIADH, modified Amsterdam Inventory for Auditory Disability and Handicap.

TABLE 6 Spearman correlations among measured hearing thresholds, perceived hearing, total and subscale scores of the (m)AIADH.

Variables	1	2	3	4	5	6	7	8
1	1							
2	**−0.795**	1						
3	**0.614**	**−0.733**	1					
4	**0.629**	**−0.755**	**0.958**	1				
5	**0.513**	**−0.638**	**0.859**	**0.730**	1			
6	**0.636**	**−0.784**	**0.884**	**0.946**	**0.657**	1		
7	**0.557**	**−0.625**	**0.846**	**0.835**	**0.696**	**0.627**	1	
8	**0.621**	**−0.729**	**0.882**	**0.797**	**0.803**	**0.712**	**0.743**	1

Note: Numbers in **bold** indicate significant at $p < 0.05$. 1: Average of hearing threshold at high frequencies (4, 6, and 8 kHz) in the worst ear; 2: Perceived hearing scores using a single question; 3: Total scores of Amsterdam Auditory Disability and Handicap; 4: Distinction/identification of sounds; 5: Localization of sounds; 6: Speech intelligibility in quiet; 7: Speech intelligibility in noise; 8: Detection of sounds.
Abbreviation: (m)AIADH, modified Amsterdam Inventory for Auditory Disability and Handicap.

the total (m)AIADH and five subscales were significantly different by measured hearing thresholds and perceived hearing ($p < 0.05$).

3.4 | Convergent validity

The correlation between the (m)AIADH scores and perceived hearing by a single question is presented in Table 6. Perceived hearing was inversely related with the total score of (m)AIADH (Spearman rho = −0.73), which means the poorer the perceived hearing, the higher the (m)AIADH scores. The five subscales showed Spearman coefficients ranging between −0.78 and −0.63.

3.5 | Criterion validity

Table 6 also shows the correlation between the (m)AIADH scores and measured hearing (average of hearing thresholds at high frequencies [4, 6, and 8 kHz] in the worst ear). The (m)AIADH was significantly related with both perceived hearing and measure average hearing thresholds from 4 through 8 kHz ($p < 0.05$). The correlation between the total score for the (m)AIADH and the measured average hearing thresholds was 0.61; The correlations of five subscale scores for the (m)AIADH with measured average hearing thresholds (4–8 kHz) ranged from 0.51 to 0.63.

4 | DISCUSSION

The purpose of this study was to investigate psychometric properties of the (m)AIADH among career firefighters in the United States. The findings indicate that the (m)AIADH is a reliable and valid measure to examine hearing performance among firefighters. The (m)AIADH showed satisfactory psychometric properties with good internal consistency and acceptable convergent and criterion validity. The present study also found that the (m)AIADH could differentiate the groups by measured hearing thresholds and perceived hearing abilities.

The total score and five subscales of the (m)AIADH demonstrated good internal consistency in this study. Specifically, Cronbach's alpha coefficients were found to range from 0.89 to 0.92 for the five subscales (*discrimination of sounds, auditory localization, intelligibility in noise, intelligibility in quiet, and detection of sounds*). The findings of this study were comparable to those of the previous studies conducted in other countries such as the Netherlands, Turkey, Sweden, and Spain.[8,12–14] In a study of 180 participants, Fuente et al.[13] reported good internal consistency with Cronbach's alpha of 0.97 for the total score and Cronbach's alpha ranging between 0.80 and 0.90 for five subscales of Spanish version of AIADH. Banu et al. found Cronbach's alpha coefficients above 0.90 for the total score of Turkish version of (m)AIADH among 240 individuals.[14] Meijer et al.[8] also revealed satisfactory internal consistency with Cronbach's alpha coefficients of 0.96 for the total score and ranging from 0.75 to 0.91 for five subscales among 94 patients in the department of orthohinolaryngology. Similar results were found in the study of Hallberg et al.[12] with 79 hearing clinic patients. The authors reported Cronbach's alpha ranging from 0.77 to 0.89 for five subscales.[12]

Our study found that the (m)AIADH can discriminate between those individuals with and without hearing loss. Consistent with our findings, Mujdeci et al. found a significant difference in the scores on all subscales between the group with hearing loss and the group without hearing loss.[14] In the present study, we only found a marginal difference in "intelligibility in quiet" between the two groups. This may be due to healthy worker survivor effect which refers to a continuing selection process in which those who remain employed tend to be healthier.[23] It is possible that workers who have severe hearing loss have already left the job. Indeed, of 65 firefighters with hearing loss in the worst ear in this study, only one showed hearing thresholds of more than 71 dB HL.[24] Unilateral hearing loss can be another explanation. Since this study only included hearing loss in the worst ear, those with hearing loss in the worst ear but with normal hearing in the better ear may not have problems understanding others in a quiet environment.

In the current study, the (m)AIADH showed discriminative ability between the group with good perceived hearing and the group with bad perceived hearing. This corroborates the Dreisbach et al.[25] study that revealed participants with more listening difficulty demonstrated worse (m)AIADH scores. Another study conducted by Fuente et al.[26] also reported similar findings, which showed a solvent-exposed group had poorer hearing than the nonexposed and the (m)AIADH was able to differentiate those two groups. The (m)AIADH also differentiate groups by measured hearing thresholds and perceived hearing. It is intriguing to note that the group with normal hearing but bad perceived hearing had more hearing difficulty than the group with hearing loss but good perceived hearing. Unlike audiometric testing, the perceived hearing reflects not only sensory aspects but also nonsensory aspects of communication,[8] so it may distinguish differences in hearing difficulty between the two groups. The study found statistically significant differences for all subscales of (m)AIADH by perceived hearing solely as well as by both perceived and measured hearing. The finding of significant differences by measured hearing, in particular, supports the use of (m)AIADH to assess hearing dysfunction if audiometric testing is not practically available.

This study also demonstrated satisfactory convergent and criterion validity of the (m)AIADH. The worse the firefighters perceived their hearing level, the higher the scores of (m)AIADH. The correlations between the perceived hearing and (m)AIADH were moderate to good. The subscale scores of the (m)AIADH correlated significantly with hearing threshold levels over the high frequencies (4, 6, and 8 kHz). This is inconsistent with a previous finding of no correlation between the (m)AIADH and audiometry at high frequencies (2, 3, 4, and 6 kHz).[12] Many studies have reported a moderate correlation between audiometry at 0.5, 1, 2, and 4 kHz and the (m)AIADH, but there is very limited data to examine the relationship of the (m)AIADH and audiometry over 4 kHz.[8,12–14,26] Therefore, our findings highlight the relationship between the (m)AIADH and hearing threshold levels over the high frequencies.

To our knowledge, this study is the first to examine psychometric properties of the (m)AIADH among career firefighters. However, several limitations of this study should be noted. First, it was based on self-report and may be subject to recall and reporting bias. Second, as we employed convenience sampling methods, our findings might have been affected by selection bias. Hence, the participants are not likely to be representative of all firefighters.

5 | CONCLUSION

Firefighting poses an increased risk of exposure to loud noise and toxins which may lead to hearing impairment and disability. The psychometric adequacy of the (m)AIADH was examined by measuring reliability and validity among career firefighters. The study's findings rendered excellent internal consistency and satisfactory convergent and criterion validity of the (m)AIADH. The (m)AIADH could also differentiate between the following groups: normal hearing and hearing loss evaluated with a hearing test; good and bad perceived hearing assessed by a self-report question and these two groups combined. In conclusion, the (m)AIADH is a reliable and valid measure to assess various domains of hearing functions among U.S. firefighters.

AUTHOR CONTRIBUTIONS

Minjung Kyung: conducted data analysis, interpretation of the results, and drafted manuscript. **Dal Lae Chin**: participated in interpretation of the results and revision of manuscript. **Stephanie Phelps**: contributed to the design of the study, data collection, and revision of the manuscript. **OiSaeng Hong**: provided the guidance for the development of study, data analysis, interpretation of findings, and performed critical review of the manuscript. All authors approved the final version of the manuscript, and agreed to be accountable for all aspects of the work in ensuring the accuracy and integrity of the study.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

John Meyer declares that he has no conflict of interest in the review and publication decision regarding this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The study was approved by the Institutional Review Board of the University of California, San Francisco. Informed consent was obtained from all participants before completing the online survey.

ORCID

Dal Lae Chin http://orcid.org/0000-0002-7485-9833
OiSaeng Hong http://orcid.org/0000-0001-7313-0613

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