Title: Professional Guidelines and Reported Practice of Audiologists Performing Fall Risk Assessment with the Elderly: A Systematic Review.

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Abstract

Purpose: This systematic review aimed to explore the recommended fall risk assessment practices in audiology, identify audiologists' reported practices in fall risk assessment and recognise the barriers and facilitators affecting fall risk assessment in clinical practice. **Method:** The systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). **Results:** CINAHL, PubMed and grey literature yielded two hundred and sixty-two articles. A

total of twenty-seven full-text articles were included in this review. An additional sixteen scope of practice and guideline documents were also reviewed. Pertinent data and findings from the review were tabulated and analysed using a qualitative, inductive approach. **Conclusion:** Results revealed that despite fall risk assessment measures and protocols being mentioned, discussed, and reportedly implemented clinically in audiology literature, many audiologists are not conducting fall risk assessments clinically. The main challenges presented appear to be due to limited guidance within audiology documentation and inadequate training and knowledge of audiologists on fall risk factors and measures. This review highlighted that all audiologists have an important role to play in reducing the global crisis of falls in the elderly. However, without further research to aid in the development of standardization of documentation and training programs, we may continue to see lack of awareness and education on fall-risk and the audiologist's role in the screening and early detection hereof.

Keywords

Falls, fall-risk, elderly, audiology, assessment.

Introduction and Rationale

Falls in the elderly are rampant, resulting in unremitting financial consequences on individuals, their families and healthcare systems. The observed medical, psychological and personal effects of fatal and non-fatal falls on individuals and their respective households can be debilitating (Montero-Odasso & Masud, 2020).

A fall is defined as an unexpected, uncontrolled, accidental, downward movement of the body to the ground or an event which results in the person coming to rest unintentionally on the ground or on another, lower level (LeCuyer, Lockwood &

Locklin, 2017). Approximately 30% of the elderly population are falling each year (Baydan et al., 2019). The concern herein is two-fold. Firstly, with improved healthcare as a result of technological advances, it is predicted that the geriatric population is expected to grow exponentially in the next three decades (Garza, 2016). Secondly, dizziness and imbalance in the elderly is a significant problem that has the potential to reach epidemic proportions in the next 20-30 years (Zalewski, 2015). In the United States of America in 2018, it was recorded that adult falls resulted in healthcare expenditure of $29.2 billion (Florence et al., 2018). The associated morbidity of falls is thus expected to put substantial financial pressure on the health care system to medically treat and rehabilitate these patients.

Early identification of fall risk may largely contribute to minimising the crippling effect falls may have on the individual, the healthcare system, and the economy at broad.

A multidisciplinary team approach to assessment and management of elderly adults with balance disorders was shown to be an efficacious way to deal with fears about falling and improving quality of life in Honaker (2006)'s PHD thesis. Within the 'future directions' statement, Honaker (2006) initiated the perspective that medical professionals need to shift their focus to encourage elderly adults to be aware of their fall risk factors. Later, Honaker (2015) further discussed in an ASHA LeaderLive article, that audiologists need to start thinking about their role in early fall-risk identification and prevention with the elderly to improve Patient-Centered Outcomes.

It is estimated that 75% of adults older than 65 have a disabling hearing loss in the USA (NIDCD, 2016). As a result, many audiologists may primarily provide services to older adults, especially as the population are living longer, and the degree of a person's hearing loss and its effects on functioning continue to progress with advancing age

(Dupuis et al., 2019). Research has revealed that elderly patients with hearing loss are more at risk of falling (Criter & Honaker, 2016b & Viljanen et al., 2009). It has been suggested within a clinical trial review and systematic review, that this is because hearing loss and vestibulopathy are intrinsic fall risk factors (Chiarella et al., 2020; Jiam et al., 2016). However, it is also important to consider that elderly individuals seeking out audiological services appear to present with poorer overall health, and thus may also present with several additional fall risk factors (Criter & Honaker, 2016b). Criter & Honaker (2016b) research revealed that audiology patients reported an average of 2.12 chronic conditions and non- audiology patients reported an average 1.56 conditions. Amongst these chronic conditions were compounding fall risk factors, such as polypharmacy, diabetes, depression and decreased cognition (Zalewski, 2015). Audiologists are thus working with a population who are highly vulnerable to falls.

Audiologists are placed in a paramount position to identify elderly individuals who are at risk of falling so that reduction of falls through individualised intervention can commence. With audiologist's regular contact with elderly individuals, and their graduate training of the vestibular and balance system, their importance in early identification of fall risk is undeniable. The question however remains as to whether audiologists are currently contributing to early identification of fall risk with their elderly patients (individuals over the age of sixty-five). The aim of this systematic review was to identify the recommended and reported practice of audiologists performing fall risk assessments with their elderly patients.

The following three objectives were defined:

A. To establish what the recommended practice for audiologists is in the realm of fall risk assessment according to professional scope of practice and guideline documents.
B. To identify current fall risk assessment practices of audiologists as mentioned in literature.
C. Lastly, this review aimed to distinguish what factors encouraged or prevented audiologists from conducting fall risk assessments, to aid in understanding the barriers and facilitators affecting fall risk assessment in audiology.

Objective A was completed by exploring information on fall risk assessment in guideline and scope of practice documents established by international professional audiology associations and available on their respective websites. Objective B and C were met through the use a systematic review. In order to ensure research rigour and trustworthiness, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was followed (PRISMA, 2015). A summary of the process followed from the search to the final selection of studies for extraction and synthesis, including how many articles were included or excluded at each stage is presented in **Figure 1**.

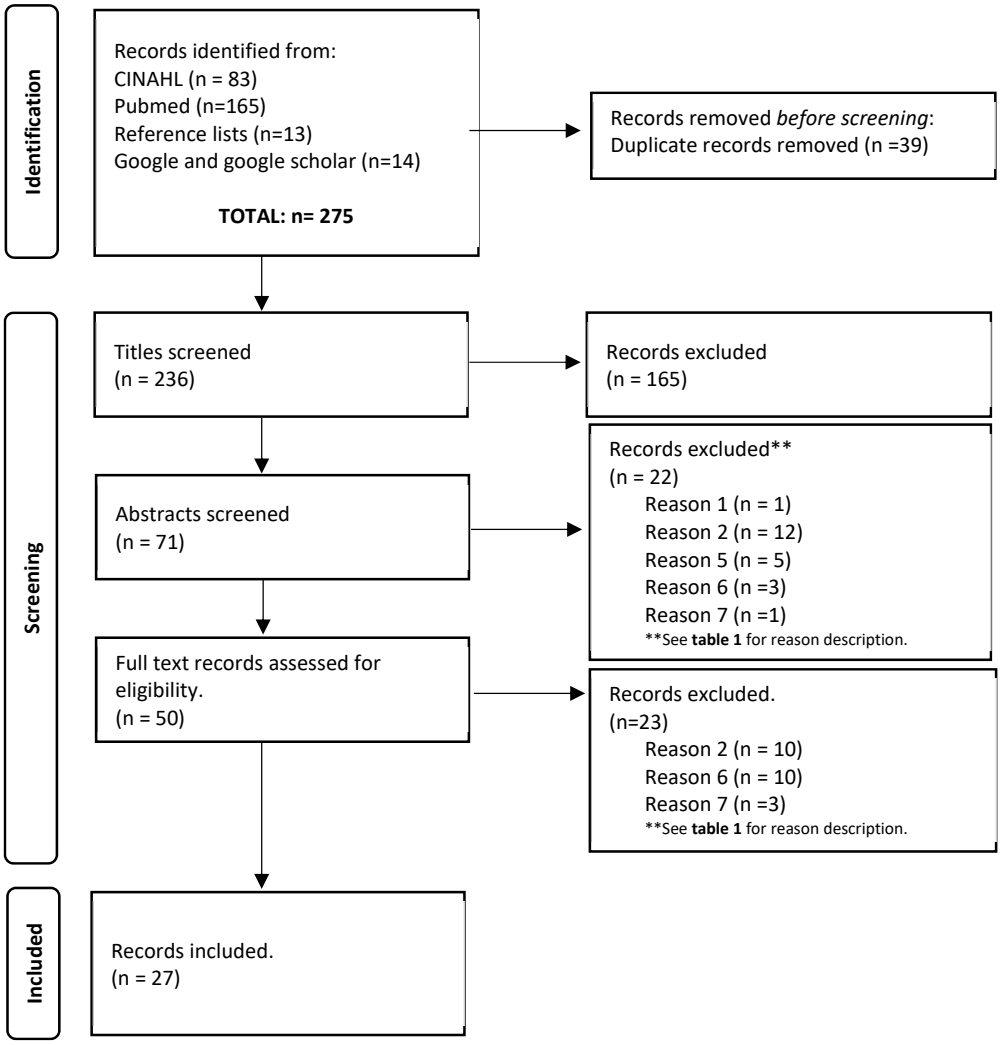
document titles pertaining to scope of practice, general audiology guidelines, balance/vestibular practice or practice with the elderly were downloaded for full text review. Lastly, to ensure that no documents had been missed, the researcher conducted several searches on each website, using the key words 'falls', 'fall risk', 'assessment', 'balance' and 'elderly'. Documents were excluded if it was identified after full text review that it did not make mention of fall risk or fall risk assessment.

The search strategy used to identify articles to be included in the systematic review proceeded as follows: firstly, the search terms were defined using the PICO (Population, Intervention, Comparison, Outcomes) guidelines, however this yielded more than twenty-one thousand search responses, most of which were irrelevant to the scope of this paper. The search terms were simplified to the following MeSH terms: "accidental falls" *and (Boolean operator)* "audiology" and the search was conducted using PubMed and CINAHL databases. Grey literature discussing fall risk assessment in audiology by conducting a google and google scholar search was also included. Non-English articles and articles older than 2005 were excluded from the search. Furthermore, only full text articles were included.

Article Assessment and selection

All records identified using the systematic review process (**Figure 1**) with relevant titles were exported to Mendeley (online reference manager software), where all three authors independently screened each report at an abstract level using the inclusion and exclusion criteria (**Table 1**). Where a conflicting decision was made as to whether an article should be included or excluded at abstract level, the article was moved to the full-text review level. At the full text review level, the articles accepted for inclusion by all three authors reached an 83% agreement. Any discrepancies related to the inclusion of articles were resolved through discussion between two authors with a

Figure 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram details the search and selection process applied during the review process.



Method

Search strategy and selection criteria

Audiology professional association documents were identified using four phases. Firstly, the professional associations were identified within South Africa, the United States of America (USA), Canada, the United Kingdom, India, and Australia. Secondly, all official documentation available on their websites were identified. Thirdly, all

conflicting view. If consensus could not be reached, the remaining author reviewed arguments from both sides and decided on whether to include the article or not.

Ultimately, twenty-seven articles were included in this review (see **Figure 1**). In the end, the inclusion of these articles was made with 100% agreement between authors. **Table 3** summarises the articles included in this review.

Systematic Review: Eligibility Criteria

The inclusion and exclusion criteria used when selecting records can be viewed in **Table 1.** Reports were not excluded based on its peer review status, study design, participants, or the outcome measures. This was because it was identified that answers to the research questions were not easily found within peer reviewed literature but tend to be found in non-peer reviewed editorials, informative, opinion and descriptive articles instead. To obtain a wide understanding of the research objectives, the inclusion/exclusion criteria was very open. It is therefore important for the reader to understand that the subsequent conclusions are based on mostly anecdotal and opinion articles with scant peer-reviewed, original data.

Data collection and extraction

Two data extraction sheets were compiled to ensure consistent and reliable data extraction from the literature reviewed. The first sheet captured pertinent data found in the scope of practice and guideline documents**.** This assisted in fulfilling objective A. The second sheet extracted relevant information from the records included in the systematic review, whereby data pertaining to objective B was separated from data pertaining to objective C.

Table 1:
Article inclusion and exclusion criteria

Reason no.	Inclusion criteria	Exclusion criteria	Rationale
1	Articles written in 2005 or later	Articles written before 2005	The first document identified in this review on an Audiology professional association website which mentioned fall-risk was published in 2006 (ASHA, 2006).
2	Included information on fall risk measures being used or possible barriers and facilitators to conducting fall risk assessments in audiology.	Did not include information on fall risk measures being used or possible barriers and facilitators to conducting fall risk assessments in audiology.	To ensure data was being recorded systematically and with stringent focus (Cherry & Dickson, 2017).
3	Free access via the university portal	Articles required payment / or no access was available due to membership requirements	Due to cost and time involved in purchasing the material (Edinger & Cohen, 2013).
4	Article available in English	Article only available in a foreign language	Due to cost and time involved in translating the material. (Edinger & Cohen, 2013).
5	Full text available	Full text not available	To ensure that data was being captured responsibility and accurately, with understanding of the research context and objectives. (Edinger & Cohen, 2013).
6	Fall risk assessment protocols discussed were conducted within the audiology context.	Fall risk protocols discussed were conducted by medical professionals other than audiologists	The purpose of this review was to identify assessment practices of audiologists (Meline, 2006).
7	The article had to be discussing fall risk assessment, where fall risk was the main concern.	Articles discussing balance assessment protocols with patients who have vestibular disorders were excluded.	The purpose of this review was to identify assessment practices of audiologist where the main concern was fall-risk of the elderly, and not fall risk as a secondary concern due to vestibular pathology (Meline, 2006).
8	The article had to focus on fall risk assessment with elderly patients.	Fall risk assessment with a population other than the elderly.	The purpose of this review was to identify assessment practices of audiologist where the main concern was fall-risk of the elderly(Meline, 2006).

Risk of individual bias and bias across studies

The focus of this review was not to assess validity or appraise the strength of evidence available on fall risk assessment practice protocols utilised in audiology. Rather, the purpose was to identify and describe reported practice in the realm of fall-risk assessment in audiology and to underpin possible facilitators and barriers in fall risk assessment in audiology, to guide future research in this area. Therefore, no formal assessments of quality or risk of bias of the articles were deemed necessary to perform.

Data analysis

All data referring to fall-risk within the reviewed scope of practice and guideline documents were summarised (**Table 2**) for discussion. Data from the twenty-seven articles identified through the systematic review were summarised and analysed using an inductive, qualitative approach. Fall risk practice discussed in audiology literature was documented and the measures mentioned and number of times they were mentioned were tabulated (**Table 4)**

Table 2:
Summary of scope of practice and guideline documents which provided information on fall risk within audiology.

Country	Organisation	Year	Document name	Mention of elderly. adults being at risk of falling	Specific mention of audiologist's role in fall risk assessment of the elderly	Guidelines on how to conduct fall risk assessment.	Fall risk information
USA	ASHA	2006	Preferred Practice Patterns for the Profession of Audiology	**X**	**X**	✓	• "Falls risk assessment may include, but not be limited to, the above assessment procedures (vestibular assessments) in addition to assessment measures of gait, blood pressure, mentation, depression, vision, and reaction time" (p34). • "Results of the balance system assessment are interpreted, and the evaluation may assist in making recommendations for vestibular and balance rehabilitation therapy, reduction in falls risk, and possible referral for medical evaluation" (p33).
USA	AAA	2014	Position Statement on the Audiologist's Role in the Diagnosis & Treatment of Vestibular Disorders	✓	**X**	**X**	• "In the elderly person, balance-related falls are associated with significant morbidity, mortality, and expense to the health-care system." (p1)
Australia	Audiology Australia	2013	Audiology Australia Professional Practice Standards – Part A Clinical Operations	✓	✓	**X**	• "Allied health professionals have an important role to play to prevent clients and patients from falling and experiencing harm from falls" (p 63) • "An audiology practice needs to consider the risk of falls with respect to its client base. There may be a greater degree of risk of falls associated with clients who are elderly and clients who may have a balance disorder." (p 63) • "In particular, clinics that have a significant client base of elderly people or offer vestibular assessment should consider a falls prevention and management policy." (p 63) Audiologists need to understand the role they play and should (p 63-64): 1) Promote independence for people at risk of falls. 2) Examine fall prevention in the context of a person's circumstances, goals and interests. 3) Understand falls prevention and how to contribute to falls prevention as a part of routine care. 4) Use surveillance and observation approaches, which are particularly useful for people who have a high fall risk and who may be temporarily or permanently cognitively impaired. 5) Consider an active role in assessment and/or assessing a person's risk of falling and act on the results. 6) Be aware of local practice in fall prevention in facilities such as hospitals and aged care facilities. 7) Consider arranging an appropriate referral for people deemed to be at risk of falls in the community setting (for example, a referral to an occupational therapist) • Encourage clients to have regular vision review. 8) Ensure that people who have fallen or are at high risk of falling have additional injury prevention strategies in place. 9) Consider the role of an audiologist in a multifactorial, multidisciplinary fall-prevention program. • Audiologists are encouraged to refer to the Australian Commission on Safety and Quality in Health Care for falls prevention guidelines.

Table 2 continued:
Summary of scope of practice and guideline documents which provided information on fall risk within audiology

Country	Organisation	Year	Document name	Mention of elderly. adults being at risk of falling	Specific mention of audiologist's role in fall risk assessment of the elderly	Guidelines on how to conduct fall risk assessment.	Recommendations specified
USA	ASHA	2020	MIPS Quality Measures for Audiologists Scope of practice: Guidance on QPP Final Rule & MIPS	✓	✓	✓	**Measure # 154 Falls: Risk Assessment** To be conducted with patients who are 65 years and older, reported a minimum of once per calendar year. To accurately report on measure #154 (Fall risk assessment), audiologists were required to document: • **Risk Assessment:** Comprised of balance/gait scale (e.g., Get Up & Go, Berg Balance Scale, Tinetti) and one or more of the following: postural blood pressure, vision, home fall hazards, and documentation on whether medications are a contributing factor or not to falls within the past 12 months. **Measure #318 Falls Assessment for Future Fall Risk** • Applicable for Patients aged 65 years and older. • Assessment of whether an individual has experienced a fall or problems with gait or balance. A specific assessment tool is not required for this measure, however potential assessment tools include the Morse Fall Scale and the timed Get-Up-And-Go test. All older persons who are under the care of a heath professional (or their caregivers) should be asked at least once a year about falls. • Older persons who present for medical attention because of a fall, report recurrent falls in the past year, or demonstrate abnormalities of gait and/or balance should have a fall evaluation performed. This evaluation should be performed by a clinician with appropriate skills and experience, which may necessitate referral to a specialist (e.g., geriatrician).
			Applies to Audiology, Family Medicine, Internal Medicine, Nephrology, Orthopaedic Surgery. Otolaryngology. Physical Therapy/ Occupational Therapy. Podiatry				

Results

The results are discussed in line with the three objectives of this review.

Recommended practice for audiologists in the realm of fall-risk measures.

Sixteen scope of practice and guideline documents were reviewed. Twelve of the sixteen documents reviewed did not make mention of fall risk. Interestingly, this included all the scope of practice documents reviewed across the 6 countries. Within the scope of practice documents, the audiologist's role in balance and vestibular testing was clear, but no specific mention was made of fall-risk assessments on elderly individuals.

Only four out of sixteen documents made mention of fall risk in the elderly. Three of these documents were from the USA and one from Australia. The fall-risk statements found within these documents are detailed in **Table 2.**

Only one document specified the roles of the audiologist (Audiology Australia, 2013), and two briefly discussed possible assessment areas and measures (ASHA, 2006, 2020). In summary, the documents in **Table 2** suggested that audiologists should "consider an active role in assessment and/or assessing a person's risk of falling and act on the results" (p. 63) (Audiology Australia, 2013). The following fall-risk measures were mentioned within audiology guideline documents: fall history questions, risk assessment, postural blood pressure, vision assessment, home fall hazards assessment, depression, mentation and reaction time and a review of medication taken (ASHA, 2006, 2020). In addition, the following functional measures of gait and balance were listed: the Get/timed Up & Go, Berg Balance Scale, Tinetti and the Morse Fall Scale Test (ASHA, 2006, 2020).

Audiologist's reported practice

The articles which were included in this review were separated into three categories and documented in **Table 3**. Within **Table 3**, category 1 consisted of articles which directly researched what audiologists' reported practice was in fall risk assessment. Category 2 included articles where the main goal was not necessarily to identify audiologists' fall risk assessment practices, however, it provided valuable insights into the chosen fall risk assessment measures included in research methodology. Lastly, Category 3 included articles which were not research based (editorials, commentaries, opinion and descriptive articles) but provided valuable insights into what authors in the field of audiology recommended or discussed with regard to fall risk in the realm of audiology. **Table 3** also reveals that the majority of articles exploring fall risk in the realm of audiology have originated from the USA. Contribution is also observed from Canada, Turkey and Italy, but to a much smaller extent.

A large variety of fall-risk assessment measures were mentioned within audiology literature. Twenty-five of the twenty-seven articles included made reference to specific fall risk assessment measures. The number of times each measure was mentioned within a screening or diagnostic assessment context can be viewed in **Table 4**.

In this review, when an article made mention of measures which gave the clinician an objective and quantitative idea of a specific systems function (such as the vestibular system), this was considered as a diagnostic test battery. Whereas a screening test battery was defined as a battery of tests mentioned which required subjective interpretation and where the goal of the assessment was to identify possible fall risk factors. Overall, nine articles mentioned fall risk measures within a diagnostic test battery and sixteen within a screening test battery (n=25).

Table 3:

Summary of articles included in the systematic review (n=27)

ARTICLE CATEGORY	NO.	STUDY CITATION	STUDY TITLE	COUNTRY	STUDY DESIGN & PUBLICATION TYPE	OBJECTIVE B SCREENING/DIAGNOSTIC FALL RISK TEST BATTERY MENTIONED	OBJECTIVE C FALL RISK ASSESSMENT BARRIERS/FACILITATIORS MENTIONED
1. Research articles which explored audiologists current fall risk screening practices	1	(Bassett, 2018)	Evaluating Fall Risk Assessment Protocols in the Field of Audiology	USA	PHD	Screening	✓
	2	(Baxter et al., 2017)	Striking the Right Balance: Current Fall Prevention Strategies in Audiology Practice: A Review of the 2017 CAA Fall Prevention Survey Results.	Canada	Descriptive study	Screening	✓
	3	(Callahan et al., 2013)	Academic Training of Audiology Graduate Students in Vestibular Evaluation and Balance Assessment Procedures	USA	Descriptive study	Tools not discussed	✓
	4	(Patterson & Honaker, 2014)	Survey of Audiologists' Views on Risk of Falling Assessment in the Clinic	USA	Descriptive study	Diagnostic	✓
2. Research articles where audiologists discussed fall risk screening or utilised fall risk screening tools in their methodology	5	(Alvord et al., 2008)	A Preliminary Study of the Effectiveness of an Otolaryngology-Based Multidisciplinary Falls Prevention Clinic	USA	Observational study	Diagnostic	✓
	6	(Baydan et al., 2019)	The Interaction Between Mild Cognitive Impairment with Vestibulo-ocular Reflex, Dynamic Visual Acuity and Postural Balance in Older Adults	Turkey	Experimental study	Screening	x
	7	(Ciorba, 2015)	Dizziness and the Risk of Falling in the Elderly: A Literature Review	Italy	Literature review	Screening	✓
	8	(Criter & Gustavson, 2020)	Subjective Hearing Difficulty and Fall Risk	USA	Correlational study	Screening	x
	9	(Criter & Honaker, 2013)	Falls in the Audiology Clinic: A Pilot Study	USA	Descriptive and Correlational Retrospective study	Screening	x
	10	(Criter & Honaker, 2016a)	Identifying Balance Measures Most Likely to Identify Recent Falls	USA	Retrospective review	Screening	✓
	11	(Criter & Honaker, 2016b)	Audiology Patient Fall Statistics and Risk Factors Compared to Non-Audiology Patients	USA	Case control study	Screening	✓
	12	(Criter & Honaker, 2017)	Fall risk Screening Protocol for Older Hearing Clinic Patients	USA	Cross-sectional study	Screening	✓
	13	(Honaker, 2006)	A Team Approach Risk of Falling Assessment and Remediation Program for Community Dwelling Older Adults with a Fear of Falling and Balance Disorders	USA	PHD	Diagnostic	x
	14	(Honaker & Shepard, 2011)	Use of the Dynamic Visual Acuity Test as a Screener for Community-Dwelling Older Adults Who Fall	USA	Experimental study	Screening	x
	15	(G. P. Jacobson et al., 2008)	Significant Vestibular System Impairment Is Common in a Cohort of Elderly Patients Referred for Assessment of Falls Risk	USA	Retrospective review	Diagnostic	✓
	16	(Krager, 2018)	Assessment of Vestibular Function in Elderly Patients	USA	Literature review	Diagnostic	x
3. Editorials, informative, opinion and descriptive articles where fall risk screening was discussed.	17	(Bassett & Honaker, 2016)	Audiologist's Role Within the Changing Climate of Fall Prevention: Are We Ready?	USA	Perspectives of the ASHA Special Interest Groups article	Screening	✓
	18	(Chiarella et al., 2020)	Disequilibrium and Risk of Falling in the Elderly is a Priority for Health Services	Italy	Review of Clinical Trials	Screening	✓
	19	(Criter et al., 2013)	Audiologists' Role in Assessing Risk of Falls	USA	Perspectives of the ASHA Special Interest Groups article	Diagnostic	✓
	20	(Danhauer et al., 2011)	An Open Letter to Dennis: We Can Do More to Educate Our Patients About Falls	USA	Audiology Today article	Screening	✓

Table 3:

Summary of articles included in the systematic review (n=27)

ARTICLE CATEGORY	NO.	STUDY CITATION	STUDY TITLE	COUNTRY	STUDY DESIGN & PUBLICATION TYPE	OBJECTIVE B SCREENING/DIAGNOSTIC FALL RISK TEST BATTERY MENTIONED	OBJECTIVE C FALL RISK ASSESSMENT BARRIERS/FACILITATIORS MENTIONED
	21	(Handelsman, 2011)	Falls Among Older Adults: A Public Health Concern	USA	ASHA Wire article	Screening	x
	22	(Hatton, 2016)	Prevent Falling Patients from Falling Off the Radar: Resources for Building Your Falls Risk Protocol	USA	ASHA Wire article	Diagnostic	✓
	23	(Honaker et al., 2013)	Life in Balance	USA	ASHA Leader Article	Screening	✓
	24	(Jedlicka, 2020)	20Q: Why All Audiologists Should be Administering Balance Screenings	USA	Audiology Online Interview	Screening	✓
	25	(Lindsey, 2015)	Audiologists Integral Piece of the Puzzle in Fall Prevention	USA	Cover Story article in "The Hearing Journal"	Diagnostic	✓
	26	(McCaslin, 2013)	Falls in the Elderly and the Role of the Audiologist	USA	Editorial	None	✓
	27	(Smith & Porter, 2013)	Fall Risk Assessment and Intervention	USA	Perspectives of the ASHA Special Interest Groups article	Diagnostic	✓

Table 4:
Fall risk assessment measures reported in audiology practice and research

Instrument type	Fall risk assessment measure	Diagnostic test battery (n=9) Goal: diagnosis	Screening test battery (n=16) Goal: identify fall risk	Total no.of mentions (n=25)
Fall risk factor screening	Case history (e.g. History of falls or fear of falling, imbalance symptoms)	6	11	**17**
	Medication review	5	5	**10**
	Risk factors checklist (co-morbidities)	2	4	**6**
	STEADI questionnaire	1	2	**3**
	Use of ambulatory device	0	2	**2**
	Morse Fall Scale	/	1	**1**
	Questions about inactivity	1	/	
	St. Thomas Risk Assessment (STRATIFY)	1	1	**2**
	Family member interviews about falls	/	1	**1**
Self-report questionnaires	Activities Specific Balance Confidence Scale (ABC Scale)	3	8	**11**
	Geriatric Depression Scale (GDS)	6	2	**8**
	Dizziness Handicap Inventory (DHI)	6	2	**8**
	Hospital Anxiety and Depression Scale (HADS)	1	2	**3**
	Beck Anxiety Inventory	3	/	**3**
	Falls Efficacy Scale (FES) Falls Efficacy Scale-International (FES-I),	2	/	**3**
	Hearing Handicap Inventory for the Elderly (HHIE)	/	3	**3**
	Instrumental Activities of Daily Living	/	1	**1**
	Vertigo Symptom Scale-short form (VSS-sf)	/	1	**1**
	The Disability Scale	/	1	**1**
	The Vertigo Handicap Questionnaire (VHQ)	/	1	**1**
	The UCLA Dizziness Questionnaire	/	1	**1**
	The Vestibular Disorders Activity of Daily Living (VADL) scale	/	1	**1**
	Centre for Epidemiologic Studies Depression Scale (CES-D)	1	/	**1**
Functional measures of gait and balance	Timed Up and Go (TUG)	7	10	17
	Computerised Dynamic Posturography (CDP) -Motor Control Test (MCT) - Sensory Organisation Performance Task (SOP)	9	2	**11**
	Dynamic Gait Index (DGI)	3	4	**7**
	Modified Clinical test of Sensory Integration on Balance (mCTSIB) - bedside/computerised	1	5	**6**
	Berg Balance Scale (BBS)	2	4	**6**
	Tinnetti Balance Assessment Tool (TBAT)	2	3	**5**
	Gait	2	2	**4**
	Romberg Test	2	2	**4**
	30 Second Sit-To-Stand	2	1	**3**
	Fukuda Stepping Test	2	1	**3**
	Functional Reach Test (FRT)	2	1	**3**
	5 Times Sit-to-Stand Times	/	3	**3**
	STEADI Tools	2	1	**3**
	Functional Gait Assessment (FGA)	2	/	**2**
	Single Leg Stance	1	1	**2**
	Gans Sensory Organisation Performance Task (Gans SOP)	/	2	**2**
	Dual-Task Measures	/	1	**1**
	CDC 4-Stage Balance Test	1	/	**1**
	Romberg	1	/	**1**
Bedside vestibular assessments	Oculomotor assessment	1	1	**2**
	Vestibular ocular reflex assessment	1	1	**2**
Vestibular clinic diagnostic procedures	Videonystagmography/Electronystagmography (VNG/ENG)	8	2	**10**
	Rotatory chair	8	/	**8**
	Dynamic Visual Acuity (DVA)	2	4	**6**
	Vestibular Evoked Myogenic Potentials (VEMP)	5	/	**5**
	Benign Paroxysmal Positional Vertigo (BPPV) assessment	5	/	**5**
	Video Head Impulse Test (vHIT).	4	/	**4**
	Caloric	4	1	**4**

Table 4 continued:
fall risk assessment measures reported in audiology practice and research

Instrument type	Fall risk assessment measure	Diagnostic test battery (n=9) Goal: diagnosis	Screening test battery (n=16) Goal: identify fall risk	Total no. of mentions (n=25)
	Gaze Stabilization Testing (GST)	2	/	**2**
	Sinusoidal harmonic testing	1	/	**1**
	Dynamic Visual Acuity Perception Time Test	1	/	**1**
	Vertebrobasilar artery insufficiency protocol	1	/	**1**
	VOR suppression	1	/	**1**
Additional measures	Mini-Mental State Examination	7	2	**9**
	Vision assessment	5	1	**6**
	Postural blood pressure	4	1	**5**
	Home fall Hazards/ environmental assessment	3	2	**5**
	Sensation, proprioception, somesthesia Vibration	5	/	**5**
	Reaction time	4	/	**4**
	Fall prevention handouts	/	1	**1**
	Katz activities of daily living	/	1	**1**
	Cardiovascular function	1	/	**1**
	Montreal Cognitive Assessment	/	1	**1**
	Lower-extremity strength and sensation	1	/	1
	Foot anomalies	1	/	**1**
	Motor control and sensory organisation test, and the big toe up or down test)	1	/	**1**
	Lawton and Brody's Instrumental Activities of Daily Living Scale (IADL)	/	1	**1**

Overall, results revealed that the six most reported fall-risk screening assessment measures in audiology literature were Case history: [11/16]; The Timed Up and Go (TUG) test *(Podsiadlo & Richardson, 1991):* [10/16], the Activities Specific Balance Confidence Scale (ABC Scale) *(Powell & Myers, 1995)*: [8/16]; the Dizziness Handicap Inventory *(Jacobson & Newman, 1990):* [6/16]; the Modified Clinical test of Sensory Integration on Balance (mCTSIB) *(Shumway-Cook & Horak, 1986):* [5/16] and Medication review: [5/16]. Likewise, the six most frequently reported fall-risk diagnostic assessment measures in audiology literature were: Computerised Dynamic Posturography (CDP): [9/9], Videonystagmography or Electronystagmography (VNG/ENG): [8/9], Rotatory chair (8/9), the TUG test (7/9), the Mini-Mental State Examination (MMSE) *(Folstein et al., 1975)*: [7/9] and the Geriatric Depression Scale (GDS) *(Sheikh & Yesavage, 1986)*: [6/9].

Although fall risk assessment measures are evident in audiology literature, insights from the articles in category 1 (see **table 3**) revealed that fall risk assessments are not being conducted by numerous audiologists as part of standard practice. Bassett (2018)'s unpublished dissertation reported that nearly half of the audiologists (45.5%, n=25/55) who responded to a survey in the USA did not conduct fall risk screening on elderly patients. Similarly, another study reported that 62.1% (n=147/238) of audiologists surveyed indicated no experience with fall risk assessments (Patterson & Honaker, 2014). Additionally, in Canada, 76.9% of audiologists stated that they do not use fall risk screening tools (Baxter et al., 2017)**.**

Patterson and Honaker (2014) further reported that of the audiologists who were conducting fall risk assessments, all of them were also practicing in vestibular audiology. The most common measures reportedly used as part of a fall risk assessment were tests of vestibular function (37.4%). Very few reported the use of functional

balance measures in their fall risk assessment protocols (only 12.6%). Furthermore, additional screening measures such as fear of falling, cognition, depression, hypertension, proprioception and vibration senses, vision screening and home hazards screening were conducted by less than 7% (n=238) of vestibular audiologists (Patterson & Honaker, 2014).

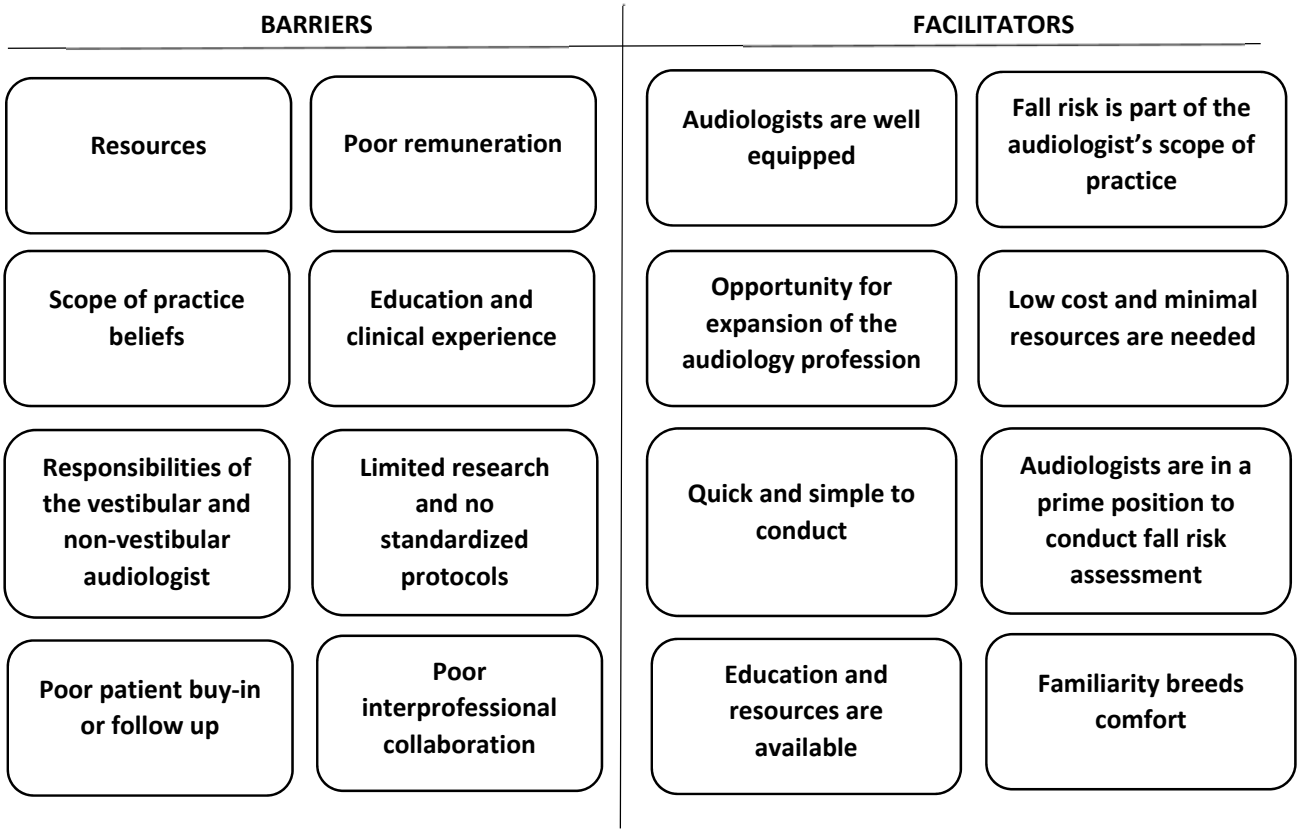
Findings also revealed that in recent years, in the USA, Medicare has initiated an incentive program encouraging audiologists to conduct fall risk screening measures with their elderly patients (ASHA, 2020). The assessment measures reportedly used by the USA audiologists who are implementing Medicare's fall risk screening guidelines appeared to correlate with some of the most mentioned screening measures found in this review. Namely, the TUG test, case history and history of falls or fear of falling questions, the DHI and medication review (Bassett, 2018).

Fall risk assessment barriers and facilitators within the audiology clinic.

Several, possible barriers, and facilitators were described, most factors were mentioned several times within the reviewed literature which affirmed the reliability of the identified barriers and facilitators summarised in **Figure 2.**

Figure 2:

Barriers and facilitators affecting fall risk screening practice in audiology.



Fall risk assessment barriers.

Scope of practice beliefs. One barrier that was suggested was the consensus between audiologists as to whether fall risk assessment was within the scope of the audiologist, with findings from both a USA and Canadian study indicating the belief that fall risk assessment and prevention should not be within the scope of the audiologist (Baxter et al., 2017; Honaker, 2014).

Education and clinical experience. The uncertainty of some audiologists with regards to their role in fall risk assessment may stem from limited education and clinical experience in the area of fall risk assessment. Eight of the twenty seven articles

discussed that formal training and education on risk of falling assessment is lacking (Bassett, 2018; Bassett & Honaker, 2016; Baxter et al., 2017; Criter & Honaker, 2017; Criter et al., 2013; Jedlicka, 2020; Patterson & Honaker, 2014).

One study from the USA, identified that very few audiology doctoral programs incorporated fall risk assessment training into the vestibular and balance coursework, with only 40% of the students reporting hands on experience with fall risk assessments (Callahan et al., 2013). This finding corresponds with findings in a later dissertation which revealed that only 19% of audiologists felt their university coursework prepared them to conduct fall-risk assessment measures (Bassett, 2018). Similarly, 90.6% of Canadian audiologists felt ill-equipped in fall risk measures after their studies (Baxter et al., 2017).

Several authors have expressed the sentiment that there is a need for further training in fall-risk practice through improved graduate coursework or continuing education credits (Bassett & Honaker, 2016; Callahan et al., 2013; Criter & Honaker, 2017), with the suggestion that it should perhaps be introduced at the same time hearing assessment is being taught and practiced (Jedlicka, 2020).

Limited research and no standardized protocols. Standardizing fall risk course work, however, may prove to be a challenge. Authors have discussed that further research is needed to identify the most sensitive, specific, quick and practical fall-risk assessment protocols within the audiology practice setting (Ciorba et al., 2017; Criter et al., 2013; Criter & Honaker, 2016a; Lindsey, 2015). One of the studies explored several combinations of fall risk assessment tools (Bassett, 2018) and revealed that varying assessment protocols had a high specificity, but lacked sensitivity, which may result in over referral to other medical professionals.

Resources. In addition to standardisation concerns, audiologists have also expressed concerns regarding not having the appropriate resources required for fall risk assessment practice. The four resources highlighted in the articles included: time (6/27 articles), equipment (6/27 articles), additional personnel needed (1/27 articles), and limited space (1/27 articles).

Poor remuneration. Another practical barrier specified is the lack of remuneration and reimbursement received for fall risk measures (Bassett, 2018; Patterson & Honaker, 2014). Within an opinion article, Jedlica (2020) confirmed that audiologists are not reimbursed for completing fall risk assessments. The only measures which are reimbursed are objective vestibular assessments. Thus, it may not be feasible for audiologists to be spending a lot of time conducting fall-risk measures. For this reason, in the viewpoint of Lindsey (2015), fall risk assessment protocols need to be quick and easy to administer.

Responsibilities of the vestibular and non-vestibular audiologist. Three articles highlighted that fall risk assessment measures may be assumed to be the responsibility of the audiologists practicing in vestibular audiology and that hearing clinic audiologists may feel exempt from fall-risk assessment of patients (Bassett & Honaker, 2016; Baxter et al., 2017; Patterson & Honaker, 2014). Patterson & Honaker (2014)'s study was the only study with original data to support this claim - 79% of audiologists believed that fall risk assessment was more prominent in the vestibular and balance clinic.

Poor patient buy-in and follow up. Fall risk assessment and prevention requires close monitoring and follow up with patients (Lindsey, 2015). An article in the Audiology Today magazine suggested that another barrier in conducting fall-risk assessment

measures may be that audiologists feel it is difficult to determine if a patient has followed their recommendations (Danhauer et al., 2011). It has also been speculated that some audiology clinics may also feel that they do not have the appropriate infrastructure to be able to adequately evaluate, recommend, and track patient outcomes (Bassett & Honaker, 2016).

Poor interprofessional collaboration. Tracking of patients may prove to be difficult because a network of medical professionals may be involved in managing one patient. Referrals to multidisciplinary team members is important as the risk factors that are identified may not be the risk factors the audiologist can provide intervention for (Criter et al., 2013). In the opinion of Dr McCaslin within an interview, another barrier to conducting fall risk assessments may be that audiologists do not know how or when the appropriate time is to refer to other professionals and may not feel they have the time to collaborate around these issues (Lindsey, 2015). Patterson & Honaker (2014) revealed that 76.1% of American audiologists who are not conducting fall risk assessments are also not referring their elderly patents to another specialist for further evaluation. This finding was also evident amongst Canadian audiologists where responses revealed that the majority of audiologists did not refer to the physical or occupational therapist if their patient had a history of falls (Baxter et al., 2017). Baxter et al. (2017) specified a need for audiologists to become stronger members within interprofessional healthcare teams.

Fall risk assessment facilitators:

Fall risk assessment is within the audiologist's scope of practice. Fall risk assessment is considered to be part of the audiologist's scope of practice. Eight papers described that fall risk assessment is indeed part of the audiologists scope of practice (Bassett,

2018; Bassett & Honaker, 2016; Baxter et al., 2017; Criter & Honaker, 2017; Jedlicka, 2020; Lindsey, 2015; McCaslin, 2013 and Smith & Porter, 2013). Additionally fall risk assessment is mentioned in several audiology professional association documentation (AAA, 2014; ASHA, 2006, 2020; Audiology Australia et al., 2013).

Opportunity for expansion of the audiology profession. Within an editorial, it was expressed that fall risk assessment may present as an avenue of expansion for the profession of audiology (McCaslin, 2013). Both Jedlicka (2020) and McCaslin (2013) are of the opinion that an assessment of the entire balance system and associated risk factors can easily be incorporated into vestibular clinics.

Audiologists are in a prime position to conduct fall risk assessments. This opportunity for expansion for audiology is also readily accessible as audiologists are in a prime position to be conducting assessments with elderly patients (Baxter et al., 2017; Lindsey, 2015). Audiology patients have been shown to be more at risk of falling than those who are not at risk of falling (Criter & Honaker, 2016b). Moreover, audiologists are balance specialists- with their main patient base being considered as being 'at-risk' of falling, they are perfectly positioned to identify fall risks and play their part in minimising the consequences of falls on the elderly population that consult with them (Baxter et al., 2017). The identification and triaging of at-risk patients identified in the audiology clinic may contribute significantly to fall prevention (Lindsey, 2015), However, no evidence could be found which supported this claim.

Simple, low cost and minimal resources are needed. Careful use of a range of simple, informal and freely available measures can give the clinician a good idea of the patient's susceptibility to falling (Criter & Honaker, 2017) with minimal time, resources or equipment needed (Baxter et al., 2017; Chiarella et al., 2020; Criter & Honaker, 2016a;

Danhauer et al., 2011; Criter et al., 2013; Jedlicka, 2020; Lindsey, 2015). Fall risk assessment can be as simple as asking questions about a patient's fall history or asking them to fill out self-reported measures at home or before their appointments (Baxter et al., 2017; Danhauer et al., 2011). Furthermore, the Timed Up and Go (TUG) test, if done in isolation, has a sensitivity of 83.3% and specificity of 61.1% (Criter & Honaker, 2016a). The TUG takes less than a minute to conduct and only a chair and timer is needed.

Familiarity with fall risk measures. An additional facilitation factor that was identified was familiarity with assessments. Fall risk assessment measures conducted in the audiology clinic are often dependant on the audiologist's knowledge and experience with fall risk tools. It has been inferred in literature that the more familiar audiologists are with certain measures, the more likely they are to implement them in clinical practice (Bassett, 2018).

There is opportunity to learn. Lastly, the opportunity to become familiar with fall risk assessment measures is available to students and practicing audiologists. Jedlica (2020) discussed that The American Academy of Audiology (AAA) and The American Speech, Language and Hearing Association (ASHA) have resources available to help guide audiologists in fall risk practice. Additionally, audiologists reportedly have the opportunity to learn through continued education through seminars or peer-reviewed journals (Criter et al., 2013).

Discussion

Overall, information on fall risk assessment and the role of the audiologist within guideline and scope of practice documents from audiology professional associations internationally was scant. None of the reviewed scope of practice documents mentioned

fall-risk assessments as being part of the audiologist's scope of practice. However, although fall risk is not explicitly stated ,it still falls within the scope of the audiologist (Bassett, 2018; Bassett & Honaker, 2016; Baxter et al., 2017; Criter & Honaker, 2017; Jedlicka, 2020; Lindsey, 2015; McCaslin, 2013 and Smith & Porter, 2013). This is because an audiologist's primary responsibility is to prevent, investigate and manage auditory dysfunction, dizziness and balance dysfunction (Criter & Honaker, 2013). Age-related decline in both the auditory and vestibular system may very well be contributing factors to imbalance symptoms (G. P. Jacobson, 2009; Krager, 2018). Regardless of the cause, should a patient be at risk of developing auditory or balance dysfunction, or report the presence of auditory or balance symptoms, the audiologist is trained to initiate further investigation and prevention.

Furthermore, of the audiology professional association documents that did discuss fall risk - the information provided was insufficient to guide audiologists in creating a comprehensive fall risk assessment protocol. The lack of overt and comprehensive discussion of the audiologist's role in fall risk screening may be due to the limited research on fall risk assessment within audiology, subsequently resulting in a scarcity of standards and guidelines available. Resultantly, many audiologists are unaware of their role in fall risk assessment of elderly individuals (Baxter et al., 2017; Patterson & Honaker, 2014). Until there is sufficient research to guide best practice and define the audiologist's scope of practice in fall risk, confusion may persist amongst audiologists as to whether fall risk assessment does indeed fall within the scope of the audiologist.

It is possible that medical centres and audiology clinics are currently conducting fall risk assessment protocols, however, if this is the case, few are published or found via a google search. The articles incorporated into this review thus represented the available audiology literature which mentioned fall risk screening. Thus, the fall risk

assessment measures collated in this article represent tools likely most familiar to audiologists and not necessarily tools that are regularly incorporated clinically. On review of the fall risk screening measures mentioned in audiology literature, it was revealed that the TUG was the most mentioned functional balance measure used and the DHI and ABC scale were the most mentioned questionnaires. Another study also revealed that these measures are also commonly used in fall risk screening protocols within audiology clinics (Bassett, 2018). The regular incorporation of the TUG test, DHI and the ABC scale test could be due to audiologists' familiarity with this test as it has been suggested that familiarity with assessment procedures is predictive of clinical usage (Bassett, 2018). Additionally, within the context of audiology, with limited time and reimbursement available, quick screening measures are better than no screening at all and have been identified as effective (Criter et al., 2013). The TUG test only takes a few seconds and has been suggested as the best measure to identify individuals with a recent history of falls (Criter & Honaker, 2016a). Similarly, Criter & Gustavson (2020) also identified that a higher HHIE score correlated with a higher number of falls experienced by audiology patients. When the TUG test, HHIE and DHI are used together, their predictive power of fall-risk is said to increase, with a 92.0% sensitivity and 100% specificity (Criter & Honaker, 2017). The implementation of quick fall risk screening measures may lead to regular conversations with patients about fall risk factors which may also encourage self-referrals to appropriate professionals, and in turn contribute towards prevention of falls (Criter & Honaker, 2016a). The literature thus revealed that conducting simple screening measures does not require extensive additional training, resources, time, or in-depth knowledge of the balance system. Hence, fall risk screening is not a service which should be limited to the vestibular audiologist's capabilities.

A quick and simple fall risk screening protocol being incorporated into all annual appointments with adults over the age of 65 would allow audiologists to triage patients who may require a more in-depth fall risk screening assessment. This review however revealed that comprehensive fall risk screening is not commonly conducted by audiologists. 'Additional measures' such as cognitive decline, depression, proprioception, and reaction time were not commonly mentioned within audiology screening protocols. Perhaps audiologists feel that they are not trained to screen these areas or that it does not fall within their scope of practice as it does not directly involve the auditory or vestibular system. Findings also revealed that screening measures for vestibular function were mentioned only once within audiology fall risk screening protocols (Honaker & Shepard, 2011). This may be because dizziness and imbalance are well-recognized problems amongst older people and audiologists may not attribute these complaints to the vestibular system unless vertigo is described (Van De Berg et al., 2015). However, in the elderly, bilateral vestibulopathy has been shown to largely contribute to falls (Chiarella et al., 2020). These patients may complain of general unsteadiness rather than vertigo (Moon et al., 2017). Screening for vestibular weakness and signs of Benign Paroxysmal Positional Vertigo (BPPV) should be conducted often by audiologists with the elderly (G. P. Jacobson et al., 2008). Subsequent referrals for diagnostic testing and early rehabilitation may prevent a fall from occurring (Furman et al., 2010).

It appears that the vestibular system is more commonly assessed within diagnostic protocols. The most mentioned measures for assessment of the vestibular system were: vestibular function (VNG/ENG and Rotatory chair), functional balance (CDP and the TUG) and risk factors (GDS and MMSE). It was interesting to note that additional fall risk screening measures of depression and cognition were used within diagnostic

protocols more commonly than within screening protocols. Perhaps this is due to more time being set aside for diagnostic testing. Concern however arises with these risk factors only being assessed at a diagnostic level. This is because, the need for a diagnostic assessment would generally imply that imbalance consequences have already occurred i.e., the patient has fallen, and the cause hereof needs to be identified. Rather, incorporating additional risk measures into fall risk screening programs may assist in early identification and appropriate triaging to multidisciplinary team members- before the patient falls. With the high morbidity and mortality rate of falls globally, there is great need for healthcare professionals to screen for fall risk before diagnostic measures are suggested, so that preventative measures can be instilled.

Due to traditional vestibular and balance graduate training, the implementation of fall-risk screening protocols within audiology may prove to be challenging. In Jedlicka (2020) and McCaslin (2013)'s opinion, many graduate programs primarily focus on the diagnostic assessment of the peripheral and central vestibular system and minimal emphasis is given to the assessment of whole-body fall risk factors and functional balance of elderly audiology patients. Callahan et al. (2013) further examined audiology doctoral programs in the USA and also identified that professors and instructors rarely reported fall risk assessment as being a component which was focused on in clinical practicals. Reliance on clear guidelines is evident before a paradigm shift can occur in the focus of the audiologist's role in balance assessments of the elderly. The shift from a vestibular diagnosis-driven focus to a whole-body function and a risk-aversion focus is essential if all audiologists are to contribute to fall prevention through fall risk screening of the elderly. Being too diagnosis-driven may be problematic for programs where risk identification and prevention needs to be emphasised.

Once all risks have been identified, effective multidisciplinary (MDT) collaboration is key to the prevention of falls. The literature however revealed that poor partnerships with MDT members exist in the realm of fall risk screening within audiology. Without having the appropriate partnership with team members, fall risk assessments programs are fruitless as the appropriate MDT intervention cannot commence. It was suggested by Baxter et al. (2017) that poor collaboration may be due to the audiologist's limited understanding of how and when to refer to other healthcare professionals for further evaluation and intervention (Baxter et al., 2017). Similarly, in Smith & Porter (2013)'s opinion, MDT members may not recognise the role of the audiologist within the fall-risk team. Success of an MDT driven program requires an awareness of each other's roles and how it adds value to the assessment and management of a patient (Criter et al., 2013). Ideally, all members of the fall-risk assessment team should be aware of the audiologist's expertise and insights in one of the largest contributing factors to falls: dizziness and imbalance (Zalewski, 2015).

Audiologists are trained in understanding the balance and hearing system comprehensively. With their regular exposure to elderly individuals with hearing loss and balance complaints, Hatton (2016) suggested that audiologists are in an optimal position to be conducting fall risk screenings with their elderly patients.

Furthermore, with the evolution and paradigm shift of audiology from a health-care service delivery model to a patient centred care approach (Boisvert et al., 2017), fall risk screening may present an ideal opportunity for the expansion of the profession. Moreover, fall risk screening of individuals 65 years and older allows for the implementation of interventional audiology. This is described by Taylor (2016) as the delivery of services to patients at an earlier stage of their impairment. As the profession of audiology advances, reliance on hearing aid sales to sustain practice costs may

become insufficient (Taylor, 2016). Audiologists will need to position themselves as trusted healthcare advisors and service providers that seek to minimize impairment and maximize daily function (Taylor, 2016). Furthermore, the audiologist's function in fall-risk screening and prevention could prove to be highly valuable in decreasing health costs because of fall morbidities.

It is important to note that there were several limitations to this study. Reports were not excluded based on its peer review status, study design, participants, or the outcome measures. This was because it was identified that answers to the research questions were not easily found within peer reviewed literature but tend to be found in non-peer reviewed editorials, informative, opinion and descriptive articles instead. To obtain a wide understanding of the research objectives, the inclusion/exclusion criteria was very open. It is therefore important for the reader to understand that the subsequent conclusions are based on mostly anecdotal and opinion articles with scant peer-reviewed, original data. . Only four articles directly reported audiologists' fall risk screening clinical practice. This article thus represents the 'most mentioned' fall risk measures in audiology literature and not the 'most used' measures. It should also be distinguished that audiologist may be implementing fall risk screening clinically, however research reports of this are limited. Another limitation of this study is that the grey literature search only included articles or documents which could be found online. Thus, it is uncertain whether medical centres or academic institutions have standard audiology fall risk screening protocols in their clinical handbooks. Although the data obtained was limited, this systematic review played an important part of a larger study whereby the information was used to adapt a survey.

Conclusion

Fall risk assessment is within the audiologist's scope of practice. The reviewed literature revealed that a vast array of fall risk assessment measures and protocols have been mentioned, discussed, and clinically implemented in audiology literature. However, the sources available are primarily not peer-reviewed and do not obtain original data. Foreseeably, with minimal evidence-based guidance available, research looking at audiologists' clinical implementation of fall risk assessment revealed that many are not conducting fall risk assessments, and some are even unaware that it falls within the audiologist's scope of practice.

The main challenges presented appear to be due to limited guidance within audiology scope of practice and guideline documents and inadequate training and knowledge of audiologists on fall risk factors and measures. There is subsequently a great need for research to be conducted so that scope of practice and guideline documents can include clear and detailed fall-risk screening guidelines for audiologists. This may also aid in the development of standardised graduate and post graduate fall risk training programs.

Although limited conclusions can be drawn from what fall risk tools and protocols audiologists are implementing clinically, it was identified that several fall risk measures are familiar to audiologists. Research has suggested that including a few of these familiar fall risk screening tools may be an effective protocol to early identification of falls in the elderly (Criter & Honaker, 2017). Nonetheless, substantial further research is still required before audiologists are able to incorporate evidence-based fall risk screening protocols which are sensitive, specific and feasible within the audiology clinic setting.

With anticipated future progression in the available evidence-based literature available, adopting the audiologist's role as part of the fall-risk multidisciplinary team will provide opportunity to grow as a profession and move towards the implementation of interventional audiology.

With audiologists interacting with numerous elderly and at-risk individuals weekly, they have an inherent responsibility to contribute to decreasing the mortality and morbidity of falls in the elderly population. However, this review suggests that in order to overcome many of the barriers to the implementation of fall risk screening clinically, fall-risk needs to be incorporated into audiology practice guidelines and standardised within graduate curricula.

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No competing interests were present.

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Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article.

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