Journal: International Journal of Audiology

Title: Changes in audiologist's mental wellbeing during the COVID-19 pandemic: the supportive role of professional associations, workplaces and manufacturers

Authors: Rebecca J. Bennett[1,2], Elise Cumming-Potvin[1,2], Robert H. Eikelboom[1,2,3], Vinaya Manchiah[3,4,5,6], Johanna C. Badcock[7], and De Wet Swanepoel[1,2,3,4]

1. Ear Science Institute Australia, Subiaco, Western Australia, Australia
2. Ear Sciences Centre, School of Surgery, The University of Western Australia, Nedlands, Australia
3. Department of Speech-Language Pathology and Audiology, University of Pretoria, Gauteng, South Africa
4. Virtual Hearing Lab, Collaborative initiative between Lamar University and University of Pretoria
5. Department of Speech and Hearing Sciences, Lamar University, Beaumont, Texas, United States
6. Department of Speech and Hearing, School of Allied Health Sciences, Manipal University, Manipal, Karnataka, India

7. School of Psychological Science, The University of Western Australia, Nedlands, Australia

ORCID

RJB: 0000-0001-9427-5539

RHE: 0000-0003-2911-5381

JCB: 0000-0003-4629-2929

DWS: 0000-0001-8313-1636

VM: 0000-0002-1254-8407

Corresponding author: Dr Rebecca J Bennett, Ear Science Institute Australia, Suite 1, Level 2, 1 Salvado Road, Subiaco, WA 6008, Australia. Tel: +61 8 6380 4900. Fax: +61 8 6380 4901. Email: bec.bennett@earscience.org.au

Conflict of Interest: The authors declare that they have no competing interests.

Declaration of interest: The authors report no declarations of interest.

Key words: psychological, depression, anxiety, loneliness, audiologist, audiology

ABSTRACT

Objective. The purpose of this study was to explore whether self-reported mental wellbeing (anxiety, depression and loneliness) in audiologists has changed over the course of the COVID-19 pandemic and to examine possible factors contributing to audiologists' current state of mental wellbeing.

Design. Two cross-sectional surveys were distributed at two different time points during the COVID-19 pandemic screening for psychological distress (PHQ-4: anxiety and depression) and loneliness (UCLA-3).

Study sample. 117 audiologists from around the world.

Results. Findings demonstrated that over the course of the COVID-19 pandemic audiologists' levels of depression decreased, levels of anxiety were low and stable, whilst levels of loneliness were stable and high. Younger age was associated with lower levels of mental well-being. Responses to open text questions suggests that audiologists could be supported through development of clear and consistent guidelines on COVID-19 workplace restrictions and allowing for more workplace flexibility and providing mental health support through employee assistance programs.

Conclusions. Although audiologists show some evidence of resiliency the rates of anxiety, depression and loneliness observed highlights the continued need for mental health and workplace interventions to support audiologists throughout the COVID-19 pandemic and the subsequent recovery period.

INTRODUCTION

Globally, the COVID-19 pandemic has had extensive impacts on almost all aspects of society, including detrimental impacts on mental and physical health (Holmes et al., 2020). The stresses to the healthcare system come about not only from managing those who are suffering from COVID-19 infection but also include additional challenges such as stressed and overworked staff, depleted resources and transitioning to online modalities like tele-health (Maccarone & Masiero, 2021). The full extent of the COVID-19 pandemic on mental health is only starting to be fully appreciated. The combination of fears for health, employment and loneliness from stay-at-home orders are factors which are likely to be associated with negative outcomes on both short- and long-term mental health and wellbeing (Galea, Merchant, & Lurie, 2020) both in the general community (Alzueta et al., 2021; Salari et al., 2020) and in healthcare providers (Spoorthy, Pratapa & Mahant, 2020; Vizheh et al., 2020).

The increased mental health problems and distress experienced by healthcare professionals during the pandemic should not be taken lightly (De Kock et al., 2021; Lai et al., 2020). Supporting the psychological wellbeing of healthcare workers must be of paramount importance as it can directly impede healthcare workers ability to provide the best quality of care (Armitage & Nellums, 2020). The increased stress, anxiety, depression and loneliness reported by healthcare professionals during the COVID-19 pandemic puts them at increased risk of workplace errors (Bennett, Eikelboom, Manchaiah, Badcock & Swanepoel, 2021), which can negatively affect client care (Lim, Holt-Lunstad, & Badcock, 2020; Weigl, Müller, Holland, Wedel, & Woloshynowych, 2016). Prior to the pandemic healthcare workers were documented to be at increased risk of loneliness, workplace stress, burnout and mental

health problems (Arslan, Yener, & Schermer, 2020). The COVID-19 pandemic has placed already vulnerable and overworked healthcare professionals under severe pressure (Armitage & Nellums, 2020). Continuous exposure to ill and contagious clients, fear of catching COVID-19 themselves or passing it onto their families, and often inadequate access to personal protective equipment (PPE) are some of the factors contributing to the increased distress and declining mental health of healthcare workers during the pandemic (Vanhaecht et al., 2021; Wanigasooriya et al., 2020), including audiologists (Bennett et al., 2021).

Over the course of the COVID-19 pandemic, audiologists have encountered considerable challenges related to working conditions, stress and economic uncertainty that may be affecting their mental wellbeing (Bennett et al., 2021; Saunders & Roughley, 2021). During June to August 2020, we conducted an international survey of audiologists to explore their mental wellbeing (Bennett et al., 2021). The prevalence of psychological distress was 12.1% (subscales for anxiety 16.3% and depression 10.4%), and loneliness 32.2%. Psychological distress and loneliness were higher in younger and less experienced audiologists. Accessibility to Employee Assistance Programs (EAPs) appeared to be a protective factor. Given the ongoing health risks and economic instability felt by audiologists during the COVID-19 pandemic (Eikelboom et al., 2021; Manchaiah, Eikelboom, Bennett, & Swanepoel, 2021; Swanepoel & Hall, 2020), continued monitoring of audiologists mental wellbeing is required, as is further investigation into factors contributing to mental health symptoms as well as exploration of measures that could be taken to address wellbeing.

The purpose of this study was to explore whether self-reported mental wellbeing (anxiety, depression and loneliness) in audiologists has changed over the course of the pandemic and to examine possible factors contributing to audiologists' current state of mental wellbeing.

METHODS

This study reports a follow-up survey of those audiologists who participated in the aforementioned international survey (Bennett et al., 2021).

Participants

The initial survey was conducted from June to August 2020 and sampled a cohort of 337 audiologists from 44 different countries, of which 239 provided mental health data. All 337 participants were invited to complete a follow-up survey, of which 117 responded (retention rate 34.7%), of which 96 provided mental health data. As such, the sample sizes for this study includes 96 for the change in mental health analyses and 117 for the open text responses.

Materials

The custom designed survey comprised three sections: demographic questions, work-related questions (including tele-health practices), and questions relating to mental wellbeing. Comprehensive report of the impacts of COVID-19 on employment and tele-health practices will be reported elsewhere. This study reports on the data relating to mental wellbeing.

Demographic questions included self-reported country of residence, gender, age (years). Mental wellbeing questions included brief screening surveys for psychological distress over the last two weeks (Patient Health Questionnaire 4: PHQ-4; (Kroenke, Spitzer, Williams, & Löwe, 2009) and loneliness (Three-item Loneliness Scale: UCLA-3; (Hughes, Waite, Hawkley, & Cacioppo, 2004). Availability and use of mental health support services in the workplace was evaluated using the two items "Does your place of work offer any support for your emotional wellbeing?" (yes/no/unsure) and, if yes, "Have you used these services?" (yes/no). Participants were also asked to provide open text responses to five questions exploring current experiences during the COVID-19: (1) "What measures have you taken to look after your mental well-being over the past 12 months? What has self-care looked like for you in these 12 months, both professionally and personally?", (2) "What would you consider the role of your employer and/or audiology professional association to be regarding helping audiology staff maintain healthy emotional and mental well-being?", (3) "What support would you like to see from your government?", (4) "What support would you like to see from your professional organisation?" and (5) "What support would you like to see from manufacturers during this time?".

The four-item PHQ-4 is an ultra-brief yet valid and reliable screening tool for anxiety and depression, assessed over the last two weeks. The PHQ-4 has been widely used in general population samples and in workforce settings. The PHQ-4 can be divided into two subscales of depression (a 2-item depression scale, named Patient Health Questionnaire 2-item: PHQ-2) and anxiety (a 2-item anxiety scale, named Generalized Anxiety Disorder 2-item: GAD-2). In screening for psychological distress, depression and anxiety, a cut-off of ≥6 in PHQ-4, and ≥3 in GAD-2 and PHQ-2 scores is recommended (Löwe et al., 2010).

The UCLA-3 evaluates self-reported loneliness (Hughes et al., 2004). It assesses how often the participants feel “left out”, “isolated from others”, and “lack companionship”. The answers are rated on a three point scale—1 (hardy ever or never), 2 (some of the time), 3 (often)—and summed to produce a score ranging from 3 to 9, with higher scores indicating greater loneliness. Scores above 6 have been used as a cut-off point for loneliness in past research (Hughes et al., 2004).

Procedures

Ethics approval for the study was received (HUM023/0420) from the Faculty of Humanities, University of Pretoria, South Africa. The survey was administered via an online platform (Qualtrics, Provo, USA), and emailed directly to audiologists who participated in the first round of the study.

Data analysis

First, cohort comparisons were made between participants in round one and round two of the study. Second, the number of audiologists scoring above and below the markers for depression and anxiety (derived from the PHQ-4), for loneliness (derived from the UCLA-3) and psychological distress (derived from the PHQ-2 and GAD-2) were identified. Third, the median and score distributions of these four psychosocial wellbeing measures were tabulated for Round 2 survey data (T2) and compared to Round 1 survey data (T1).

Data were tested for normality. Skew and Kurtosis were within limits. However, Kolmogorov-Smirnov and Shapiro-Wilk tests were both statistically significant suggesting the violation of the assumption of normality.

To determine whether mental health had significantly changed from T1 to T2 non-parametric test Wilcoxon Signed Ranks Test was used to examine change in scores. Effect size was calculated as r = (z/(sqrtN)).

Spearman's correlation was applied to explore the direction and strength of the relationship between variables, controlling for wellbeing at T1. Multiple regression was then used to investigate predictors of mental health at T2. As the normality assumption was violated in the sample, bootstrapping (2000 replications) was used to bypass normality assumptions for multiple regression. Multicollinearity were acceptable, less than 0.70. Factors considered in the multiple regression included only age and gender. Country of audiologist was excluded due to limited number of observations per variable.

Content analysis was used to analyse the responses to the five open ended questions (Graneheim & Lundman, 2004). This qualitative analysis involved: (1) reading and clarifying participants' answers to survey questions; (2) identifying meaning units within the data (identifying individual words/phrases within the data, yet still retaining their original meaning and context; (3) coding meaning units by grouping together those most closely related; and (4) grouping coded meaning units into categories. Peer debriefing was used to improve the rigour of the qualitative content analysis. Student researcher (E.C.) completed the initial content analysis. A senior researcher (R.J.B.) then crosschecked 100% of the analysed data to strengthen the accuracy of the coding. Members of the research team (E.C., R.J.B. & R.H.E.) then discussed categorisation of the meaning units and descriptors for each domain. Data was tabulated, including the number of participants contributing to each category.

RESULTS

The mean age of round 2 respondents was 46 years of age (SD 12.8; Range: 22-71) with 75 females (78.1%) and 21 males (21.9%). Participants came from 25 different countries, predominantly Australia (27.1%, n=26), South Africa (18.8 %, n=18) and the United States of America (12.5%, n=12). A further 15.6% or 15 responses were received from four countries, Singapore, United Kingdom of Great Britain and Northern Ireland, New Zealand, and Sweden.

Amongst the participants, 45.8% (n=44) audiologists reported that their workplace had EAPs made available to them for managing emotional well-being; 31.3% (n=30) indicated that their workplace did not have EAPs and 22.9% (n=22) were unsure if their workplace offered such services. Of those whose workplaces did offer professional support services, 18.2% of respondents (n=8) had previously utilised these services (at any point in time), and 81.8% (n=36) had never used them.

There was no sig diff in age [$F(1,332) = 0.239$, $p = 0.625$] or gender [$z = -7.20$, $p < 0.001$] between those who participated in round one versus round two.

Mental wellbeing status

In Round 2, mean PHQ-4 total scores were 1.65 (SD 1.99), mean GAD-2 scores were 0.96 (SD 1.20) with 8.3% (n = 8) screened positive for anxiety; mean PHQ-2 scores were 0.69 (SD 1.04) with 7.3% (n =7) screened positive for depression (Table 1). Three-item Loneliness Scale scores ranged from 3 to 9 (M 4.5, SD 1.5), with 31.3% (n=30) screened positive for loneliness.

Table 1. Summary data showing range, median and interquartile range for psychological distress (PHQ-4), anxiety (GAD-2), depression (PHQ-2) and loneliness (UCLA-3), scores from round 1 and round 2 survey data (n=96).

Survey	Round 1 Survey Data			Round 2 Survey Data		
	Range	Median	IQR	Range	Median	IQR
PHQ-4	0-10	1.00	4	0-8	1.00	3
GAD-2	0-5	0.00	2	0-5	0.00	2
PHQ-2	0-6	1.00	2	0-4	0.00	1
UCLA-3	3-8	4.00	3	3-9	4.00	3

Note IQR = inter quartile range.

Those who screened positive for loneliness (UCLA equal or greater than 6) showed higher levels of depressive and anxious symptoms (Table 2). Depression scores of those who were lonely (Median= 1) were significantly higher than those who were not lonely (Median= 0), indicated by *Mann-Whitney U*(N_{lonely}= 30, $N_{not\ lonely}$= 66) = 534.00, z = -4.20, p<.001. Further, anxiety scores of those who were lonely (Median = 2) were also significantly higher than those who were not lonely (Median = 0), indicated by *Mann-Whitney U*(N_{lonely}= 30, $N_{not\ lonely}$= 66) = 596.00, z = -3.40, p<.001.

Table 2. Crosstabulation of participants who screened positive for loneliness compared to anxiety and depression.

		Depression		Anxiety	
Loneliness		No	Yes	No	Yes
	Yes	26	4	27	3
	No	64	2	61	5
Total		90	6	88	8

Note. Where a positive depression screen = ≥3 on PHQ-2, positive anxiety screen = ≥3 on GAD-2 and positive loneliness screen ≥6 on UCLA-3.

Change in mental wellbeing from T1 to T2

A Wilcoxon Signed-Ranks Test indicated that the median depression scores at T2 was significantly lower than those at T1 (z = -2.67, p = 0.008) with a small effect size (r = -.19). However, there were no significant differences in anxiety (GAD-2; z = -1.02, p = 0.306, r = -.07), or loneliness (Loneliness Scale; z = -1.13, p = 0.258, r = -.08) scores from T1 to T2. Inspection of Table 1 shows that scores on GAD remained low and stable from T1 to T2, whilst scores on UCLA-3 were modestly elevated at T1 and remained so at T2.

Partial Spearman's correlations were estimated to assess bivariate associations between age, gender and psychological wellbeing outcomes at T2, controlling for psychological wellbeing at T1 (Table 3). Increased levels of anxiety at T2 were associated with higher depression scores, and increased loneliness. Individual differences in depression scores were significantly accounted for by age, such that those who were younger, reported higher levels of depression at T2. Younger age was also associated with higher levels of anxious

symptoms reported at T2. Gender was not associated with any of the psychology wellbeing measures.

Table 3. Partial Spearman's correlations controlling for T1 depression, anxiety, and loneliness.

	1	2	3	4	5
1. PHQ-2	-	-	-	-	-
2. GAD-2	.56***	-	-	-	-
3. UCLA-3	.35***	.28*	-	-	-
4. Age	-.28*	-.21*	.01	-	-
5. Gender	-.05	-.04	-.02	-	-

*Note. *p <.05, **p<.01, *** p<.001. Where PHQ-2 = Patient Health Questionnaire; GAD-2 = Generalized Anxiety Disorder; Loneliness = 3-Item Loneliness Scale.*

To assess the unique contributions of age and gender on psychological wellbeing, bootstrapped multiple linear regression models were estimated for depression, anxiety, and loneliness, controlling for psychological wellbeing at T1 (Table 4). All regression models were significant. However, regression models only accounted for 16%, 20% and 15% of variance in depression, anxiety, and loneliness scores, respectively. When considering the unique contributions of demographic variables and psychological wellbeing at T1, younger age remained significantly associated with higher depression and anxiety scores, but not loneliness. Gender did not uniquely contribute to any of the wellbeing measures.

Table 4. Multiple linear regression predicting psychological wellbeing, including standardized beta weights (unstandardized beta weights, standard errors).

Predictor	PHQ-2	GAD-2	UCLA-3
T1 PHQ-2	-0.01 (-0.00, -0.09)	0.33* (0.28,0.10)	0.00 (0.00, 0.13)
T1 GAD-2	0.07 (0.07, 0.12)	-0.08 (-0.08, 0.13)	0.12 (0.16, 0.15)
T1 UCLA-3	0.25* (0.18, 0.09)	0.20 (0.16, 0.10)	0.36*(0.37, 0.12)
Age	-0.32* (-0.03, 0.01)	-0.24* (-0.02, .001)	0.05 (0.01, 0.70)
Gender	-0.09 (-0.23, 0.22)	-0.12 (-0.32, 0.30)	-0.05 (-0.19, 0.40)
R^2	0.16***	0.20***	0.15*

*Note. *p <.05, **p<.01, *** p<.001. Where PHQ-2 = Patient Health Questionnaire; GAD-2 = Generalized Anxiety Disorder; UCLA-3 = 3-Item Loneliness Scale.*

Identifying possible factors contributing to mental wellbeing through open text responses

Participants were asked to answer an open-response question "What measures have you taken to look after your mental wellbeing over the past 12 months? What has self-care looked like for you in these 12 months, both professionally and personally?". A total of 103 participants responded providing 253 meaning units (individual statements), across 6 themes (Table 5). Of note, there was little mention of looking after social connections or managing loneliness despite the high rates of loneliness observed within the cohort. This may indicate an important gap in audiologists' self-awareness of the need for social connectedness.

Table 5. Themes describing measures respondents have taken to look after their mental wellbeing over the past 12 months and what self-care has looked like for them both professionally and personally over the past 12 months (n = 103).

Theme	Description (number of meaning units)
Maintaining Health and lifestyle strategies	Engaging in health and lifestyle strategies for managing mental wellbeing including hobbies, diet, exercise, lifestyle (92)
Support from others	Social and/or support from friends, family, colleagues, and spiritual practice (69)
Managing my mental health	Engaging in strategies to maintain and improve my mental health including positive thinking, self-care and accessing professional support (34)
Keeping busy	Continuing with pre-pandemic routines and/or taking on new projects or initiatives (21)
Maintain work life balance	Taking breaks, taking time off and vacations (20)
Workplace strategies	Altering workload/schedule/modality to support mental health (12)

The question “What would you consider the role of your employer and/or audiology professional association to be regarding helping audiology staff maintain healthy emotional and mental wellbeing?”, elicited 102 responses, into 164 meaning units and grouped across five themes (Table 6). The most prevalent theme described their employer’s role in

supporting mental wellbeing. Additionally, a sizable portion of responses talked about their opinion on whether employers/ professional associations should have a role in mental wellbeing, with 8 participants stating employers/ professional associations have an important role, 11 indicated they should have a limited or no role and 7 unsure about their role.

Table 6. Themes describing what respondents consider the role of their employer and/or audiology professional association in helping audiology staff maintain healthy emotional and mental wellbeing (n=102).

Theme	Description (number of meaning units)
Supporting mental wellbeing	Providing resources to promote mental wellbeing and support individuals struggling with their mental health (51)
Workplace changes	Implementing changes in the workplace to help facilitate patient care, reduce stress, and maintain work/life balance (28)
Maintaining open communication	Using strategies to ensure and promote communication (27)
Advocating for audiologists	Providing and promoting guidelines, protocols, policy and preventative measures (PPE and vaccines) in response to the COVID-19 pandemic (25)
Showing appreciation	Letting employees know they are valued with gifts, feedback, praise, and acknowledgement (7)

Analysis of participant responses to the question “What support would you like to see from your government?” coded and grouped 115 meaning units into seven themes. Themes

included (i) Public health changes - Interventions to respond more effectively to the COVID-19 pandemic, relating to vaccination, contact tracing, information and resources (47 meaning units); (ii) Economic assistance - Financial assistance to the individuals and businesses to support them through the COVID-19 pandemic (20 meaning units); (iii) Workplace support - Policy and laws to improve working conditions and promote changes in workplaces in response to the COVID-19 pandemic (12 meaning units); (iv) Resource management - Ensuring there are sufficient resources address the COVID-19 pandemic, including staff, PPE and equipment (11 meaning units); (v) Mental health/emotional support - Acknowledgement of and support to address the emotional and mental health challenges arising from the COIVD-19 pandemic (8 meaning units); (vi) More support - Increased government intervention and proactivity (4 meaning units) and (vii) Less support - Decreased government interventions (4 meaning units).

The open-text question “What support would you like to see from your professional organisation?” yielded 81 meaning units across five themes. These included (i) Improved communication - Consistent information on how to adapt to new changes from COVID-19, with guidelines, and education on teleaudiology (26 meaning units); (ii) Facilitating change - Adapting the profession of audiology to respond to the COVID-19 pandemic (19 meaning units); (iii) Business support - Support businesses and individuals economically, through assistance with finance, networking, employment and marketing (8 meaning units) and (iv) Emotional support - Implementing changes to ensure the mental health of audiologists, including check-in and self-care workshops (4 meaning units).

In response to the question "What support would you like to see from manufacturers during this time?" respondents (n=116) provided 78 meaning units across four themes. These included (i) Customer service - Being adaptable to facilitate and implement changes to current audiological practices (19 meaning units); (ii) Technological support - Implementation and education on technologies to assist with teleaudiology, privacy and service provision (17 meaning units); (iii) Training and education - Providing up-to-date information, guidelines and training to facilitate safety during the COVID-19 pandemic (15 meaning units) and (iv) Financial support - Providing monetary contributions, reducing costs or extending re-payment times to relieve economic pressure on businesses (6 meaning units).

DISCUSSION

The purpose of this study was to explore whether self-reported mental wellbeing (anxiety, depression and loneliness) in audiologists has changed over the course of the pandemic and to examine possible factors contributing to audiologists' current state of mental wellbeing. Compared to the initial survey conducted June to August 2020, the findings in the follow-up survey administered April to July 2021 indicated that audiologists' levels of depression decreased, levels of anxiety were stable at low levels, whilst levels of loneliness were stable and high. Notably, younger age was associated with increased levels of depression scores over the pandemic and lower levels of anxiety in the second survey, suggesting older audiologists may be coping better through the pandemic. Despite the reduction in symptomology it should not be overlooked that a sizeable portion of audiologists appear to still be experiencing clinically significant symptoms of anxiety, depression and loneliness.

The prevalence of anxiety and depression in our study (GAD-2 ≥3: 8.3%; PHQ-2 ≥ 7.3%); was significantly lower compared to a recent study also conducted during the COVID pandemic on the general population within the USA (PHQ-2 ≥ 3: 39%; GAD-2≥3: 42%) (Khubchandani, Sharma, Webb, Wiblishauser, & Bowman, 2021). The prevalence of clinically significant symptoms of anxiety and depression in the audiologists participating in our study were more comparable to levels observed in a representative sample of Germans (PHQ-2≥3: 11.6%; GAD-2 ≥3: 11.1%) (Beutel et al., 2021) and a study of Chinese health care workers (PHQ- 2 ≥3: 10.4%; GAD-2 ≥3: 9.9%) (Luo, Hawkley, Waite, & Cacioppo, 2012) measured during the COVID-19 pandemic. The prevalence of audiologists reporting loneliness in our follow-up survey (UCLA-3 ≥ 6: 31.25%) were similar to other data obtained from a general public sample in the United Kingdom (UCLA-3 ≥ 6: 32.5%) (Bu, Steptoe, & Fancourt, 2020) and a study of older adults in Austria (UCLA-3 ≥ 6: 29%) (Stolz, Mayerl, & Freidl, 2021). During the initial months of the pandemic, particularly during March-April 2020, when many countries first started to enter lockdowns, levels of psychological distress, depression, and anxiety initially increased (Daly, Sutin, & Robinson, 2020; Fancourt, Steptoe, & Bu, 2021; Yamamoto, Uchiumi, Suzuki, Yoshimoto, & Murillo-Rodriguez, 2020). Subsequent to this initial spike in mental health measures, there appeared to be a discernible recovery in mental well-being of the general population, close to baseline levels of mental distress (Daly & Robinson, 2021; Hawes, Szenczy, Olino, Nelson, & Klein, 2021; Shevlin et al., 2021). The results from our study, showing a decrease in levels of depressive symptoms over the pandemic echo this improved mental health observed in other studies.

Notably, the portion of audiologists in the current study experiencing loneliness was substantially higher than those reporting clinically significant symptoms of anxiety or

depression. This may be due to higher underlying pre-pandemic levels of loneliness. Indeed, there were reports that there was an epidemic of loneliness within industrialised countries that was present even before the spread of COVID-19 (Cacioppo & Cacioppo, 2018). The mental wellbeing of audiologists prior to the COVID-19 pandemic has received little research attention. Burnout and compassion fatigue appear prevalent among audiologists in New Zealand (Severn, Searchfield, & Huggard, 2012), USA (Blood, Cohen, & Blood, 2007), Sweden (Brännström et al., 2013), and India (Ravi, Gunjawate, & Ayas, 2015). The major sources of stress for clinical audiologists include time demands, navigating audiological management of cases and client contact (Ravi et al., 2015; Servern et al., 2012). Importantly, the widespread problem of audiologists suffering from loneliness observed in this study may not abate post-pandemic and thus requires targeted measures to be addressed.

Despite many studies emphasising the need for mental health support and outlining what should be done to improve psychological distress during the COVID-19 pandemic (Tracy et al., 2020; Xiang et al., 2020), to date, there have been few studies assessing the efficacy of different mental health interventions tailored to address pandemic-related concerns. Emerging interventions targeting pandemic-related stress include a mindfulness meditation course for teachers improving anxiety, depression, affective empathy, emotional exhaustion and psychological wellbeing (Matiz et al., 2020); a psychological support hotline for hospital workers improving psychological wellbeing (Geoffroy et al., 2020); and ensuring adequate access to appropriate PPE in conjunction with mental health resources for allied healthcare professionals reduced stress levels (Coto et al., 2020). The urgent COVID-19 mental health crisis and need for programs to support pandemic is undeniable. Nonetheless, there are gaps in the literature regarding the most effective evidence-based methods to improve the

mental health of those in the general public and healthcare workers during the pandemic, especially with regard to supporting audiologists and their specific work environments.

Given the prevalence and persistence of psychological distress and loneliness in our results, it is evident that audiologists require substantial ongoing support throughout the pandemic, both professionally and personally. This need is particularly pertinent in light of previous research on past infectious disease outbreaks, which has highlighted the pervasive and profound impact these outbreaks have on healthcare workers' mental health (Busch, Moretti, Mazzi, Wu, & Rimondini, 2021). Audiologists' responses to the open-text questions illuminate possible strategies to support audiologists' mental well-being going forward. Based on participant's responses to the open-text questions, there are some key areas where changes could be implemented to better support audiologists' mental well-being. Maintaining open communication, providing clear, consistent, and updated guidelines regarding COVID-19 protocols and supplying adequate PPE are some critical areas where audiologists feel their professional associations and workplaces need to better support them. Introducing such changes would not only make the workplace safer for clients and employees but can also help alleviate some of the health-related stress and anxiety audiologists are experiencing, as was the case in other studies (Cai et al., 2020). Additionally, from manufacturers, audiologists mostly expressed a desire for more technological support, specifically around the implementation and education of tele-audiology and remote fittings. Given the reports of substantial increased usage of tele-audiology during the pandemic (Eikelboom et al., 2021; Saunders & Roughley, 2021), greater assistance in this area is imperative to enable audiologists to adapt to workplace changes during the pandemic and continue to best support their clients. In order to provide an effective pandemic response, professional associations

and workplaces must not only address the professional needs of audiologists' but also consideration must be taken to ensure they provide sufficient support for their employees' mental well-being. As evidenced from audiologists' responses to the content analysis, professional associations and workplaces must endeavour to provide more resources to promote mental well-being and support individuals struggling with their mental health. Supporting audiologists' mental health needs may take many forms including EAPs, providing mental health workshops or resources, enabling for more flexible work schedules and/or granting time off for mental health reasons. The first part of this research project found having access to EAPs was a protective factor for mental well-being (Bennett et al., 2021). Other studies have also endorsed the benefits of EAPs to manage psychological distress (Couser, Nation, & Hyde, 2020) and have emphasised the importance of ensuring adequate vacation time and flexible work schedules to support the mental health of health care workers (Theorell, 2020). As the COVID-19 pandemic continues, there is a role for professional associations, workplaces, and manufacturers to play in supporting audiologists, both professionally and personally, to enable them to provide the best quality of care to their clients.

Limitations and future research

There are several limitations of this study that require mention. The sample of audiologists included in our study was not representative of the global distribution of audiologists. Despite concerted efforts to recruit participants from around the globe, most respondents came from only three different countries: Australia, USA, and South Africa. Additionally, the self-selection of survey participants introduced sampling bias and the survey in the study was only available in English, which may have biased responses. Another limitation was that during the time

when the surveys were being conducted, different countries were in various stages of lockdown, which could not be controlled for, and which may have impacted participant's responses.

While the current study provides information about the mental wellbeing of audiologists during the COVID-19 pandemic, further research is needed to establish whether audiologists' mental health status is associated with the pandemic or represents underlying mental wellbeing issues. Moreover, given that our research has uncovered that a sizable portion of audiologists around the world are experiencing persistent levels of psychological distress and loneliness, future investigations examining interventions that help to mitigate loneliness and psychological distress in audiologists are warranted.

CONCLUSION

This study highlights the continued need for mental health and workplace interventions to support audiologists throughout the COVID-19 pandemic and the subsequent recovery period. Supporting audiologists both professionally and personally not only protects the mental well-being of audiologists themselves, but also enables audiologists to provide the best quality of care to their clients.

Acknowledgements

The authors would like to thank participants for devoting their time to this study, the International Society of Audiology (ISA) for distributing the survey to their members and affiliated societies. We greatly appreciate the assistance of Megan Knoetze and Caitlin Frisby

for their help in creating the online survey, and Sara Donaldson for her help with data analysis.

References

Alzueta, E., Perrin, P., Baker, F. C., Caffarra, S., Ramos-Usuga, D., Yuksel, D., & Arango-Lasprilla, J. C. (2021). How the COVID-19 pandemic has changed our lives: A study of psychological correlates across 59 countries. *Journal of clinical psychology, 77*(3), 556-570.

Armitage, R., & Nellums, L. (2020). Protecting health workers' mental health during COVID-19. *Public Health, 185*, 18.

Arslan, A., Yener, S., & Schermer, J. A. (2020). Predicting workplace loneliness in the nursing profession. *Journal of Nursing Management, 28*(3), 710-717.

Bennett , R. J., H., E. R., Manchaiah, V., Badcock, J. C., & Swanepoel de, W. (2021). International Survey of Audiologists during the COVID-19 pandemic: Effects on mental well-being of audiologists. *International Jounal of Audiology*, 1-11.

Beutel, M. E., Hettich, N., Ernst, M., Schmutzer, G., Tibubos, A. N., & Braehler, E. (2021). Mental health and loneliness in the German general population during the COVID-19 pandemic compared to a representative pre-pandemic assessment. *Scientific Reports, 11*(1), 1-9.

Blood, I. M., Cohen, L., & Blood, G. W. (2007). Job burnout, geographic location, and social interaction among educational audiologists. *Perceptual and motor skills, 105*(3_suppl), 1203-1208.

Brännström, K. J., Båsjö, S., Larsson, J., Lood, S., Lundå, S., Notsten, M., & Taheri, S. T. (2013). Psychosocial work environment among Swedish audiologists. *International Journal of Audiology, 52*(3), 151-161.

Bu, F., Steptoe, A., & Fancourt, D. (2020). Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic. *Public Health, 186*, 31-34.

Busch, I. M., Moretti, F., Mazzi, M., Wu, A. W., & Rimondini, M. (2021). What we have learned from two decades of epidemics and pandemics: a systematic review and meta-analysis of the psychological burden of frontline healthcare workers. *Psychotherapy and psychosomatics*, 1-13.

Cacioppo, J. T., & Cacioppo, S. (2018). The growing problem of loneliness. *The Lancet, 391*(10119), 426.

Cai, W., Lian, B., Song, X., Hou, T., Deng, G., & Li, H. (2020). A cross-sectional study on mental health among health care workers during the outbreak of Corona Virus Disease 2019. *Asian journal of psychiatry, 51*, 102111.

Coto, J., Restrepo, A., Cejas, I., & Prentiss, S. (2020). The impact of COVID-19 on allied health professions. *PLoS One, 15*(10), e0241328.

Couser, G. P., Nation, J. L., & Hyde, M. A. (2020). Employee assistance program response and evolution in light of covid-19 pandemic. *Journal of Workplace Behavioral Health*, 1-16.

Daly, M., & Robinson, E. (2021). Psychological distress and adaptation to the COVID-19 crisis in the United States. *Journal of psychiatric research, 136*, 603-609.

Daly, M., Sutin, A. R., & Robinson, E. (2020). Longitudinal changes in mental health and the COVID-19 pandemic: Evidence from the UK Household Longitudinal Study. *Psychological medicine*, 1-10.

De Kock, J. H., Latham, H. A., Leslie, S. J., Grindle, M., Munoz, S.-A., Ellis, L., . . . O'Malley, C. M. (2021). A rapid review of the impact of COVID-19 on the mental

health of healthcare workers: implications for supporting psychological well-being. *BMC public health, 21*(1), 1-18.

Eikelboom, R. H., Bennett, R. J., Manchaiah, V., Parmar, B., Beukes, E., Rajasingam, S., & Swanepoel, D. W. (2021). International Survey of Audiologists during the COVID-19 pandemic: Use of and attitudes to telehealth. *International Journal Audiology*, 1-11.

Fancourt, D., Steptoe, A., & Bu, F. (2021). Trajectories of anxiety and depressive symptoms during enforced isolation due to COVID-19 in England: a longitudinal observational study. *The Lancet Psychiatry, 8*(2), 141-149.

Galea, S., Merchant, R. M., & Lurie, N. (2020). The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. *JAMA internal medicine, 180*(6), 817-818.

Geoffroy, P. A., Le Goanvic, V., Sabbagh, O., Richoux, C., Weinstein, A., Dufayet, G., & Lejoyeux, M. (2020). Psychological support system for hospital workers during the Covid-19 outbreak: rapid design and implementation of the Covid-Psy hotline. *Frontiers in psychiatry, 11*, 511.

Hawes, M. T., Szenczy, A. K., Olino, T. M., Nelson, B. D., & Klein, D. N. (2021). Trajectories of depression, anxiety and pandemic experiences; A longitudinal study of youth in New York during the Spring-Summer of 2020. *Psychiatry research, 298*, 113778.

Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., . . . Everall, I. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *The Lancet Psychiatry*.

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A Short Scale for Measuring Loneliness in Large Surveys. *Research in Aging, 26*(6), 655–672.

Khubchandani, J., Sharma, S., Webb, F. J., Wiblishauser, M. J., & Bowman, S. L. (2021). Post-lockdown depression and anxiety in the USA during the COVID-19 pandemic. *Journal of Public Health, 43*(2), 246-253.

Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: the PHQ–4. *Psychosomatics, 50*(6), 613-621.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., . . . Li, R. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open, 3*(3), e203976-e203976.

Lim, M., Holt-Lunstad, J., & Badcock, J. (2020). Loneliness: contemporary insights into causes, correlates, and consequences. In: Springer.

Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., . . . Brähler, E. (2010). A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of affective disorders, 122*(1-2), 86-95.

Luo, Y., Hawkley, L. C., Waite, L. J., & Cacioppo, J. T. (2012). Loneliness, health, and mortality in old age: A national longitudinal study. *Social science & medicine, 74*(6), 907-914.

Maccarone, M. C., & Masiero, S. (2021). The important impact of COVID-19 pandemic on the reorganization of a Rehabilitation Unit in a National Healthcare System hospital in Italy: lessons from our experience. *American journal of physical medicine & rehabilitation, 100*(4), 327-330.

Manchaiah, V., Eikelboom, R. H., Bennett, R. J., & Swanepoel, D. W. (2021). International survey of audiologists during the COVID-19 pandemic: effects on the workplace. *International Journal of Audiology*, 1-8.

Matiz, A., Fabbro, F., Paschetto, A., Cantone, D., Paolone, A. R., & Crescentini, C. (2020). Positive impact of mindfulness meditation on mental health of female teachers during the COVID-19 outbreak in Italy. *International journal of environmental research and public health, 17*(18), 6450.

Qualtrics (2021), Provo, Utah, USA. Available at: https://www.qualtrics.com

Ravi, R., Gunjawate, D., & Ayas, M. (2015). Audiology occupational stress experienced by audiologists practicing in India. *International Journal of Audiology, 54*(2), 131-135.

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., . . . Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and health, 16*(1), 1-11.

Saunders, G. H., & Roughley, A. (2021). Audiology in the time of COVID-19: practices and opinions of audiologists in the UK. *International Journal of Audiology, 60*(4), 255-262.

Severn, M. S., Searchfield, G. D., & Huggard, P. (2012). Occupational stress amongst audiologists: Compassion satisfaction, compassion fatigue, and burnout. *International Journal of Audiology, 51*(1), 3-9.

Shevlin, M., Butter, S., McBride, O., Murphy, J., Gibson-Miller, J., Hartman, T. K., . . . McKay, R. (2021). Refuting the myth of a 'tsunami'of mental ill-health in populations affected by COVID-19: evidence that response to the pandemic is heterogeneous, not homogeneous. *Psychological medicine*, 1-9.

Spoorthy, M. S., Pratapa, S. K., & Mahant, S. (2020). Mental health problems faced by healthcare workers due to the COVID-19 pandemic–A review. *Asian Journal of Psychiatry*, 51, 102119.

Stolz, E., Mayerl, H., & Freidl, W. (2021). The impact of COVID-19 restriction measures on loneliness among older adults in Austria. *European journal of public health, 31*(1), 44-49.

Swanepoel, D. W., & Hall, J. W. (2020). Making Audiology Work During COVID-19 and Beyond. *The Hearing Journal, 73*(6), 20-22.

Theorell, T. (2020). COVID-19 and working conditions in health care. *Psychotherapy and psychosomatics*, 1.

Tracy, D. K., Tarn, M., Eldridge, R., Cooke, J., Calder, J. D., & Greenberg, N. (2020). What should be done to support the mental health of healthcare staff treating COVID-19 patients? *The British Journal of Psychiatry, 217*(4), 537-539.

Vanhaecht, K., Seys, D., Bruyneel, L., Cox, B., Kaesemans, G., Cloet, M., . . . Lowet, K. (2021). COVID-19 is having a destructive impact on health-care workers' mental well-being. *International Journal for Quality in Health Care, 33*(1), mzaa158.

Vizheh, M., Qorbani, M., Arzaghi, S. M., Muhidin, S., Javanmard, Z., & Esmaeili, M. (2020). The mental health of healthcare workers in the COVID-19 pandemic: A systematic review. *Journal of Diabetes & Metabolic Disorders*, 1-12.

Wanigasooriya, K., Palimar, P., Naumann, D., Ismail, K., Fellows, J. L., Logan, P., . . . Ismail, T. (2020). Mental Health Symptoms in a Cohort of Hospital Healthcare Workers Following the Peak of the COVID-19 Pandemic in the United Kingdom. *British Journal of Psychiatry, SSRN 3688850*.

Weigl, M., Müller, A., Holland, S., Wedel, S., & Woloshynowych, M. (2016). Work conditions, mental workload and patient care quality: a multisource study in the emergency department. *BMJ Quality & Safety, 25*(7), 499-508.

Xiang, Y.-T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The Lancet Psychiatry*, *7*(3), 228-229.

Yamamoto, T., Uchiumi, C., Suzuki, N., Yoshimoto, J., & Murillo-Rodriguez, E. (2020). The psychological impact of'mild lockdown'in Japan during the COVID-19 pandemic: a nationwide survey under a declared state of emergency. *medRxiv*.