

International survey of audiologists during the COVID-19 pandemic: effects on mental well-being of audiologists

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Abstract

Objective: The aim of the study was to examine the mental well-being of audiologists in the midst of the COVID-19 pandemic.

Design: A cross-sectional online survey was conducted during the COVID-19 pandemic, between 23 June and 13 August 2020. A self-report survey included screening measures for psychological distress (PHQ-4: anxiety and depression) and loneliness (UCLA-3).

Study sample: 239 audiologists from around the world.

Results: The prevalence of psychological distress was 12.1% (subscales for anxiety 16.3% and depression 10.4%), and loneliness 32.2%. Depression and loneliness were higher in those participants self-reporting perceived job insecurity, with psychological distress (anxiety and depression) higher in those from South Africa. Accessibility to Employee Assistance Programs (EAPs) appears to be a protective factor.

Conclusions: Well-being interventions, such as EAPS, are needed to support audiologists during challenging times like the COVID-19 pandemic.

Keywords: Psychological; depression; anxiety; loneliness; audiologist; audiology

Introduction

The economic and psychological impact of the COVID-19 pandemic has been substantial, with widespread fears for health, socialisation, and employment across the world. Rampant outbreaks of infectious disease are often associated with a heightened prevalence of psychological distress and mental illness (Torales et al. 2020; Yamamoto et al. 2020). Preliminary evidence suggests the same for this COVID-19 pandemic with reports of widespread elevated symptoms of stress, anxiety and depression (Ettman et al. 2020; Rajkumar 2020). Lockdowns and “stay-at-home” orders due to the COVID-19 pandemic also appear to be contributing to a rise in loneliness (Bu, Steptoe, and Fancourt 2020; Holmes et al. 2020).

Healthcare workers may be disproportionately affected by the COVID-19 response. They are at greater risk of contracting COVID-19 due to their increased exposure to potentially infected individuals (Lapolla, Mingoli, and Lee 2020; Tan 2020). Furthermore, they are likely at greater risk of secondary mental health concerns due to demands on them to continue to go to work during crisis periods, consequently risking their own health, and by extension their families (Hall 2020; Spoorthy, Pratapa, and Mahant 2020; Wanigasooriya et al. 2020). In an Iranian sample of 304 healthcare staff (doctors, nurses, radiologists, technicians, etc.), a sizable portion screened positive for anxiety (28%), depression (31%), and distress (20%); significantly higher than pre-COVID-19 rates (Zhang et al. 2020). Similar results have been observed in Austria, with depressive symptoms (21%) and anxiety symptoms (19%) higher during COVID-19 as compared to previous epidemiological data (Pieh, Budimir, and Probst 2020). Furthermore, healthcare professionals are known to be at greater risk of loneliness (Achor et al. 2018; Arslan, Yener, and Schermer 2020; Vogel 2018), but with the increased rates of loneliness due to lockdown orders, clinicians may be experiencing either an exacerbation of pre-existing loneliness or new onset of workplace loneliness. Workplace loneliness isn't trivial. It has been related to increased workplace errors, burnout and emotional exhaustion and a desire to leave their position in a range of medical and allied health professionals (Lim, Holt-Lunstad, and Badcock 2020).

Audiologists provide hearing healthcare services to persons with ear and hearing disorders. Although audiologists are not considered frontline workers, in many countries during lockdowns they were classified as essential healthcare workers and permitted to continue service provision during periods of lockdown. Audiology services require the clinician to put themselves in close proximity to the patient's ear, putting them within an infectious zone should the patient be contagious. Furthermore, the use of face masks for protection is particularly challenging for audiologists as masks undermine speech communication for patients with hearing loss (Chodosh, Weinstein, and Blustein 2020). Although face masks with clear windows could allow access to vitally important facial expressions and lip movements, there are few manufacturers, and supplies are low. In the absence of a safe alternative, many audiologists anecdotally report feeling obliged to disregard face masks and instead provide clear communication to their hearing-impaired patients. Despite guidance and support from representative bodies (Audiology 2020), it has been suggested that audiologists lack clarity and support around safe service delivery in the midst of the pandemic, and demonstrate poor practices towards infection control measures, especially in terms of handwashing (Gunjawate et al. 2021).

Further challenges to audiologists, particularly those in private practice, have been related to the dramatic reduction in patient caseloads and subsequent income (Swanepoel and Hall 2020). The majority of audiological patients, those with age-related hearing loss, are at the highest risk for mortality and morbidity due to COVID-19 and has impacted willingness to attend in-person appointments (Swanepoel and Hall 2020). This in combination with hard lockdowns without audiologists able to earn a living for extended periods has impacted economic viability. This effect of COVID-19 lockdowns has arguably been more detrimental in poorer world regions (Broadbent et al. 2020).

Given the personal risks afforded by work continuation, the apparent confusion regarding COVID-19 work-safe practices, and the economic impact, it is likely that audiologists will exhibit decreased levels of mental well-being during the pandemic, as found to be the case with other healthcare workers (Gorini et al. 2020; Kramer et al. 2020; Krystal and McNeil 2020; Spoorthy, Pratapa, and Mahant 2020; Wang et al. 2020). Accordingly, this study investigated self-reported mental well-being (anxiety, depression and loneliness) in a global sample of audiologists in the midst of the COVID-19 pandemic and explored potentially confounding demographic and work-related factors. The specific objectives included: (i) to compare self-reported mental well-being (anxiety, depression and loneliness) in audiologists with available data on the mental well-being of other healthcare workers during the COVID-19 pandemic; (ii) to explore whether participant factors (age, gender, country of residence) and work-related factors (area of work, changes in employment status, telehealth practices, and availability of psychological support services) are associated with self-reported mental well-being; and (iii) to identify possible factors contributing to mental well-being through open text responses.

Methods

A cross-sectional self-report survey conducted from 23 June to 13 August 2020 was used to screen for anxiety, depression, and loneliness in an international sample of audiologists. Ethics approval for the study was received (HUM023/0420) from the Faculty of Humanities, University of Pretoria, South Africa.

Materials

This study is part of a larger research project exploring audiologists working conditions, clinical practices, use of tele-audiology practices, and mental well-being during the first wave of the COVID-19 pandemic. The custom-designed survey comprised three sections: demographic questions, work-related questions (including telehealth practices), and questions relating to mental well-being. Participants were not drafted to report on their mental well-being, rather, questions exploring mental well-being comprised a small subset of questions in the broader survey focussing on how audiologists experienced the COVID-19 pandemic and whether they used tele-audiology during this period. A comprehensive report of the impacts of COVID-19 on employment and telehealth practices is provided in Eikelboom et al. (2021) and Manchaiah et al. (2021). This study reports on the data relating to mental well-being.

Demographic questions included self-reported country of residence, sex, and age (years). Work-related questions included employer type (employed in a hospital setting, employed in private

practice, private practice owners), years of clinical experience, employment status (categorisations of increase/decrease number of hours), expected work status in 6 months from now (same options as the previous question), and two questions relating to the use of tele-audiology services in the workplace “Did your workplace use telehealth services before COVID-19?” (yes/no) and “Are you using telehealth services now?” (yes/no).

While there are many available measures for the various dimensions of well-being, we selected measures that were brief to reduce participant burden, and those that were commonly reported in the COVID-19 literature to enable comparison with other studies. Mental well-being questions included brief screening surveys for psychological distress (Patient Health Questionnaire 4: PHQ-4; Kroenke et al. 2009) and loneliness (Three-item Loneliness Scale: UCLA-3; Hughes et al. 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 well-being?” (yes/no/unsure) and, if yes, “Have you used these services?” (yes/no). Participants were also asked to provide open text responses to two questions exploring current experiences during the COVID-19 pandemic: “Can you describe for me what your greatest work-related concerns have been during this time of change?” and “Can you describe for me what you have felt most grateful for regarding audiological practice in this challenging 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 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 Generalised 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 (hardly 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). Reliability of the UCLA-3 was high in the current sample; Cronbach’s alpha = 0.840.

Procedures

The survey was administered online using Qualtrics (Provo et al., USA), and distributed through the International Society of Audiology (ISA) to all affiliated societies with a request for them to distribute it to their members. Invitations were also distributed through professional and personal networks, and via social media platforms.

Data analysis

The audiologists 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-4 and GAD-2) were identified. The means and rates of these four psychosocial well-being

measures were tabulated and compared to the rates reported by others (Aim 1), and cross-tabulated against a number of independent variables (Aim 2).

Aim (i) The means, standard deviations, and rates of self-reported psychological well-being were compared with published data on the mental well-being of health professionals during the COVID-19 pandemic. As there was no literature available on the loneliness levels of healthcare workers during the pandemic using the UCLA-3 at the time of publication of this manuscript, we compared audiologists' UCLA-3 scores with those published for the general population.

Aim (ii) The rates of those showing signs of psychological distress, depression, anxiety and loneliness were cross-tabulated with the following dependent variables: Median age (≤ 43 or > 43 years), Gender, Country of residence (Australia, USA, South Africa, other), Place of employment (hospital, private practice owner, employed in private practice, other), Median of the length of clinical experience (< 16 , ≥ 16 years), Employment status at the time of the survey, Employment status expected 6 months from the time of the survey, Availability of psychological support services in the workplace (yes, no, unsure), and Use of available psychological support (yes, no). Significant associations between these and each of the four dependant variables were tested using the Pearson chi-squared test, or the Fisher Exact Test in the case of low expected cell counts, using SPSS v26. The raw PHQ-4, GAD-2 and UCLA-3 scores were not normally distributed and therefore a linear regression with age and years of experience was not attempted. Bonferroni correction for multiple comparisons (10 comparisons, $p = 0.05$ corrected to 0.005) was applied.

Aim (iii) To identify possible factors contributing to mental well-being in this sample of audiologists, beliefs were examined using two open-ended questions: "Can you describe for me what your greatest work-related concerns have been during this time of change?" and "Can you describe for me what you have felt most grateful for regarding audiological practice in this challenging time?". Content analysis was used to analyse the responses to these two open-ended questions (Graneheim and 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. One research assistant completed the initial content analysis. Two members of the research team (RJB & RE) then crosschecked all of the analysed data to strengthen the accuracy of the coding. Categories and meaning units were tabulated, with the number of participants contributing to each category provided.

Results

Demographic factors and work-related factors

A total of 337 people from 44 countries responded to the survey between 23 June and 13 August 2020. Of these, 239 (71%) provided complete data on the mental well-being section of the survey; and were thus included in the analyses presented in this paper. These respondents came predominantly from Australia (26%, $n = 63$), the USA (17%, $n = 40$) and South Africa (16%,

$n = 38$). The remaining 41% ($n = 98$) came from other, predominantly high-income, countries and each had 10 or fewer respondents from each country (Supplemental Appendix 1).

The respondents consisted of 185 females (77.4%) and 54 males (22.6%), with a mean age of 58.4 (Median 43; SD 8.4; Range: 22 to 81) years. The mean years of clinical experience were 21.5 (Median 16; SD 8.2; Range 1 to 53). Males were significantly older than females (mean difference 5.2 years; $p = 0.01$), but there was no significant difference in their years of clinical experience ($p = 0.094$).

Work-related descriptive statistics are provided in Table 1. Clinical employment type varied with 21.1% ($n = 44$) employed in a hospital setting, 42.6% ($n = 89$) employed in private practice, 21.1% ($n = 44$) private practice owners, and 15.3% ($n = 32$) selecting “Other.” Just over half of the participants had maintained the same number of hours of work as compared to pre-COVID-19 employment, while 43% indicated a reduction in hours due to the COVID-19 pandemic.

Table 1. Respondent characteristics.

Variables	Psychological distress (PHQ-4) scored ≥ 6 %(n)	Anxiety (GAD-2) scored ≥ 3 %(n)	Depression (PHQ-2) scored ≥ 3 %(n)	Loneliness (UCLA-3) scored ≥ 3 %(n)
Demographic variables, %(n)				
Age*				
<43, 48.0 (109)	16.5 (18)	22.0 (24)	11.0 (12)	40.4 (44)
>43, 54.0 (129)	8.5 (11)	11.6 (15)	10.1 (13)	24.8 (32)
Gender				
Female, 77.4% (185)	13.0 (24)	17.8 (33)	11.4 (21)	35.2 (19)
Male, 22.6% (54)	9.3 (5)	11.1 (6)	7.4 (4)	31.4 (58)
Country of residence				
Australia, 26.4 (63)	7.9 (5)	11.1 (7)	4.8 (3)	27.0 (17)
USA, 16.7 (40)	10.0 (4)	17.5 (7)	7.5 (3)	25.0 (10)
South Africa, 15.9 (38)	31.5 (12)	39.5 (15)	28.9 (11)	36.8 (14)
Other countries, 41.0 (98)	8.2 (8)	10.2 (10)	8.2 (8)	36.7 (36)
Work-related variables				
Employer type				
Employed in a hospital setting, 31.7 (76)	11.8 (5)	15.8 (12)	9.2 (7)	38.2 (29)
Employed in private practice, 25.6 (61)	19.1 (9)	13.1 (8)	9.8 (6)	29.5 (18)
Private practice owner, 19.7 (47)	8.2 (9)	21.3 (10)	17.0 (8)	27.7 (13)
Other, 23.0 (55)	10.9 (5)	16.4 (9)	7.3 (4)	30.9 (17)
Years of clinical experience				
<16, 45.6 (109)	14.7 (16)	20.2 (22)	10.1 (11)	40.4 (44)
>16, 54.4 (130)	10.0 (13)	13.1 (17)	10.8 (14)	25.4 (33)
Employment status: at time of the survey				
Increased number of hours, 4.6 (11)	9.1 (1)	18.2 (2)	0 (0)	18.2 (2)
Unchanged number of hours, 52.3 (125)	7.2 (9)	11.2 (14)	5.6 (7)	27.2 (34)
Hours reduced by about 25%, 23 (55)	14.5 (8)	20.0 (11)	10.8 (6)	40.0 (22)
Hours reduced by about 50%, 13 (31)	22.6 (7)	25.8 (8)	19.4 (6)	35.5 (11)
Hours reduced by about 75%, 5 (12)	23.5 (4)	23.5 (4)	35.3 (6)	33.3 (2)
Laid off but retained by my employer, 0.8 (2)	0 (0)	0 (0)	0 (0)	100 (2)
Laid off with no promise for re-employment, 1.3 (3)	0 (0)	0 (0)	0 (0)	66.7 (2)
Employment status: expectations in 6 months from the survey				
Increased number of hours, 27.6 (66)	12.1 (8)	12.1 (8)	9.1 (6)	39.4 (26)
Unchanged number of hours, 58.2 (139)	8.6 (12)	8.6 (12)	6.5 (9)	24.5 (34)
Hours reduced by about 25%, 7.9 (19)	21.1 (4)	21.1 (4)	21.1 (4)	52.6 (10)
Hours reduced by about 50%, 4.2 (10)	20.0 (2)	20.0 (2)	30.0 (3)	30.0 (3)
Hours reduced by about 75%, 0.4 (1)	0 (0)	0 (0)	0 (0)	0 (0)
Laid off but retained by my employer, 0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Laid off with no promise for re-employment, 1.7 (4)	100 (4)	100 (4)	75 (3)	100 (4)
Availability of psychological support services in the workplace				
Yes, 56 (133)	6.0 (8)	9.8 (13)	4.5 (6)	22.6 (30)
No, 30 (73)	21.9 (16)	26.0 (19)	21.9 (16)	45.2 (33)
Unsure, 14 (33)	15.2 (5)	21.2 (7)	9.1 (3)	42.4 (14)
Made use of available psychological support services				
Yes, 23 (38)	15.8 (6)	10.2 (13)	10.5 (4)	39.5 (15)
No, 77 (128)	5.5 (7)	18.4 (7)	3.9 (5)	22.7 (29)

*One person did not provide their age.

Percentages and numbers (n) in the rows under the heading of the four psychological well-being measures represent the percentage/number of audiologists in that category at or above the cut-off scores.

Fifty-six percent of respondents ($n = 133$) indicated that their workplace offered professional support services for managing emotional well-being; 31% ($n = 73$) worked for organisations that do not offer these services, and 14% ($n = 33$) were unsure. Of those who had professional emotional well-being support services available to them, 23% ($n = 38$) had utilised these services (ever, at any point in time) and 77% ($n = 128$) had not. There was no association between age and gender with these two variables.

Mental well-being

PHQ-4 total scores ranged from 0 to 12 (M 2.4, SD 2.7), with 16.3% screened positive for anxiety (GAD2 ≥ 3 : M 1.4, SD 1.6), and 10.4% for depression (PHQ2 ≥ 3 : M 1.0, SD 1.4). Reliability of the mental well-being surveys was high in the current sample; Cronbach's alpha for PHQ-4 = 0.878, GAD-2 = 0.883, and PHQ-2 = 0.833.

Three-item Loneliness Scale scores ranged from 3 to 9 (M 4.6, SD 1.6), with 32.2% screened positive for loneliness. Regarding the availability of emotional support services in the workplace; 55.6% reported that they were available, 30.5% that they were not available, and 13.8% were unsure. Of those indicating whether they had used these services or not ($n = 166$), 22.9% reported that they had.

Comparing mental well-being of audiologists with reports of other healthcare workers and the general population during the COVID-19 pandemic

Audiologists appeared to have lower levels of psychological distress (anxiety and depression) compared to the general population and other health professionals, and similar levels of loneliness compared to the general population during the pandemic (Table 2).

Table 2. Comparison of audiologists' mental well-being with previous reports of other healthcare workers during the COVID-19 pandemic.

Study	Anxiety & depression (PHQ-4)	Anxiety (GAD-2)	Depression (PHQ-2)	Loneliness (UCLA-3)
Current study: Global sample of Audiologists	12.1% (scored ≥ 6); M 2.4, SD 2.7	16.3% (scored ≥ 3); M 1.4, SD 1.6	10.4% (scored ≥ 3); M 1.0, SD 1.4	32.2% (scored ≥ 6); M 4.6, SD 1.6
Aliyer et al. (2020): Healthcare workers in the United States	37% (scored ≥ 6); Men (M 2.9, SD 2.6); Women (M 5.1, SD 3.4)			
Gorini et al. (2020): Hospital healthcare workers in Italy	23.7% (scored ≥ 6)	29.6% (scored ≥ 3)	22.8% (scored ≥ 3)	
Wanigasooriya et al. (2020): Hospital healthcare workers in the United Kingdom		34.3% (scored ≥ 3)	31.2% (scored ≥ 3)	
Zhang et al. (2020): Hospital healthcare workers in Iran		28.0% (scored ≥ 3)	20.7% (scored ≥ 3)	
Thomaler et al. (2020): Oncology physicians in the United States (N=374)		62.0% (scored ≥ 3)	23.5% (scored ≥ 3)	
Mora-Magaña et al. (2020): Healthcare professionals in Mexico (N=231)		27.7% (scored ≥ 3); M 1.96, SD 1.74	20.8% (scored ≥ 3); M 1.68, SD 1.62	
Daly and Robinson (2021): Population representative sample from the USA	M 2.61, SD 3.09			
González-Sanguino et al. (2020): Population representative sample from Spain		M 1.80, SD 1.57	M 1.80, SD 1.43	
Joseph (2020): Population representative sample from Saudi Arabia	M 2.9, SD 2.6	17.6% (scored ≥ 3)	21.9% (scored ≥ 3)	
	14.5% (scored ≥ 6)			
Groarke et al. (2021): Population representative sample from the UK				26.6% (scored ≥ 6)
Strickley, Matsubayashi, and Ueda (2020): Population representative sample from Japan				41.4% (scored ≥ 6)
Rosenberg et al. (2020): Population representative sample from the United States				M 4.4, SD 1.7

Exploring whether participant and work-related factors are associated with self-reported psychological distress and loneliness

Chi-square analysis of the associations between markers for anxiety, depression and loneliness, and various independent variables showed a number of significant associations (Table 3). Whilst

there was no associative relationship between current employment status and psychological well-being, expected employment status in 6 months was significantly associated with greater rates of depression and loneliness.

Table 3. Associations between various study variables and markers for psychological distress, anxiety, depression and loneliness, analysed using the Pearson Chi-squared test or the Fisher Exact test (indicated by *) (*p*-value – exact 2-sided).

Variables	Psychological distress	Anxiety	Depression	Loneliness (score ≥ 6 on the
	(score ≥ 6 on the PHQ-4) Value (<i>p</i> -value)	(score ≥ 3 on the PHQ-2) Value (<i>p</i> -value)	(score ≥ 3 on the GAD-2) Value (<i>p</i> -value)	UCLA-3) Value (<i>p</i> -value)
Age (<43 or ≥ 43 years)	3.52 (0.074)	4.66 (0.031)	0.055 (0.835)	6.58 (0.012)
Gender (M/F)	0.54 (0.495)	1.38 (0.298)	0.69 (0.463)	0.28 (0.622)
Country of residence (Australia, South Africa, USA, other)	12.82 (0.004)*	18.90 (<0.001)	13.27 (0.003)*	3.03 (0.387)
Employer type (private, hospital, practice owner, other)	3.14 (0.373)	1.32 (0.725)	2.69 (0.414)*	1.92 (0.598)
Years of clinical experience (<16 or ≥ 16 years)	1.22 (0.322)	2.19 (0.161)	0.29 (1.0)	6.09 (0.018)
Employment status: at time of survey	8.69 (0.050)*	6.29 (0.158)*	5.29 (0.511)	9.27 (0.128)
Employment status: expectations in 6 months from survey	13.97 (0.009)*	9.91 (0.054)*	14.88 (0.002)*	16.85 (0.002)*
Availability of psychological support services in the workplace (Y/N/unknown)	11.42 (0.002)*	9.86 (0.007)*	19.37 (0.001)*	12.88 (0.001)
Made use of available psychological support services (Y/N)	3.73 (0.077)*	1.73 (0.253)*	14.17 (0.001)*	4.25 (0.058)

Application of the Bonferroni correction resulted in a *p*-value of 0.005 (indicated in bold).

There was a significant association between country of residence and self-reported distress, with participants residing in South Africa self-reporting greater levels of anxiety and depression than those in Australia and the USA. Chi-squared analyses were used to investigate the possible interaction between work-related factors and country of residence to explore possible explanations for the elevated levels of psychological distress in audiologists residing in South Africa. Audiologists working in South Africa were more likely to be private practice owners (36.8%) than participants from the other countries (Australia = 18.5%; USA = 16.7%; Other = 17.2%), with a significant association between country of residence and Employer Type ($\chi^2 = 40.03$; $p \leq 0.001$). Audiologists working in South Africa were less likely to have access to workplace support services (42.1%) than participants from the other countries (Australia = 69.8%; USA = 65.0%; Other = 48.0%), with a significant association between country of residence and availability of support services ($\chi^2 = 19.60$; $p = 0.003$).

Availability of psychological support services in the workplace was associated with psychological distress and loneliness, with higher levels of psychological distress detected in those who had no support services available to them. The use of available psychological support services was associated with depression and loneliness, with higher levels of psychological distress detected in those who had accessed these services.

Identifying possible factors contributing to mental well-being through open text responses

In response to the question “Can you describe for me what your greatest work-related concerns have been during this time of change?” respondents ($n = 180$) provided 356 meaning units across 12 categories (Table 4). The category included general and mental health risks, employment and financial stress, and workplace challenges (such as the adoption of COVID-19 safe practices,

transition to blended telehealth services, and concerns regarding the quality of services provided).

Table 4. Categories describing respondents’ greatest work-related concerns during the COVID-19 pandemic (*n* = 180).

Category	Description	Total number of statements describing this phenomenon
Health risk relating to COVID-19	Concerns regarding health and safety in relation to COVID-19, including risks to themselves, their clients, their colleagues, and their family.	72
Concerns for clients’ hearing needs and quality of audiology services	Restrictions limiting the provision of audiological services, subsequently impacting on waitlists, quality of care, professional relationships, and client’s access to services.	62
Business and employment	The impact of COVID-19 on businesses includes reduced demands on services, reduced revenue, and increased costs, subsequently resulting in widespread job insecurity and unemployment.	56
Infection control	Access to PPE and sanitiser, maintaining a safe work environment, and keeping up with continual changes to recommendations for safe practice.	37
Financial stress	COVID-19 placed increased financial pressures on businesses and their staff, including unexpected costs relating to government COVID-19 responses, physical distancing restrictions, PPE, and tele-audiology equipment/software.	35
Mental health and well-being	Feelings of anxiety and fear in relation to their own (and others’) general health, emotional well-being and employment.	23
Management, support, and the health system	The challenges of working with people and within the system during COVID-19 times. This included challenges associated with both meeting the expectations of, and dually supporting staff, colleagues, and managers. Participants described increased work pressures to include cleaning and sanitisation responsibilities, health cheques of colleagues and clients, increased administration tasks, increased financial pressures, lack of clear communication from managers, and lack of recognition regarding how COVID-19 had impacted them professionally and personally.	21
Tele-audiology and online service	Limitations on tele-audiology services relating to client’s familiarity and access to technology, and lack of funding for tele-audiology services.	16
Uncertainty about future	Participants described feeling uncertain about their future, both professionally and personally.	13
Education and research	Their lack of training to cope with the required changes to clinical practice, and also the impact of lockdowns on student’s access to ongoing training.	8
Communication challenges when using masks/PPE	The challenges of providing quality hearing healthcare while using precautionary measures (such as distancing, masks and PPE).	7
No concerns	Having no work-related concerns.	6

In response to the question “Can you describe for me what you have felt most grateful for regarding audiological practice in this challenging time?” respondents (*n* = 167) provided 229 unique meaning units across nine categories (Table 5). Categories included the ability to continue providing audiological services (in general and via the availability of technology), a supportive work environment, and people’s general adherence to COVID-19-safe practices.

Table 5. Categories describing that which respondents have felt most grateful for regarding audiological practice during the COVID-19 pandemic ($n = 167$).

Category	Description	Total number of statements describing this phenomenon
Supportive work environment	Having supportive, grateful and loyal clients; community recognition of healthcare workers; support from peers and managers; support from professional organisations (especially the hearing device manufacturers); and flexible working conditions (working from home and/or hours compatible with parenting)	52
Availability of technology for services	Access to digital technology enabling the continuation of audiology services; training and support facilitating use of these devices and platforms; receptiveness of clients to receive audiological services via tele-audiology practices.	51
Providing audiological services	Being able to continue (or recommence) providing audiological services; to help their clients, reconnect with their work community, and rebuild the business.	46
Employment	That they were able to maintain their employment.	25
Audiology profession	Gratitude towards the profession of audiology: being an in demand (essential) service, not being a front-line worker (not high risk), resilience of audiologists to adapt under pressure, and passion within the profession.	23
COVID-19-Safe practice	Access to personal protective equipment and hand sanitiser; unity in the workplace with regard to using protective equipment and distancing rules; and availability of clear window face masks.	15
Finance	Having sufficient financial security to weather the storm and availability of government financial assistance programs	7
Developing skills	The opportunity to learn from this experience: improve services, adopt tele-audiology practices, and learn new skills.	5
Nothing to be grateful for	A few participants stated that they were either unsure what to be grateful for, or that they had nothing to be grateful for	5

Discussion

This is the first study into the mental well-being of the global audiology community. Levels of anxiety and depression reported were slightly elevated compared with pre-COVID-19 normative data obtained from a general public population sample in Germany (PHQ-4: M 1.76, SD 2.06; GAD-2: M 0.82, 1.10; PHQ-2: M 0.94, SD 1.20) (Löwe et al. 2010), yet comparative with a sample of USA-based college students (PHQ-4: M 2.98, SE 0.08; GAD-2: M 1.91, SE 0.05; PHQ-2: M 1.06, SE 0.04) (Khubchandani et al. 2016), and a sample of English-speaking Hispanic Americans (PHQ-4: M 2.07, SD 2.59) (Mills et al. 2015). Yet, levels of anxiety and depression were lower than reports in other healthcare workers during the COVID-19 pandemic (see Table 2). This is possibly due to the role that these various healthcare workers play and their level of interaction with COVID-19 infected individuals. Although some audiologists would have been providing hearing services to COVID-19 positive patients, the majority would have been providing services to otherwise healthy patients from the community. Importantly, as we had no pre-COVID-19 baseline levels for comparison, we are unable to determine whether or not audiologists' psychological well-being has been impacted by COVID-19, or whether audiologists' exhibited these levels of psychological distress and loneliness prior to the pandemic.

Relation between demographic/work-related factors and psychological well-being

Low- and middle-income countries, like South Africa, have been affected more detrimentally by COVID-19 lockdowns and restrictions likely increasing economic impact on audiologists (Broadbent et al. 2020). Specifically, participants from South Africa were more likely to own their own private practice and thus would more likely be personally impacted by the financial downturn in clinic revenue. Additionally, the lack of EAP for audiologists in South Africa likely also contributed to the higher levels of psychological distress observed in this participant group.

Given the lack of pre-COVID-19 data it is difficult to discern the validity and causality of the lower mental well-being observed in participants residing in South Africa. Although the PHQ-2 appears to be a valid screening tool for depression in South African populations (Bhana et al. 2015), the validity of the GAD-2 and UCLA-3 in this population is unknown. Research suggests rates of depression are generally lower in the general South African population as compared to the general US population (Tomlinson et al. 2009), indicating that the opposite finding of South Africa-based clinicians reporting higher levels of distress than the USA-based clinicians in this sample warrants closer investigation.

Whilst current employment status was not a predictor of psychological well-being, perceived job insecurity (people expecting a 25% or 50% reduction in employment) was associated with greater levels of anxiety and loneliness compared to those with more positive views of their future employment. Although it is not surprising that job insecurity contributes to anxiety (Boya et al. 2008) and loneliness (Kalil et al. 2010), the impact of short-term job insecurity on long-term mental health is less understood and warrants further investigation.

An employer's duty of care includes the need to take reasonable care of the health and safety of their workforce, including the psychological well-being of employees. To assist with this, organisations often provide Employee Assistance Programs (EAPs). EAPs are workplace intervention programs designed to provide preventive and proactive intervention for the work and personal problems that may adversely affect performance and well-being. The benefits of EAPs include reduced levels of absenteeism and enhanced employee productivity (Joseph, Walker, and Fuller-Tyszkiewicz 2018). The negative association of the availability of EAP programs with anxiety, depression and loneliness highlights the benefits of the availability of these programs for audiologists during this pandemic.

Audiologists' perceptions on possible factors affecting their mental well-being

Health fears were the greatest sources for work-related concerns during the COVID-19 pandemic as described by participants. These included concerns regarding their own health and safety, but also the health and safety of their clients, colleagues, and family. These fears were exacerbated by limited access to Personal Protective Equipment (PPE) and hand sanitiser, as well as challenges of maintaining a safe work environment due to continual changes to government restrictions and recommendations for safe practice. There were also challenges of providing quality hearing healthcare while using precautionary measures (such as distancing, masks and PPE). Availability of PPE has played a major role in contributing to psychological distress in healthcare workers across the world during the COVID-19 pandemic (Wanigasooriya et al. 2020; Zhang et al. 2020). Yet psychological well-being also appears to influence use of PPE. Individuals self-reporting loneliness (on the UCLA-3) during the COVID-19 pandemic self-reported lower engagement in individual preventative behaviours, including mask-wearing, disinfecting hands, and social distancing (Stickley, Matsubayashi, and Ueda 2020). Another source of stress raised by audiologists was the impact of COVID-19 on business, including reduced demands on services, reduced revenue, and increased costs, subsequently resulting in widespread job insecurity and unemployment. Economic uncertainty has played a major role in contributing to psychological distress during the COVID-19 pandemic (Duarte and Jimenez-Molina 2020), with unemployment and loss of work significantly related to poorer mental health

during the pandemic (Achdut and Refaeli 2020; Burchell et al. 2020). Audiologists require more support, resources and guidelines from professional bodies about how to manage their work during this COVID-19 pandemic.

The greatest sources of gratitude during the COVID-19 pandemic as described by participants included having supportive, grateful and loyal clients; support from peers and managers; support from professional organisations (such as hearing device manufacturers); and flexible working conditions (working from home and/or hours compatible with parenting). Participants were grateful when they had access to PPE and hand sanitiser; for the development and distribution of clear window face masks; and to their workplace community for using protective equipment and following physical distancing requirements. One of the major sources of gratitude was access to digital technology enabling the continuation of audiology services; training and support facilitating the use of these devices and platforms; receptiveness of clients to receive audiological services via tele-audiology practices, and the resilience of the audiology community to adapt to the delivery of audiological services via telehealth modalities. In response to the COVID-19 restrictions placed on businesses, audiology clinics increased the use of tele-audiology practices. In a sample of 120 audiologists in the UK, the use of tele-audiology services increased from ~30% (prior to COVID-19 restrictions) to 98% (during to COVID-19 restrictions) (Saunders and Roughley 2020). Our global report also showed an increase in the use of telehealth in the audiology workplace from reflections before COVID-19 ($n = 123$, 41.3%) to the use of telehealth at the time of the survey ($n = 180$, 61.9%), and again to the expectation of the use of telehealth after COVID-19 ($n = 222$, 80.4%) (Eikelboom et al. 2021), suggesting that we may see a permanent increase in the availability and use of these services. It is worth noting, however, that provision of tele-audiology services may not necessarily ease psychological distress or loneliness. In contrast, whilst telehealth can overcome constraints relating to access to services, it can introduce a form of professional isolation (Gogia et al. 2016).

Clinical considerations: towards better mental health

An effective pandemic response must also include a mental health response. While it appears that audiology clinics have provided audiologists with workplace safety equipment and digital technologies to continue services provided during the pandemic (Eikelboom et al. 2021; Manchaiah et al. 2021), audiologists have received insufficient support for their psychological needs. Psychological support can take many forms, including counselling services (workplace provided or personally sought), informal/formal supervision and establishing peer support systems among colleagues. In a 2020 meta-analysis, Kisely et al. (2020) reviewed the successful measures used to manage psychological distress in clinicians working during viral outbreaks. Clear communication, access to adequate personal protection, adequate rest, and both practical and psychological support were associated with reduced morbidity. Lan et al. (2020) raised awareness of the fatigue associated with wearing full PPE, and the need for proper rest cycles, as well as the rise in skin damage due to frequent handwashing and use of sanitisers. The role of clinical and policy strategies should not be overlooked. Different countries vary in their medical systems, the availability of PPE, labour and employment conditions, government response to the COVID-19 pandemic, information in both mainstream and social media, and culture. Mental health responses to the COVID-19 pandemic will need to consider all of these factors. There is a

role for professional associations, business owners, managers, and peers to play in supporting audiologists during this psychologically distressing time.

Limitations and future research

Limitations of this study include the sample size, which is relatively small for an international study. The distribution of participants is not representative of the global distribution of audiologists. Although we endeavoured to recruit audiologists from around the world, there was greater representation in responses from High-Income countries, than from Upper-Middle, Lower-Middle or Low-Income countries, as per the World Bank Atlas method of classifying the economy of countries (The World Bank). Second, the self-selection of survey participants may have introduced sampling bias. Third, the timing of the survey and the various lockdown status in different countries (e.g. partial versus full lockdown) may have affected the responses. However, the survey was conducted at a crucial time interval when most countries were under some social distancing and lockdown measures making the results comparable across regions. Fourth, data obtained from self-reported questionnaires were not verified with medical records and mental health screening tools have not been examined for measurement invariance across countries, and could thus be a source of validity concern when trying to compare results for different countries. Fifth, the study did not assess socioeconomic status, which may be helpful in evaluating associations of mental health status. Sixth, the survey was only available in English, potentially biasing the responses.

While the current study provides preliminary results about the mental well-being of audiologists during the initial wave of the COVID-19 pandemic, future studies should assess for progression or even a potential rebound effect of psychological manifestations once the imminent threat of COVID-19 subsides. Psychological interventions are required to support the audiology workforce during the COVID-19 pandemic and subsequent recovery period. Workplace factors contributing to stress and also gratitude as described by the participants in this study may provide insight into aspects that might be targeted for such interventions.

Conclusion

The global COVID-19 pandemic has led to dramatic changes in the functioning of healthcare services, forcing audiologists to adapt and work under great pressure. The findings of this study indicate that 16% of audiologists screened positive for anxiety, 10% for depression, and 32% for loneliness. Rates of anxiety, depression and loneliness were significantly lower in audiologists who had access to EAP programs. Psychological interventions are required to support the audiology workforce during the COVID-19 pandemic and subsequent recovery period.

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