

Call Centre-associated Occupational Hearing Loss in Africa: A Clarion Call Falling on Deaf Ears?

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Abstract

Objectives: The call centre industry is one of the fastest growing sectors in Africa, and in the world employing millions of call operators. These employees are prone to various occupational hazards which cannot be ignored due to their irreversible consequences, such as noise-induced hearing loss which has morbidity and economic implications. This study sought to determine the prevalence of noise-induced hearing loss among workers in one of the biggest call centres in East and Central Africa.

Methods: In a descriptive cross-sectional study, a total of 1122 employees in a call centre were screened for hearing loss using pure tone audiometry. Their demographic information and clinical data was analysed using SPSS version 20.

Results: The prevalence of hearing loss among the subjects was 12%, with the peak majority (75.5%) seen in the 31-40 year olds. Most of the affected individuals had between 4 to 7 years of work experience.

Conclusion: Occupational hearing loss in call centres is an underestimated problem leading to devastating long-term irreversible disability, hence hearing conversation measures ought to be pursued at all costs.

Keywords: Occupational hearing loss; Noise-induced hearing loss; Call centre; Call operator; Occupational health; Headset

Introduction

Auditory disturbances make a significant contribution to the occupational hazards faced by headset users in a call centre. Having employed over 11.5 million call operators globally by the year 2010 [1], stakeholders in this booming call centre industry ought to be cognisant of the various occupational hazards facing these workers. Apart from noise-induced hearing loss which tends to be irreversible, other related problems and health effects that may be experienced include sleep disorders, attention impairment, anxiety, depression, hypertension, reduced performance, stress, tinnitus, among others [2]. With reduced performance and debilitating effects on health, this can negatively influence employee livelihood and potentially translate to loss of income.

Adult-onset hearing loss has been cited to be the “fifteenth most serious health problem” in the world, even contributing to devastating national economic burdens [3]. It has been estimated that about 16% of adult cases of hearing loss (over 4 million disability-adjusted life years) have a direct correlation to workplace noise exposure [2] which causes damage to the cochlea of the ear [4,5]. New work environments such as call centres are increasingly raising concern as the most remarkable high-risk groups [1] and should not be underestimated. Studies have shown over 50% of call centre operators reporting auditory fatigue [6]. Various call centres have reported varying

prevalence of hearing loss such as reports from Malaysia (21.2%), Poland (19.9%), Egypt (44.8%) among others [4,7,8]. Unfortunately, occupational health measures aimed at mitigating auditory disturbances are wanting [9]. The true magnitude of occupational hearing loss among call operators is not fully appreciated by many, as there is paucity of research worldwide more so in the African setting. We undertook a novel study in one of the biggest call centres in East and Central Africa to determine the prevalence of occupational hearing loss among call operators. This was the first study of its kind, to the best of our knowledge, seeking to investigate hearing loss among over 1000 call operators in the region.

Methods

A total of 1122 employees in a call centre were recruited in a descriptive cross-sectional study, as part of their company annual medical examination exercises. Refusal to participate was used as exclusion criteria. The participants who were included were screened for hearing loss using pure tone audiometry (PTA). This screening was done in a quiet room with the Fonix Audiometer FA-12. Those who failed the screening were subjected to a diagnostic hearing test in a sound proof booth with a diagnostic audiometer (Interacoustics Model AC40) and classified according to the World Health Organisation (WHO) Grades of Hearing Impairment. These subjects were also examined for other ear, nose and throat comorbidities, which were noted alongside other demographic and work information. Data was stored in Microsoft Excel and analysed using SPSS version 20 using

numerical descriptive methods such as measures of central tendency and dispersion. Finally, the employees with clinical abnormalities were referred for further evaluation by ENT specialists. Due consent was obtained from all employees and approval for ethical research was granted from the Department of Occupational Safety and Health Services (DOSHS), through the Research and Ethics Committee of the Occupational Safety and Health Research and Training Institute.

Results

We examined a total of 1122 employees, whereby there were 450 male and 672 female. The mean age of the subjects was 34.45 years (\pm 4.56 SD), ranging between 24-63 years. Majority of the employees (71.5%) fell in the age group bracket between 31-40 years, whereas minority (0.2%) fell in the 61-70 year-old age bracket. This has been illustrated in Table 1.

Age Group (years)	Hearing Loss		Total N (%)
	Yes n (%)	No n (%)	
21-30	7 (5.0%)	164 (16.7%)	171 (15.2%)
31-40	105 (75.5%)	697 (70.9%)	802 (71.5%)
41-50	19 (13.7%)	72 (7.3%)	91 (8.1%)
51-60	2 (1.4%)	1 (0.1%)	3 (0.3%)
61-70	1 (0.7%)	1 (0.1%)	2 (0.2%)
Not specified	5 (3.6%)	48 (4.9%)	53 (4.7%)
Total	139 (100%)	983 (100%)	1122 (100%)

Table 1: Pattern of distribution of hearing loss across various age groups among call centre workers.

A total of 139 subjects were diagnosed with hearing loss. This represents a prevalence rate of 12% (139/1122). Out of these subjects with hearing impairment, there were 64 male (46%) and 75 female (54%) as seen in Table 2. This gender bias towards females was not

statistically significant ($p=0.139$). There was unimodal distribution of hearing loss across the age groups, with the peak majority (75.5%) seen in the 31-40 year olds. This was an insignificant finding (Table 1).

Variable	Hearing Loss		p-value
	Yes N (%) / Mean \pm SD	No N (%) / Mean \pm SD	
Sex			
Male	64 (46.0%)	386 (39.3%)	0.139
Female	75 (54.0%)	597 (60.7%)	
Age	36 \pm 5.29	34 \pm 4.39	0
Duration of employment*	5.99 \pm 3.17	5.20 \pm 2.80	0.253
*Adjusted for age as a confounder			

Table 2: Analysis of various correlations in developing hearing loss among call centre workers.

The mean duration of employment in the call centre was about 5.23 years (\pm 2.83 SD). Majority of the subjects had worked for about 4-7 years (Table 3). This finding was congruent to the majority of those diagnosed with hearing loss. Out of all these employees, those who had

worked for 7 years were at highest risk of developing hearing loss, forming 19.4% of the total number of victims. However, there was no statistical significance between the duration of employment and development of hearing loss (Table 2).

Years of employment	Hearing Loss		Total N (%)
	Yes n (%)	No n (%)	
Less than 1	4 (3%)	23 (2.3%)	27 (2%)
1	6 (4.3%)	42 (4.3%)	48 (4.3%)

2	5 (3.6%)	101 (10.3%)	106 (9.4%)
3	12 (8.6%)	95 (9.7%)	107 (9.5%)
4	19 (13.7%)	175 (17.8%)	194 (17.3%)
5	19 (13.7%)	129 (13.1%)	148 (13.2%)
6	10 (7.2%)	124 (12.6%)	134 (11.9%)
7	27 (19.4%)	103 (10.5%)	130 (11.6%)
8	16 (11.5%)	47 (4.8%)	63 (5.6%)
9	13 (9.4%)	64 (6.5%)	77 (6.9%)
10	1 (0.7%)	22 (2.2%)	23 (2.0%)
11	1 (0.7%)	14 (1.4%)	15 (1.3%)
12	0 (0.0%)	7 (0.7%)	7 (0.6%)
13	1 (0.7%)	4 (0.4%)	5 (0.4%)
14	0 (0.0%)	2 (0.2%)	2 (0.2%)
15	1 (0.7%)	3 (0.3%)	4 (0.4%)
16	2 (1.4%)	5 (0.5%)	7 (0.6%)
17	2 (1.4%)	2 (0.2%)	4 (0.4%)
Not specified	0	21 (2.1%)	21 (1.9%)
Total	139 (100%)	983 (100%)	1122 (100%)

Table 3: Duration of employment of study subjects in the call centre.

The WHO Grades of Hearing Impairment classification was used to stratify the employees with hearing loss. Out of these, there were 99 employees (71%) with mild hearing loss, 23 (17%) with moderate hearing loss and 13 (9%) with severe hearing loss. Four subjects (3%) with hearing loss were not classified. This has been illustrated in Figure 1.

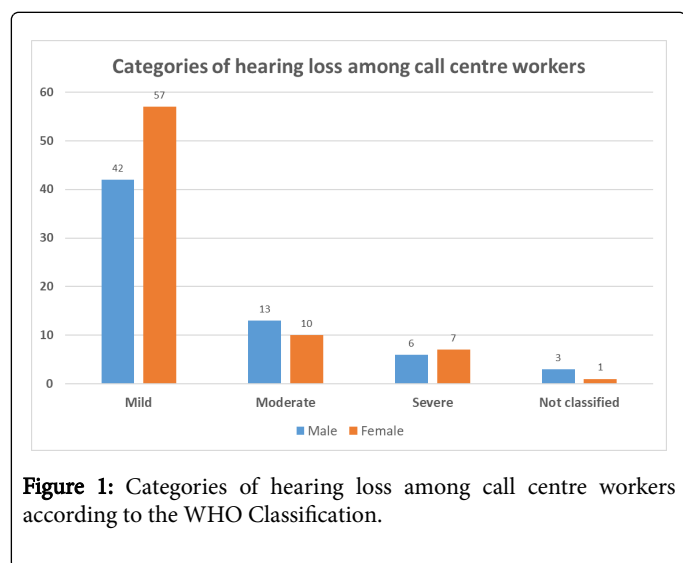


Figure 1: Categories of hearing loss among call centre workers according to the WHO Classification.

Discussion

Despite years of research, policies and interventions, the second most common self-reported occupation-related illness remains to be hearing loss [2]. Unfortunately, this condition is irreversible, leaving hearing amplification as one of the only modes of management [10]. The definition criteria for occupational hearing loss involves a minimum of 2 years work experience in a noisy workplace or exposure to noise higher than 85 dB (A) for at least 30 days [1], though 80 dB has been noted to constitute risk for hearing impairment [10].

The prevalence of hearing loss in our study was noted to be 12%. This rate is comparable to other call centres in other parts of the world such as Malaysia (21.2%) and Poland (19.9%) [4,8]. This is also comparable to the global burden of occupational hearing loss which has been cited to be around 16% [2]. In another Polish study, about 50% of call centre study subjects had abnormal hearing [11] whereas an Egyptian study cited 44.8% sensorineural hearing loss among telephone operators [4]. Inasmuch as background noise in call centres is usually not too high (54-60 dB), it has been cited as an annoying hazard - however when added to headset noise, contributes to the risk of hearing loss [12]. The headset use in our facility was quite extensive, and this has been consistently cited in literature as a cause of sensorineural hearing loss. This occurs due to damage and scarring of the outer hair cells of the cochlea [4,5] that initially manifests as early hearing loss of the high frequency range [13]. In these cases, headset noise exposure levels exceeding 85 dB (A) pose greater risk of hearing loss [4].

When reporting factors associated with hearing loss, it is important to adjust for any confounders such as age, which has been statistically proven to be associated with sensorineural hearing loss [2,4]. Global data is unequivocal that hearing impairment increases with age at any noise level [2]. We found age to be a significant risk factor in our study. Majority of the study subjects with occupational hearing loss were between 31-40 years of age, consistent with global estimates of the largest proportions exposed to occupational noise. This age group corresponds to the ages of peak labour force participation worldwide [2].

Inasmuch as length of exposure to occupational noise increases chances of hearing impairment, it is important to note that the highest risk is found at the highest levels of exposure [2]. As such, the level of noise presents a stronger association with development of noise-induced hearing loss, than the duration of that exposure [13]. This explains why there was no evidence of occupational hearing loss among our call centre subjects with longer duration of employment in the facility. This finding has been corroborated by other call centre studies investigating noise-induced hearing loss among telephone operators using headsets [4,7,8,11]. All of them reported no association between duration of employment and hearing loss. Alternatively, the level of headset noise is critical to development of hearing impairment, including loud caller voices and environmental noise transmitted through the headset [4,14]. We were unable to measure headset noise in our setup. Methods of noise measurement (including both headset noise and background noise) in the call centres ought to be implemented to aid in protection of exposed workers [9].

Other risk factors for noise-induced hearing loss such as hypertension, diabetes, obesity, smoking, ototoxic antibiotic treatments have been reported in literature [11,15] but were not controlled for in our study. Similarly, aging-associated deafness and prior hearing loss were possible confounders that we did not explore. Other study limitations included the fact that measurements of environmental noise and individual noise exposure could not be obtained in our setup. We were unable to measure headset noise for the various subjects.

Ultimately, our study underscores the need for occupational preventive strategies for human implementation. These include measurement and moderation of headset noise levels, which is infrequently done in many call centres. Other strategies include hearing conservation measures and appropriate legislative policies. However, the efficacy of these measures or worse still, poor compliance by both employers and employees is in question, as evidenced by the continuing high rate of occupational hearing loss [10]. In circumstances where hearing loss prevention programs are ineffective, there is greater need for 'more efficient legal regulations' [10]. All in all, further studies looking at interventions to prevent occupational hearing loss in the call centre setting are greatly needed.

Conclusion

Occupational hearing loss in call centres is an underestimated problem leading to devastating long-term irreversible disability. Relevant stakeholders, both employers and employees alike, cannot afford to ignore this growing burden but instead ought to heed this clarion call towards hearing conservation measures. In the promotion of favourable health and economic outcomes in our society, the old adage "prevention is better than cure" will always hold true.

Declarations

Ethical considerations

Ethical approval was granted from the Department of Occupational Safety and Health Services (DOSHS), through the Research and Ethics Committee of the Occupational Safety and Health Research and Training Institute.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

FK designed the study, supervised the data management and wrote the manuscript, with suggestions from JA and MN. All subjects were examined under the clinical supervision of JA and MN. All authors read and approved the final manuscript.

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