ORIGINAL ARTICLE

The public healthcare sector of Mauritius: knowledge of and attitudes toward hearing loss among community health workers

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Abstract. Mauritius does not have community health workers trained in identifying risk factors for hearing loss or in referring patients for diagnostic testing. It is crucial to gather information about the knowledge of and attitudes toward hearing loss among community health workers before involving them in the identification and intervention of hearing loss in Mauritius. To describe the knowledge of and attitudes toward hearing loss among community health workers in Mauritius. A descriptive survey design with quantitative analysis was used. Using non-probability purposive sampling, 125 community health workers which included 94 community health officers and 31 community-based rehabilitation officers were recruited from the five catchment areas of the public healthcare sector. Participants filled in a 15-item paper-based questionnaire on the knowledge of and attitudes toward hearing loss. The questionnaire was internally consistent, with Cronbach alpha scores of 0.759 and 0.863. The overall knowledge of community health workers regarding risk factors and the identification of hearing loss was poor (38.3%). 92.6% of community health workers reported positive attitudes toward hearing loss. General knowledge of hearing loss (P=0.015) and knowledge of risk factors and identification of hearing loss (P=0.005) were significant predictors of attitudes toward hearing loss. Knowledge of and attitudes toward hearing loss were significantly associated with working experience and practice setting (P=0.004). There remains a need to educate community health workers about the risk factors and identification of hearing loss to ensure timely diagnosis and management of hearing loss at the community level.

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Introduction

Hearing loss, which currently affects more than 1.5 billion people worldwide, is a public health concern (1). By 2050, nearly 2.5 billion people will be living with hearing loss (2). Unaddressed hearing loss can lead to an approximate loss of one trillion international dollars (1). It can have a considerable impact on an individual's communication, education, employment, and well-being (3). Through the early identification of hearing loss and subsequent intervention, these negative consequences can be reduced or prevented (4,5).

Mauritius has a strong primary healthcare system (6). The first level, also referred to as the community level, serves as the first point of contact within the health system, as demonstrated by the 1.5 million attendances in 2018 (7). Community-level services in Mauritius are mostly run by community health (CH) and community-based rehabilitation (CBR) officers, with support from doctors. Currently, CH officers in Mauritius follow a certificate course where they are trained in performing simple examinations such as measuring the height of patients and testing their eyesight, as well as taking their pulse and temperature (8) CBR officers follow a certificate course in CBR, where training is provided in identifying disabled persons in localities, counselling family members, and administering rehabilitation exercises to stroke patients (9).

In Mauritius, ear, nose, and throat specialists and audiologists are the primary sources of information on hearing loss. Due to the scarcity of these hearing health professionals in Mauritius, patients are on long waiting lists, which implies delays before appointments (10). Scarcity of an appropriately trained workforce is a barrier to implementing proper hearing healthcare services (11). Training CH and CBR officers in hearing loss management can reduce the demand on the limited number of hearing healthcare professionals (12).

Several studies have been conducted to evaluate the knowledge of and attitudes toward hearing loss among healthcare professionals. Sanju *et al* (13) who investigated the knowledge and attitudes of 160 allied health professionals in India toward hearing impairment and vestibular disorders, reported that participants had good knowledge of basic areas related to hearing loss and vestibular disorders. The gaps demonstrated in certain areas, however, required awareness regarding the role

of audiologists in the treatment of patients with hearing loss and vestibular disorders. Yousuf Hussein *et al* (14) investigated the knowledge and attitudes of early childhood practitioners regarding the identification of children affected by hearing loss in South Africa. Gaps in knowledge regarding identification techniques for children who are three to six years of age and the impact of hearing loss were evident. Nonetheless, these practitioners displayed a positive attitude toward children receiving a hearing test. The authors concluded that additional training was required to improve the knowledge and attitudes of practitioners.

Before CH workers (CHWs) can be involved in hearing health in Mauritius, it is important to collate baseline information regarding their knowledge of and attitudes toward hearing loss. This will allow audiologists to provide CHWs with appropriate information so that hearing services can be introduced at the community level in Mauritius. To the best of our knowledge, there is currently no published research exploring the knowledge of and attitudes toward hearing loss among CHWs in Mauritius. This study aimed to investigate the hearing loss-related knowledge and attitudes of CHWs in Mauritius.

Materials and methods

Ethical considerations. This study was conducted in accordance with the Helsinki Declaration of 1975, as revised in 2013, and was approved by the Ministry of Health and Wellness, Mauritius, and the Research Ethics Committee of the Faculty of Humanities, University of Pretoria, South Africa [HUM004/0921]. Participants were given a detailed explanation regarding the purpose of the study through information sheets, and written informed consent was obtained. Participation was voluntary, and the confidentiality of respondents was assured by providing each participant with an alphanumerically coded number.

Participants and study design. A non-experimental, cross-sectional, descriptive survey was conducted from July to October 2022. For the purpose of this study, CHWs included CH and CBR officers to represent the community-based workforce in Mauritius. CHWs were selected through non-probability purposive sampling from the five catchment areas of the public healthcare sector of Mauritius.

After obtaining the email addresses of the supervisors of the CH and CBR officers of each catchment area from the public health superintendent, the researcher communicated with each supervisor by email. Specific days and times were scheduled for meetings between the researcher and the supervisor of each catchment area in their respective offices. The CH and CBR officers were also called to each meeting. The researcher explained the study to the CH and CBR officers of each catchment area and distributed the questionnaires, information sheets, and consent forms, in collaboration with the respective supervisor. All participants of each catchment area who agreed to participate in the study completed the questionnaires individually. At the end of each meeting day, the researcher collected the questionnaires and thanked the CH and CBR officers for their participation. Using a 95% confidence interval and a margin of error of 5%, the minimum required sample size was computed as 117 (15). A sample of 125 (31 CBR and 94 CH officers) was obtained, achieving a response rate of 77.5%.

Data collection. The questionnaire developed by Yousuf Hussein *et al* (14) was adapted for this study, with modifications. Written permission was obtained from the main author prior to data collection. After having obtained permission from the main author, the self-administered questionnaire was pilot-tested by email on three supervisors of the CH officers and two supervisors of the CBR officers to ensure clarity of the questions, content and face validity. Based on the outcomes of the pilot study, some questions were reviewed whereas others were reformatted. The five supervisors included in the pilot study were excluded from the main study. The final version of the questionnaire was paper-based and consisted of a total of 15 questions, divided into three sections. The first section (Section A) consisted of four questions related to the demographic background of the participants, including the type of CHW, sex, years of experience, and practice setting. Section B consisted of one question regarding experience with hearing loss and one question regarding general knowledge of hearing loss, four questions related to risk factors for hearing loss, and one question focused on the identification of hearing loss. Section C comprised four questions about participants' attitudes toward hearing loss. Sections B and C consisted of statements that measured the knowledge of and attitudes toward hearing loss on a five-point Likert scale (strongly disagree, disagree, neutral/not sure, agree, strongly agree). The questionnaire was internally consistent, with Cronbach's alpha values of 0.759 and 0.863 for knowledge of and attitudes toward hearing loss, respectively.

Statistical analysis. Quantitative data were analyzed using Statistical Packages for Social Sciences (SPSS) Statistics version 26 (IBM Corporation, Armonk, New York). Descriptive statistics described the frequency of responses. To enable categorization, a continuity correction of ±0.5 was used for the five Likert scale options, which were initially rated as 1 to 5, where strongly disagree/disagree and neutral/not sure were grouped as 'poor' (interval:<3.5) and agree/strongly agree were grouped as 'good' (interval:≥3.5). Inferential analyses included correlation, multiple regression, and cross-sectional analyses using the chi-square test. Multiple regression analysis was conducted to determine whether knowledge of hearing loss affected the attitudes of CHWs toward hearing loss. The default significance level was set at 5%, and the results are reported to the nearest P-value.

Results

The results are presented in the same order as the questions in the survey.

Participant characteristics. The participants included 94 (75.2%) CH officers and 31 (24.8%) CBR officers of whom 25 (20.0%) were men and 100 (80.0%) were women. Among them, 62 participants had working experience of less than 5 years (49.6%), whereas 8 (6.4%) and 55 (44.0%) CHWs had working experiences of 5-9 years and at least 10 years, respectively.

Table I. Experience and general knowledge of hearing loss.

Survey statement	SD/D (%)	N (%)	A/SA (%)
Experience and general knowledge			
1. Provided services to a patient with hearing loss	24 (19.2)	45 (36.0)	56 (44.8)
2. Hearing loss is an important problem	4 (3.2)	20 (16.0)	101 (80.8)
Overall (Experience and general knowledge)	28 (11.2)	65 (26.0)	157 (62.8)
Knowledge of hearing loss (risk factors and identification of hearing loss)			
3. Listening to music at a high intensity can cause hearing loss	52 (41.6)	41 (32.8)	32 (25.6)
4. Certain illnesses can cause hearing loss	58 (46.4)	46 (36.8)	21 (16.8)
5. Certain types of medications can cause hearing loss	63 (50.4)	41 (32.8)	21 (16.8)
6. Ear infections can cause hearing loss	32 (18.4)	31 (24.8)	71 (56.8)
7. Hearing loss can be identified at any age	71 (56.8)	21 (16.8)	33 (26.4)
Overall (knowledge of risk factors and identification of hearing loss)	267 (42.7)	180 (28.8)	178 (28.5)
Overall knowledge	285 (33.7)	245 (28.0)	335 (38.3)

SD, strongly disagree; D, disagree; N, neutral/not sure; A, agree; SA, strongly agree.

Table II. Attitudes toward hearing loss.

Survey statement	SD/D (%)	N (%)	A/SA (%)
Attitudes toward hearing loss			
1. Hearing loss is a condition that can become handicapping	3 (2.4)	9 (7.2)	113 (90.4)
2. Hearing plays an important role in the development of speech and language of a child	2 (1.6)	4 (3.2)	119 (95.2)
3. It is important to perform hearing screenings for newborns	1 (0.8)	11 (8.8)	113 (90.4)
4. I would like to receive additional information on hearing loss	1 (0.8)	6 (4.8)	118 (94.4)
Overall attitudes	7 (1.4)	30 (6.0)	463 (92.6)

SD, strongly disagree; D, disagree; N, neutral/not sure; A, agree; SA, strongly agree.

CHWs worked in more than one setting at the same time: 107 (85.6%) in area health centers, 9 (7.2%) in community hospitals, 92 (73.6%) in CH centers, and 4 (3.2%) in medi-clinics.

Experience with and knowledge of Hearing Loss among CHWs. Results indicated that 56 (44.8%) of CHWs had provided services specifically to patients with hearing loss (Table I). The majority of the participants (80.8%, n=101) were aware that hearing loss is an important problem, 20 (16.0%) were unsure whereas 4 (3.2%) disagreed.

Knowledge regarding risk factors and identification of hearing loss among CHWs. In total, 32 (25.6%) of CHWs were aware that listening to music at a high intensity can cause hearing loss, whereas 21 (16.8%) knew that certain illnesses can cause similar damage. The same number knew that certain types of medication can cause hearing loss, whereas 33 (26.4%) knew that hearing loss can be identified at any age. In contrast, 71 (56.8%) of CHWs were aware that ear infections can cause hearing loss.

Attitudes toward hearing loss among CHWs. The attitudes toward hearing loss were overwhelmingly positive (Table II), with 139 (95.2%) of CHWs asserting that hearing plays an important role in the development of the speech and language of a child and 118 (94.4%) affirming they would like to receive additional information on hearing loss. 113 (90.4%) agreed or strongly agreed that hearing loss is a condition that can become handicapping, and the same number also agreed or strongly agreed that it is important for newborns to undergo hearing screening.

Association between knowledge of and attitudes toward hearing loss among CHWs. Knowledge of and attitudes toward hearing loss were significantly correlated at the 1% level (r=0.241, P=0.007, Fig. 1). Both experience with and general knowledge of hearing loss (P=0.015) and knowledge of risk factors and identification (P=0.005) were significant predictors of attitudes toward hearing loss (Table III).

Association of demographic variables with knowledge of and attitudes toward hearing loss. Poor knowledge was more significant among CHWs with working experiences of less than 5 years (93.5%: poor, 6.5%: good) and 5-9 years (87.5%: poor, 12.5%: good), as compared to those with at least 10 years of experience (58.2%: poor, 41.8%: good).

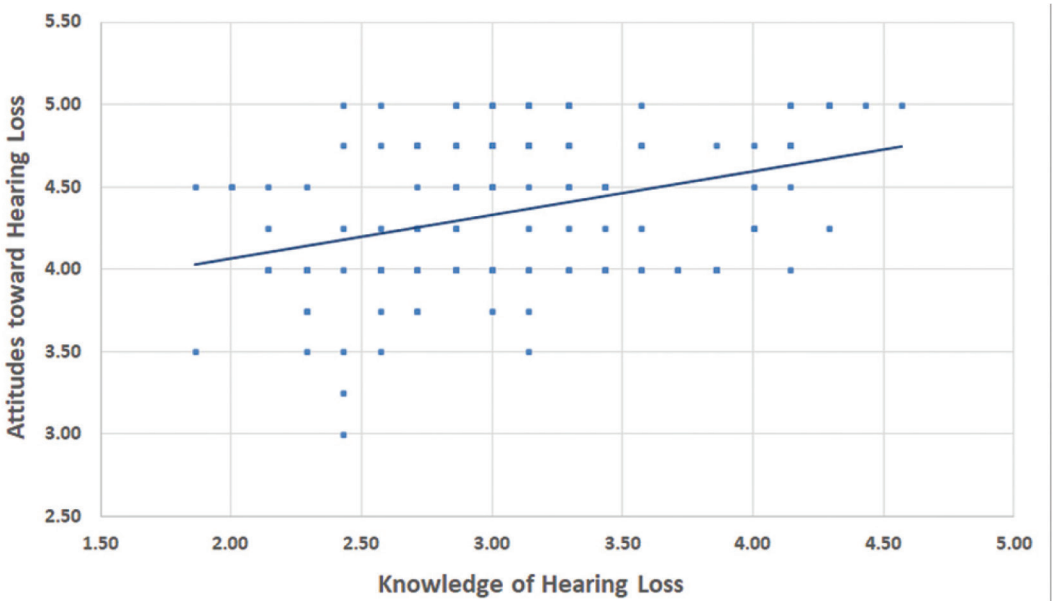

Figure 1. Scatterplot showing the correlation between the knowledge of and attitudes toward hearing loss.

Attitudes toward hearing loss were significantly associated with working experience (P<0.001) and practice setting (P=0.004). CHWs with working experience of 5-9 years (37.5%: poor, 62.5%: good) had significantly poorer attitudes toward hearing loss compared to those with working experiences of less than 5 years (3.2%: poor, 96.8%: good) and those with at least 10 years (0.0%: poor, 100.0%: good). CHWs who worked in community hospitals (22.2%: poor, 77.8%: good) had significantly poorer attitudes toward hearing loss compared to those who worked in area health centers (2.8%: poor, 97.2%: good), CH centers (1.1%: poor, 98.9%: good), and medi-clinics (0.0%: poor, 100.0%: good).

Discussion

The current study investigated the knowledge of and attitudes toward hearing loss among CHWs in Mauritius. While CHWs had good experience with and general knowledge of hearing loss, gaps in knowledge were noted regarding the risk factors and identification of hearing loss. Positive attitudes were demonstrated toward hearing loss.

General experience with and knowledge of hearing loss. The largest group of CHWs reported that they had provided services to patients with hearing loss. In a study conducted in Nigeria, 38.7% of participants indicated only one previous encounter with a patient with hearing loss (16). Most participants recognized that hearing loss is an important problem. This may be attributed to the general knowledge of the negative consequences of hearing loss among CHWs. Yousuf Hussein *et al* (14) reported that the majority of early childhood development practitioners in their study recognized that hearing loss is an important problem, even though merely 35.4% of these practitioners had previously worked with children with hearing loss.

Knowledge of risk factors and identification of hearing loss. The responses from the CHWs regarding the knowledge of risk factors of hearing loss were varied. First, the largest group of participants disagreed that listening to music at a high intensity may cause hearing loss. In contrast, the study by Alnuman and Ghnimat (17) showed that 81.2% of the young adult participants in their study admitted to having known that loud sounds can be damaging to hearing. Similarly, a study on the knowledge of and attitudes toward hearing loss by Sanju *et al* (13) revealed that 70% of participants were aware of the harmful effect of noise on hearing. The discrepancy in the current study may be attributed to the fact that to the best of our knowledge, no hearing education campaigns regarding hearing loss and its causes have been run at the community level in Mauritius. Lack of exposure to these campaigns may have contributed to the lack of knowledge shown by the study participants. This is a matter of concern as a lack of knowledge regarding the risk factors associated with noise-induced hearing loss may contribute to hazardous health effects (18).

Another area in which CHWs showed a lack of knowledge was that certain illnesses are risk factors for hearing loss. In contrast, a substantial number of participants (69.5%) in the study of Yousuf Hussein *et al* (14) recognized that illnesses can cause hearing loss. The significantly lower percentage in this study, reflecting a lack of knowledge about the effects of illnesses on hearing, is noteworthy. However, the dissimilarity may be attributed to the difference in the type of participants of the two studies and the fact that healthcare professionals with different qualifications have different levels of knowledge about the risk factors associated with hearing loss (19). The CHWs who participated in the current study were novices on the topic of hearing loss, and the authors are aware that there is limited emphasis on the topic of hearing loss during their training. Knowledge of the associated risk factors for hearing loss is vital, particularly for CHWs.

Poor knowledge about the ototoxic effects of commonly used medications was noted. A relatively low proportion of CHWs agreed with the ototoxic effects of commonly used medications, whereas more than half of CHWs disagreed. Such

Table III. Simple regression analysis.

Model	Unstandardized coefficients		Standardized coefficients	t	p
	B	Std. error	Beta		
General knowledge	.127	.051	.218	2.467	.015[a]
Risk factors and identification	.164	.057	.254	2.875	.005[a]

a. Dependent variable: Attitudes toward hearing loss
R^2=0.146; adjusted R^2=0.131

[a]P<0.05.

incorrect information is to be expected and may indeed reflect the general lack of training regarding hearing health among CHWs in Mauritius. CHWs working in primary care settings in developing countries have received limited attention regarding hearing health (20) as is the case in Mauritius. A systematic literature review by Ravi *et al* (21) about the knowledge, attitude, and practices among different healthcare professionals (22,23) in terms of hearing screening revealed a lack of accurate knowledge among various disciplines of healthcare professionals regarding some of the causes of hearing loss. The results of the study by Ravi *et al* therefore confirm those of the current study.

Regarding the knowledge of ear infections as risk factors for hearing loss, the majority of the participants agreed that ear infections can cause hearing loss. The awareness of CHWs regarding ear infections as an important etiological factor of hearing loss may be attributed to the visual nature of ear infections (24). Evidence suggests that poorly managed or unmanaged ear infections such as otitis media, which can be treated with medical and surgical interventions, remains one of the leading causes of hearing loss (11). In a study conducted by Biagio *et al* (25) regarding otitis media at a community clinic, the prevalence of chronic suppurative otitis media was 6.6%. It is possible that the CHWs in the present study may have previously encountered patients with ear infections. Other studies have also reported that healthcare workers have knowledge about ear infections as risk factors for hearing loss (19,13).

The lack of training on hearing loss among CHWs was further reflected in their limited knowledge regarding the identification of hearing loss. The majority of the participants in the current study disagreed that hearing loss can be identified at any age. Inadequate knowledge regarding the identification of hearing loss among CHWs raises concern and may be related to the fact that there are currently no regulations regarding hearing screening in Mauritius. Furthermore, this finding may also be consistent with the current lack of hearing health services at the community level in Mauritius (10). Lack of awareness concerning the early identification of hearing loss may adversely affect the development of language in children (26). Therefore, educating CHWs in Mauritius regarding the best practices for timely and prompt identification of hearing loss and appropriate intervention is important. Late diagnosis has often been the norm in Mauritius, with the average age at which congenital hearing loss is identified reported to be two to three years or even later (10).

Attitudes toward hearing loss. Regarding the attitudes of CHWs toward hearing loss, responses were overwhelmingly positive. It was encouraging to note that most of the participants responded in a positive manner to the statement 'it is important to perform hearing screenings for newborns.' This positive attitude may indicate the readiness of CHWs for the implementation of a newborn hearing screening program on the island. In Mauritius, where there are only eight audiologists in the public healthcare sector servicing a population of 1.2 million people across five regional hospitals (27) the role of hearing screening for newborns could be managed by CHWs, overseen by audiologists. Finally, almost all participants indicated that they wanted additional information on hearing loss. This may suggest potential support by the CHWs for hearing health promotion activities in Mauritius.

Association between knowledge of hearing loss, attitudes toward hearing loss, and demographic variables. The current study also showed that knowledge of hearing loss and attitudes toward hearing loss were significantly correlated. This finding differs from that of Velonaki *et al* (28) who found no correlation between knowledge of and attitudes toward hearing loss among nurses. Knowledge is an important factor that can influence attitude (29) and although the knowledge of risk factors of the CHWs in the current study was poor, nearly all participants exhibited positive attitudes toward hearing loss. This finding may be attributed to the type of disability assessed in this study. It may be that individuals tend to show less negativity toward individuals with hearing loss (30) since hearing loss is an invisible disability. Furthermore, CHWs with working experience of less than 5 years had significantly poorer knowledge of hearing loss than those who have 5-9 years or 10 years or more of working experience. This is to be expected and may be due to an increase in knowledge associated with longer working experience. Similarly, Mohamed-Asmail *et al* (12) and Yousuf Hussein *et al* (14) revealed statistically significant differences between participants' knowledge of hearing loss and years of work experience.

Attitudes toward hearing loss were also significantly associated with working experience and practice setting. This finding disagrees with that of Velonaki *et al* (28) who reported no statistically significant differences in knowledge of and attitudes toward individuals with hearing loss among nurses with different years of work experience.

Clinical and research implications. The findings of this study make an important contribution to clinical practice in Mauritius by providing baseline information on the knowledge of and attitudes toward hearing loss among CHWs in Mauritius. The findings highlight the importance of developing in-service training programs on hearing loss which can be added to the curricula of CHWs to enhance their knowledge of hearing loss. Resources like the World Health Organization's primary ear and hearing care training manuals may be used to educate CHWs about hearing loss, its impact, and its management (11). Digital technologies, such as smartphones and tablets that can facilitate screening to diagnosis of hearing loss, may also be used by CHWs for the early identification and intervention of hearing loss in Mauritius.

Future directions. Future studies should focus on understanding the implications of the implementation of a newborn hearing screening program in Mauritius among all members of the multidisciplinary team, prior to its introduction. The questionnaire implemented in this study, with additional questions, can also be used to assess changes in the knowledge levels of CHWs, especially after they have received training in hearing health care and following the implementation of a newborn hearing screening program in Mauritius.

Conclusions

Although most participants exhibited positive attitudes toward hearing loss, the results suggested a lack of knowledge about some risk factors associated with hearing loss, and the identification of hearing loss. The results clearly emphasize the need for relevant authorities to invest in enhancing knowledge of hearing loss among CHWs in order to bridge the knowledge gap evident in the findings of this study. Such a systematic approach will contribute to the timely diagnosis of hearing loss in individuals, especially in newborns through the introduction of a newborn hearing screening program at the community level.

Limitations. The current study has some limitations. One is the potential proclivity of the CHWs who participated in this study to provide socially desirable responses compared to those CHWs who did not participate. It may be that participants expressed attitudes that seemed more positive than their actual views. As in the case of any other self-administered survey, the accuracy of the results was heavily dependent on the honesty and understanding of participants. Additionally, the small sample size affects the generalizability of the findings. Lastly, the questionnaire which was used could have included more intensive items pertaining to the causes of, risk factors for, identification of, and, particularly, interventions for hearing loss. This may be important in subsequent studies, considering the importance of early intervention for hearing loss.

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Availability of data and material

The data presented in this study are available on request from the corresponding author.

Contributions

TF, conceptualization, methodology, formal analysis, data curation, writing-original draft preparation; TF, LP, MS, writing-review and editing; LP, MS, supervision. All the authors contributed to revising the manuscript and approved the final version to be published.

Ethical approval and consent to participate

The study was approved by the Ministry of Health and Wellness, Mauritius, and by the Research Ethics Committee of the Faculty of Humanities, University of Pretoria, South Africa (HUM004/0921).

Informed consent

Informed consent was obtained from all participants involved in the study.

Conference presentations

Part of this manuscript was presented orally at the 6th Malaysian Audiology Scientific Conference (MASCO) which was held virtually on the 13th-15th October 2022. Part of this manuscript was also presented orally at the International Conference on Multidisciplinary Research held on the 8th-9th December 2022 at the Ravenala Attitude Hotel, Balaclava, Mauritius.

Conflict of interest

The authors declare no potential conflict of interest.

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