https://doi.org/10.23925/2176-2724.2024v36i1e64474

Access to health service and hearing rehabilitation for adult and older adults during the initial period of the COVID-19 pandemic in Brazil

Acesso a serviço de saúde e reabilitação auditiva de adultos e idosos durante o período inicial da pandemia COVID-19 no Brasil

Acceso a servicios de salud y rehabilitación auditiva para adultos y ancianos durante el período inicial de la pandemia COVID-19 en Brasil

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Received: 11/28/2023
Accepted: 03/27/2024

Abstract

Introduction: Hearing loss is a common disability in the world population and contributes to difficulty in verbal communication and reduced quality of life, highlighting the importance of early identification, rehabilitation and audiological monitoring of this disability to mitigate its consequences. During the COVID-19 pandemic, restrictive measures reduced the service capacity of hearing health services and made it difficult to seek help to solve problems related to adaptation to personal sound amplification products (PSAPs), being a barrier in the rehabilitation process of hearing loss. **Aim:** To characterize PSAPs users and the initial hearing rehabilitation process for adults and elderly people and verify the factors associated with the return to hearing monitoring consultations in the initial period of the COVID-19 pandemic. **Methods:** Cross-sectional observational study with adults and elderly people: elderly users of an outpatient hearing health service who return for a scheduled hearing monitoring consultation in the initial period of the implementation of restrictive measures of the COVID-19 pandemic in Brazil. **Results:** Most participants were able to return to the hearing monitoring clinic, the majority of whom were elderly, female and vaccinated against COVID-19. There was a higher prevalence of adequate adaptation to the PSAPs. There was no statistical association between variables related to adaptation to PSAPs, COVID-19 and mental health and return to hearing monitoring consultation. **Conclusion:** Factors related to adaptation to PSAPs, COVID-19 or mental health did not influence the return to hearing monitoring consultation in the present investigation.

Keywords: Hearing Loss; Correction of Hearing Impairment; Health Services Accessibility; COVID-19.

Resumo

Introdução: A perda auditiva é uma deficiência comum na população mundial e contribui para dificuldade na comunicação verbal e redução da qualidade de vida, evidenciando a importância da identificação precoce, reabilitação e acompanhamento audiológico dessa deficiência para mitigar suas consequências. Durante a pandemia da COVID-19, as medidas restritivas diminuíram a capacidade de atendimento dos serviços de saúde auditiva e dificultaram a busca de auxílio para resolver problemas relacionados à adaptação aos dispositivos eletrônicos de amplificação sonora (DAES), sendo uma barreira no processo de reabilitação da perda auditiva. **Objetivo:** Caracterizar os usuários de DEAS e o processo inicial de reabilitação auditiva de adultos e idosos e verificar fatores associados ao retorno para a consulta de monitoramento auditivo durante o período inicial da pandemia da COVID-19.**Métodos:** Estudo observacional transversal com usuários adultos e idosos de um serviço ambulatorial de saúde auditiva com retorno para consulta de monitoramento auditivo agendada no período inicial da implementação das medidas restritivas da pandemia da COVID-19 no Brasil. **Resultados:** A maioria dos participantes conseguiu retornou para a consulta de monitoramento auditivo, sendo eles em sua maioria idosos, do sexo feminino e vacinados contra a COVID-19. Houve maior prevalência de adaptação adequada aos DAES. Não houve associação estatística entre as variáveis relacionadas à adaptação aos DAES, COVID-19 e saúde mental e o retorno à consulta de monitoramento auditivo. **Conclusão:** Os fatores relacionados à adaptação aos DAES, à COVID-19 ou à saúde mental não influenciaram o retorno à consulta de monitoramento auditivo na presente pesquisa

Palavras-chave: Perda auditiva; Reabilitação da Deficiência Auditiva; Acesso aos Serviços de Saúde; COVID-19.

Resumen

Introducción: La pérdida auditiva es una discapacidad común en la población mundial y contribuye a la dificultad en la comunicación verbal y a la reducción de la calidad de vida, destacando la importancia de la identificación temprana, rehabilitación y seguimiento audiológico de esta discapacidad para mitigar sus consecuencias. Durante la pandemia de COVID-19, las medidas restrictivas redujeron la capacidad de atención de los servicios de salud auditiva y dificultaron la búsqueda de ayuda para resolver problemas relacionados con la adaptación a dispositivos electrónicos de amplificación del sonido (DEAS), siendo una barrera en el proceso de rehabilitación de la pérdida auditiva. **Objetivo:** Caracterizar a los usuarios

de DEAS y el proceso inicial de rehabilitación auditiva de adultos y ancianos y verificar los factores asociados al retorno a las consultas de monitorización auditiva en el período inicial de la pandemia COVID-19. **Métodos:** Estudio observacional transversal con adultos y ancianos: ancianos usuarios de un servicio ambulatorio de salud auditiva que regresan para consulta de monitorización auditiva programada en el período inicial de la implementación de medidas restrictivas de la pandemia de COVID-19 en Brasil. **Resultados:** La mayoría de los participantes pudieron regresar a la clínica de monitorización auditiva, la mayoría de los cuales eran ancianos, mujeres y estaban vacunados contra COVID-19. Hubo mayor prevalencia de adaptación adecuada a la DEAS. No hubo asociación estadística entre variables relacionadas con adaptación a DEAS, COVID-19 y salud mental y retorno a consulta de monitorización auditiva. **Conclusión:** Los factores relacionados con la adaptación a DEAS, el COVID-19 o la salud mental no influyeron en el retorno a la consulta de monitorización auditiva en la presente investigación.

Palabras clave: Pérdida Auditiva; Corrección de Deficiencia Auditiva; Accesibilidad a los Servicios de Salud; COVID-19.

Introduction

Hearing loss is a common disability in the world population, which promotes hearing deprivation and influences social, physical, and mental aspects, contributing to reduced access to verbal communication and reduced quality of life[1,2]. Early identification, rehabilitation, and audiological monitoring of this disability are key to mitigating its consequences, with electronic sound amplification devices (ESAD) being one of the main approaches to rehabilitating hearing impairment in adults and older adults provided by hearing health services[3,4].

The effects of hearing loss on the general health of the individual, such as sleep disorders, loneliness, feelings of loss, difficulty in performing activities of daily living, and depression, were aggravated during the period of the COVID-19 pandemic due to social isolation and discontinuity in the auditory rehabilitation process due to restrictive measures imposed on health services[1,3,5-9].

With the restrictive measures imposed by government agencies during the COVID-10 pandemic, hearing health services suspended activities or decreased their care capacity, making it challenging to attend in-person consultations and increasing the chances of giving up the use of ESAD since many health services do not provide remote care[10].

ESAD users who were in the initial stage of auditory rehabilitation, which comprises the moment of auditory monitoring to monitor and solve difficulties of users related to using ESAD by users to ensure their continuous use, were strongly affected by restrictive measures, especially at the beginning of the pandemic. It is necessary to verify and analyze the difficulties faced by ESAD users during the pandemic to identify approaches that can mitigate barriers to access to health services and reduce the chances of abandoning hearing rehabilitation during future periods of health crisis.

Thus, this research aimed to characterize ESAD users and the initial hearing rehabilitation process of adults and older adults and to verify factors associated with the return to the hearing monitoring consultation during the initial period of the COVID-19 pandemic.

Methods

Study design

This is a cross-sectional observational study with a convenience sample of adult (≥18 years old) and older adult (≥60 years old) users undergoing hearing rehabilitation in a referral outpatient service in the state of Santa Catarina, whose consultation for hearing monitoring was scheduled in the initial period of the COVID-19 pandemic in Brazil, between March and April 2020. Due to restrictive measures imposed by government agencies, the service suspended services on March 19, 2020, resumed services at 50% of capacity on April 20, 2020, and at 100% on August 31, 2020.

This outpatient service is accredited to the Unified Health System (SUS), receiving demands from primary care and specializing in auditory diagnosis and rehabilitation, covering all life cycles, from children to older adults. The service has a team of speech therapists, otorhinolaryngologists, psychologists, physiotherapists, social workers,

and administrative technicians, to serve the users comprehensively.

The auditory rehabilitation process involves three stages: (1) initial evaluation, (2) auditory monitoring, and (3) follow-up. The first stage (1) consists of a visit to the otorhinolaryngologist, social worker, and psychologist, as well as auditory evaluation, selection, and adaptation of ESAD with speech therapists. In the second stage (2), it is proposed to monitor the initial hearing rehabilitation process that occurs 30 days after ESAD adaptation, with tracing of complaints about the difficulties related to its use in this period. The third stage (3) consists of the return after one year of the first ESAD adaptation, maintaining the annual return of the user to the service for tracing complaints and ESAD maintenance. The service has an emergency outpatient clinic that the user can use at any time to assist in the ESAD adaptation process.

Users who performed the first stage (1) before the restrictive measures had the second stage (2) scheduled for the initial period of the pandemic.

Data collection

The survey of users and telephone contacts was conducted in June 2021 through the service's information system. Adult and older users with a hearing monitoring appointment between March and April 2020 were identified. Between July and December 2021, the researchers contacted users via telephone, clarified the research objectives, informed them in a clear and accessible way about their rights as research participants, and invited them to be part of this study. After the participants had given their verbal consent, they were invited to answer the questionnaire via telephone. The questionnaire consists of the questions the researchers prepared and used in other studies and/or validated in the scientific literature. The questionnaire used in the research was divided into two blocks: (A) sociodemographic characteristics, lifestyle, social relations, and mental health; (B) information related to COVID-19 and ESAD adaptation.

The interviews conducted by telephone lasted an average of 20 minutes. All data was obtained on the same call per user.

It was characterized as a loss when it was impossible to call the user due to outdated registration information in the institution's system or after three unsuccessful telephone attempts. It was characterized as refusal when users chose not to answer the interview via telephone.

Sociodemographic characteristics, lifestyle, social relations, and mental health

For these analyses, sex (male/female), age (mean and standard deviation, in complete years), ethnicity/skin color (Caucasian/other), education (≤ 5 years/6 to 11 years/ ≥ 12 years), income (up to 1 MW/ ≥2 MW), partner presence (no/yes), and data on lifestyle habits were considered: physical activity (no/yes), smoking (no/yes), alcohol consumption (no/yes). Data were obtained through questions about interaction with family and friends, feelings of loneliness, quality of sleep (no/yes), use of medication to sleep and for depression (no/yes), and presence of depressive symptoms (no/yes).

The questionnaire prepared by ICICT/FIOCRUZ[11] and adapted by the researchers with questions related to the frequency of contact with their family members/friends was used to evaluate the interaction with family members/friends. Moreover, the number of people in the household (living alone/accompanied) was also used to verify the interaction with family/friends.

Data on sleep quality and medication use during the pandemic period were collected through closed-ended questions (yes/no) prepared by the researchers linked to the study. The presence of depressive symptoms in older participants was verified using the *Geriatric Depression Scale* — (*GDS-15*) questionnaire, a brief version validated in Brazil[12,13]. The questionnaire has 15 questions with dichotomous answers (yes/no), addressing complaints regarding mental suffering and seeking to screen for mood disorders in older adults, specifically depressive symptoms. Participants with a score ≥ 6[13] were considered to have depressive symptoms.

COVID-19 information and ESAD adaptation

Data were collected regarding the history of COVID-19 infection, vaccination against COVID-19 (no/yes), and the occurrence of deaths of relatives during the pandemic period (no/yes). These questions were evaluated through questions prepared by the researchers linked to the study. To describe the ESAD adaptation process, information regarding complaints, difficulties, and percep-

tions related to ESAD use was collected through a questionnaire with dichotomous questions (no/yes) prepared and made available by the hearing health service.

Variables

To analyze the association of the factors associated with the return to the hearing monitoring visit, information recorded in the information system of the rehabilitation service regarding the return of the user was collected. The variable considered as dependent refers to the return to the hearing monitoring visit. It is categorized as binary (yes/no), and users who had not returned to the monitoring visit until the data collection date were considered "no." The independent variables refer to isolated issues related to ESAD adaptation, information related to COVID-19, and mental health.

Data analysis

To characterize the users, descriptive analyses were performed using absolute and relative frequency. Pearson's Chi-square test was used for association analyses. The analyses were performed using the statistical software Stata SE 16.0 (Stata Corp., College Station, United States), and the significance level established was $p<0.05$.

Ethical aspects

The study was approved by the Human Research Ethics Committee (CAAE: 39562720.8.0000.0121). All participants received the necessary clarifications about the study, and their oral consent was issued by telephone at the first effective contact.

It should be noted that the information referred to by the participants and presented in the results section is related to the period from the day of receipt and adaptation of ESAD (prior to the beginning of the restrictive measures in Brazil on March 20, 2020) to the day of data collection conducted by the researchers via telephone (between July and December 2021).

Results

Between March 19, 2020, and April 30, 2020, 241 adult and older users were scheduled to return for hearing monitoring. Of these, 29 losses were recorded after the three calls, 05 due to outdated contact details, 08 refusals, and 06 deaths (Figure 1), resulting in 193 participants, 87 adults, and 106 older adults.

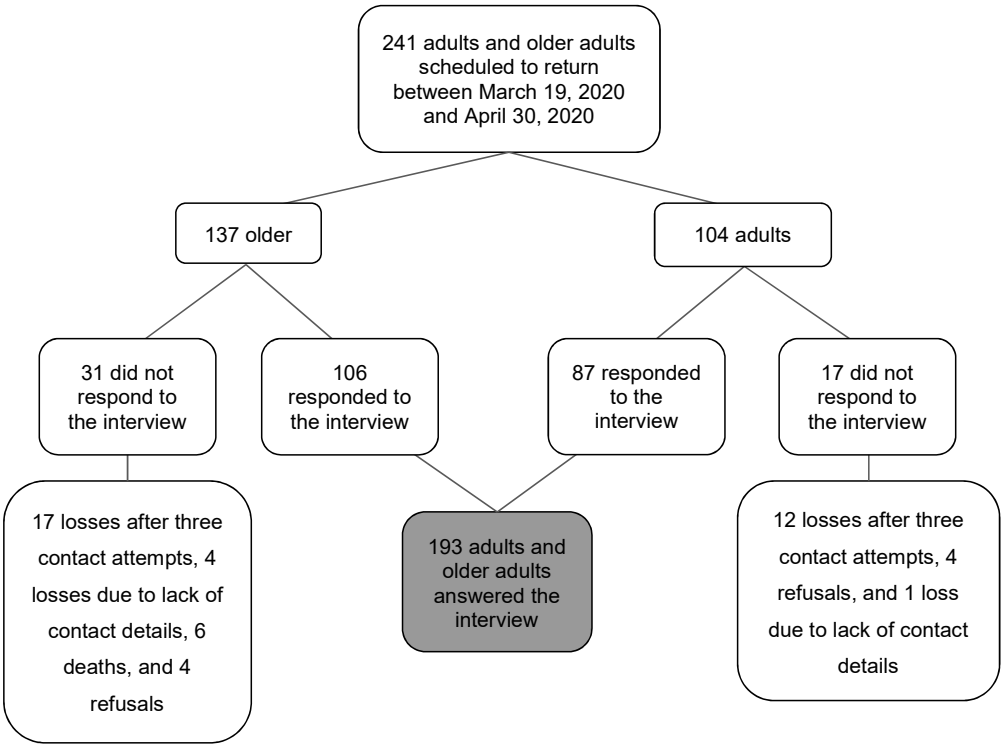

Figure 1. Diagram of interviews with users in the hearing rehabilitation process of the hearing health service. Florianópolis, Brazil, 2021

The mean age of the users was 60.72 ± 16.22 years old. Of the 193 participants, 111 (57.5%) were female, 156 (80.8%) were Caucasian, 156 (80.8%) had 6 to 11 years of education, and 126 (65.3%) had monthly income of the family group from two minimum wages. Regarding the marital/love situation, 110 (57.0%) reported living without a partner, but 166 (86.0%) live with at least one person. As for lifestyle, 168 (87.0%) do not smoke, 155 (80.3%) do not drink alcohol (80.3%), and 107 (55.4%) do not practice physical activity (Table 1).

Table 1. Sociodemographic profile and life habits of users in the hearing rehabilitation process in the hearing health service. Florianópolis, Brazil, 2021 (n=193)

Sociodemographic variables	n	%
Sex		
Male	82	42.5
Female	111	57.5
Age (mean ± SD, in full years)	60.7 ±16.2	
Ethnicity/skin color		
Caucasian	156	80.8
Other	37	19.2
Education		
Up to 5 years	22	11.4
6–11 years	156	80.8
12 years and more	15	7.8
Income (monthly family)		
Up to 1 MW	67	34.7
≥ 2 MW	126	65.3
Partner presence		
No	110	57.0
Yes	83	43.0
Lives alone		
No	166	86.0
Yes	27	14.0
Smoking		
No	168	87.0
Yes	25	13.0
Practice of physical activity		
No	107	55.4
Yes	86	44.6
Alcohol consumption		
No	155	80.3
Yes	38	19.7

SD: standard deviation; MW: minimum wages

Of the 193 participants scheduled to return between March and April 2020, 127 (66.2%) returned for the hearing monitoring visit, and 65 (33.8%) did not return.

Regarding the 127 participants who returned for the hearing monitoring visit, 121 (66.9%) are able to place and remove the devices from the ears independently, 119 (66.1%) can place and remove the battery of the devices also independently, and 124 (66.7%) feel supported by the family to use the devices. Still, 120 (66.3%) stated that using ESAD met their expectations, and 113 (68.9%) reported enjoying using the devices at home. However, only 46 (60.5%) can use the devices throughout the day and among the main difficulties found by the participants during the use of the devices, 67 (65.1%) reported discomfort with intense sounds, 77 (64.2%) reported microphony, that is, they hear a whistle from the devices when they are erroneously fitted to the ear, 68 (66.7%) reported the presence of tinnitus, and 20 (74.1%) used the institution's emergency service. Notably, one participant claimed not to have used the ESAD due to the difficulties found soon after the first adaptation made in the hearing health service. The researcher instructed them to seek the emergency outpatient clinic of the hearing health service to get assistance in the rehabilitation process.

Also, of the total number of study participants, 164 said they liked using devices at home. Of these, 112 (68.9%) returned for the monitoring visit, which was almost statistically significant (p=0.051) (Table 2).

Table 2. ESAD adaptation, according to the return to the monitoring visit of adult and older adult users. Florianópolis, Brazil, 2021 (n=192)

Variables related to adaptation of electronic sound amplification devices (ESAD)*	Return to Monitoring				p**
	YES		NO		
	n	%	n	%	
Can put on and remove the device by themselves	121	66.9	60	33.1	0.402
Can put on and remove the battery by themselves	119	66.1	61	33.9	0.969
Likes using the devices at home	113	68.9	51	31.1	0.051
Can listen to TV at an appropriate volume	101	66.9	50	33.1	0.677
Likes using the devices away from home	111	67.3	54	32.7	0.415
Uses the phone with the devices in their ears	81	63.8	46	36.2	0.333
Felt their expectations were met	120	66.3	61	33.7	0.856
Has family support with the use of the devices	124	66.7	62	33.3	0.396
Uses the devices all day long	46	60.5	30	39.5	0.183
Has tinnitus	68	66.7	34	33.3	0.871
Has dizziness	40	58.9	28	41.1	0.112
Device hurts their ear	29	60.4	19	39.6	0.333
Microphony	77	64.2	43	35.8	0.454
Is bothered by loud sounds	67	65.1	36	34.9	0.730
Needed to use the institution's emergency service	20	74.1	7	25.9	0.348

*The absolute number (n) and prevalence (%) refer only to participants who answered "yes" to the questions considered as exposure variables.
**p-value obtained by Pearson's chi-square test

Table 3 shows the results relative to COVID-19, highlighting that of the 193 participants, 187 (96.9%) were vaccinated against the disease, of which 124 (64.3%) returned for hearing monitoring. Also, of the users who returned, 22 (71.0%) were diagnosed with COVID-19, and 44 (71.0%) reported the death of a relative during the pandemic.

Table 3. COVID-19-related variables, according to the return to the monitoring visit. Florianópolis, Brazil, 2021 (n=193)

Variables related to COVID-19*	Return to Monitoring				p**
	YES		NO		
	n	%	n	%	
Had a diagnosis of COVID-19	22	71.0	9	29.0	0.550
Underwent vaccination against COVID-19	124	64.3	63	32.6	0.985
A relative died during the COVID-19 pandemic	44	71.0	18	29.0	0.347

*The absolute number (n) and prevalence (%) refer only to participants who answered "yes" to the questions considered as exposure variables.
**p-value obtained by Pearson's chi-square test

Regarding the mental health of the 193 participants, 27 (14.0%) live alone, 167 (86.5%) report communicating with family and friends via telephone at least once a week, but 93 (48.1%) report feeling lonely, 37 (19.2%) use medication for depression, and 48 (24.9%) use medication to sleep. Of the 106 older adult participants, 16 (22.9%) had depressive symptoms, according to the *GDS-15* questionnaire.

Table 4. Mental health-related variables, according to the return to the monitoring visit. Florianópolis, Brazil, 2021 (n=193)

Mental health-related variables	TOTAL		Return to Monitoring				p**
			YES		NO		
	n	%	n	%	n	%	
Communicates with relatives/friends (weekly)	167	86,5	113	67,7	54	32,3	0.317
Lives alone	27	14,0	19	70,4	8	29,6	0.631
Has a feeling of loneliness	93	48,1	57	61,3	36	38,7	0.154
Use sleep medication	48	24,9	30	62,5	18	37,5	0.518
Has good sleep quality	45	23,3	27	60,0	18	40,0	0.306
Uses depression medication	37	19,2	20	54,0	17	46,0	0.079
Presence of depressive symptoms in older adults (GDS-15)	16	22,9	9	72,0	7	28,0	0.445

Legend: GDS-15: Geriatric Depression Scale — 15.
*The absolute number (n) and prevalence (%) refer only to participants who answered "yes" to the questions considered as exposure variables.
**p-value obtained by Pearson's chi-square test

The association analyses found that the exposure variables (ESAD adaptation, information related to COVID-19, and mental health) did not have a statistically significant association with the outcome (return to the monitoring visit).

Discussion

The limitations of this research are mainly due to its cross-sectional design, which makes it impossible to analyze the causality between the exposure and outcome variables. The small sample may have influenced the association analyses, justifying the absence of statistically significant associations. The questionnaire does not include questions that allow us to verify whether the difficulty of adaptation occurred before or after the return to the hearing monitoring visit, preventing us from verifying when the individual was able to adapt adequately to the ESAD (whether right after the first adaptation of the devices or after the guidance received by the speech therapist at the hearing monitoring visit).

The profile of participants returning for hearing monitoring scheduled for the initial period of the COVID-19 pandemic mainly consisted of older adults, female, Caucasian, with 6 to 11 years of education, with an income greater than two minimum wages, without a loving partner, and residing with at least one person. It was observed through the responses to the questionnaire that most of the 127 participants who returned for the hearing monitoring visit obtained good ESAD adaptation and were vaccinated against COVID-19. None of the exposure variables analyzed were associated with the outcome. Therefore, they did not influence the return to the hearing monitoring visit.

The profile of the participants in this research is similar to the previously published literature, which shows that the prevalence of individuals with hearing loss is female, with a mean age of 64 years old[10], single, Caucasian, low income and education[14,15], with high rates of unemployment or underemployment, and high annual health costs[16]. Although this population has a higher prevalence of hearing loss, most people who seek a health service to perform early diagnosis and follow-up by health professionals are people aged 64 years old or younger, Caucasian, married, with high income, and education and who report having good health are more likely to seek a health service, obtain early diagnosis, and have companions during visits[14,15]. The recognition of hearing difficulties is paramount in the search for health care and early diagnosis and depends mainly on the educational, financial, and social support level[15]. Thus, it is observed that the participants in this research attended the hearing monitoring visit, even in the presence of aspects considered as social barriers.

When well-adapted, ESAD significantly improves the individual's hearing and quality of life. It depends on factors such as good manual skill, degree of fit/comfort of earmolds, environmental noise, relatives' knowledge of hearing loss and social support, availability of hearing health services, and technical assistance[17-19]. Family support is fundamental to the effectiveness of the rehabilitation

process, as it collaborates in the understanding of instructions, increases the user's feeling of safety, facilitates the recognition of their difficulties, and access to health services[22,23]. On the other hand, the discontinuity of hearing health services during the pandemic made it challenging to purchase of batteries, repair of broken devices, manufacture of new earmolds, and reprogramming of devices[19-21], with a consequent decrease in the time of daily use of ESAD, hearing-related problems (infections, dizziness, and tinnitus), and communication difficulties with relatives[19]. Most participants reported independence in handling devices and batteries, like using them at home and outdoors, feeling supported by the family, and meeting their expectations. However, many participants reported the presence of microphony, discomfort to intense sounds, tinnitus, dizziness, and that the devices hurt the ears, which are cited in the literature as barriers to the continuity of ESAD. Although 117 participants reported difficulty using the devices throughout the day, only 27 used the institution's emergency service to solve adaptation-related problems. Also, one participant reported the impossibility of using the devices from the first adaptation to the moment of data collection, evidencing the difficulty in accessing the health service, an impossibility in use, and/or decrease in the time of daily ESAD use during the period of restrictive measures due to the pandemic.

The comprehensiveness of the individual with hearing loss should be considered during health care since chronic diseases can be risk factors for hearing loss[22]. Individuals with hearing problems often report having poor general health, a more significant number of chronic comorbidities, and functional limitations[15]. Early diagnosis and rehabilitation prevent the deterioration of auditory and/or cognitive skills and decrease public health spending on care aimed at the consequences of undiagnosed hearing loss[17, 24]. In our study, it is observed that less than half of the participants in the hearing rehabilitation process use medications for depression or sleep disorders, depressive symptoms, diagnosis of COVID-19, smoking, and alcohol consumption, characterizing this sample as having a low prevalence of habits and health conditions that may be related to undiagnosed and untreated hearing loss.

Conclusion

Our findings allow us to characterize the ESAD users in this research as having an average age of 60 years old, with the majority being female, Caucasian, with 6 to 11 years of education, with monthly income of the family group from two minimum wages, without a loving partner, living with at least one person, non-smokers, non-alcoholics, and non-practitioners of physical activity. Most participants could attend the hearing monitoring visit during March and April 2020, even with the imposition of restrictive measures by government agencies. It was observed that most participants could adapt adequately to the devices but had difficulty using them throughout the day. In the analysis of variables, aspects related to the use of the devices, COVID-19, and mental health were not associated with the return to the hearing monitoring visit. Due to the gaps caused by the impossibility of causal analysis in our research, it is suggested that future research aims to longitudinally follow the ESAD users to observe factors that influence the adaptation to the devices and how to ensure the adaptation and proper use of these devices during health crises that can distance and isolate individuals and that impact the functioning of hearing health services.

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