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TELEGRAM: contribution in assistive technology indication for individuals with hearing impairment

TELEGRAM: contribuição na indicação de tecnologia assistiva para indivíduos com deficiência auditiva

ABSTRACT

Purpose: The objective of the study was to translate and culturally adapt to Portuguese the TELEGRAM instrument and to evaluate its effectiveness in adults with hearing impairment using hearing aids. **Methods:** The TELEGRAM was translated into the Portuguese language, reviewed for grammatical and idiomatic equivalences (reverse translations) and linguistic and cultural adaptations. After translation, the TELEGRAM was applied to 20 individuals with hearing impairment. **Results:** A descriptive analysis of the results was performed. After the grammatical and idiomatic equivalence, the replacement of one term/item was suggested, which was modified and adapted to the Brazilian context. In general, the questions of the instrument were considered easy to understand. Among the categories assessed, individuals with hearing loss had greater difficulty using the telephone and in activities such as attending church gatherings, parties, or in situations of noisy environments, distance and reverberation. **Conclusion:** The TELEGRAM translated into Brazilian Portuguese proved to be an easily applicable tool in population studies and effective to assess which are the main situations where individuals with hearing impairment have greater difficulty in communication, reinforcing the importance of hearing rehabilitation and assistive technology to minimize these difficulties.

RESUMO

Objetivo: O objetivo do estudo foi traduzir e adaptar culturalmente para a Língua Portuguesa Brasileira o instrumento TELEGRAM e avaliar sua aplicabilidade em adultos com deficiência auditiva usuários de Aparelho de Amplificação Sonora Individual. **Método:** Foram realizadas a tradução do TELEGRAM para o idioma Português, a revisão das equivalências gramatical e idiomática (traduções reversas) e as adaptações linguística e cultural. Após a tradução, o TELEGRAM foi aplicado em 20 indivíduos adultos com deficiência auditiva. **Resultados:** Foi realizada análise descritiva dos resultados. Após a equivalência gramatical e idiomática foi sugerida substituição de um termo/item, tendo sido o mesmo modificado e compatibilizado ao contexto brasileiro. De modo geral, as perguntas do questionário foram consideradas de fácil entendimento. Dentre as categorias avaliadas, os indivíduos com deficiência auditiva apresentaram maior dificuldade quanto ao uso do telefone e em atividades como participar de eventos em igrejas, festas, ou seja, em situações de ruído, distância e reverberação. **Conclusão:** O TELEGRAM traduzido para a Língua Portuguesa Brasileira mostrou ser uma ferramenta de fácil aplicação na população estudada e efetivo para avaliar quais são as principais situações em que indivíduos com deficiência auditiva apresentam maior dificuldade de comunicação, reforçando a importância da reabilitação auditiva e das tecnologias assistivas para minimizar essas dificuldades.

Study carried out at Department of Speech-Language Pathology and Audiology, School of Dentistry of Bauru, Universidade de São Paulo – USP - Bauru (SP), Brazil.

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INTRODUCTION

The use of Hearing Aids (HA) assists in audibility of people with hearing impairment, especially in quiet situations. However, many of these people complain of hearing difficulties in noisy environments, for what they can make use of additional technologies to improve their communication skills⁽¹⁾. There are many factors to be considered in the selection of the HA, which include evaluating the degree of hearing loss, communicative demands of individuals, family support, manual dexterity and overall health. Still, in some cases, the use of the HA may not be enough to reduce hearing difficulties of the users of this device⁽²⁾.

In order to define and indicate which Assistive Technology (AT) or technical assistance best meet individuals with hearing impairment, the users' needs, their dynamics and their lifestyle in the family, school and social environment should be considered. The TELEGRAM instrument has been developed in this context to evaluate the communication needs more comprehensively^(1,3). The use of this information along with other audiological tests helps in therapeutic goals. This may include the use of AT, the development of communication strategies, guidance to individuals about possible technologies that help their hearing performance in public places and the involvement of family members in the therapeutic process⁽³⁾.

The TELEGRAM evaluates communication needs taking into account the different situations of hearing challenges such as at phone calls, in work environments, with regard to legislation, entertainment, communication groups, recreation, hearing alarms and family members.

The motivation of this work was to contribute to the improvement of protocols, supporting the indication and selection of HA and/or AT, development of communication strategies, orientation to individuals about the possible technologies that may help in their hearing performance and in improving communication in public places.

OBJECTIVES

The objectives of the study were to translate and culturally adapt to the Brazilian Portuguese the TELEGRAM instrument and to evaluate its effectiveness in adults with hearing impairment using HA.

METHODS

The study was approved by the Ethics Committee of the Faculdade de Odontologia de Bauru, Universidade de São Paulo, under number 21195713.9.0000.541. All participants of the validation process signed the Informed Consent (IC).

The author of the TELEGRAM instrument was contacted and this authorized the version in Brazilian Portuguese^(1,3).

The acronyms of the TELEGRAM assessment tool reflect the areas that should be considered in the communication environment of individuals: Telephone, Work, Law, Entertainment, Communication Group, Recreation, Alarms, and Family. The goal of this study is to obtain information through open

questions about the person's life in each area evaluated and its use for guidance or use of assistive technologies to maximize communication.

The format of the instrument is similar to the audiogram and the professional must record on the individual needs areas and define the main goals, in order to minimize the difficulties encountered in each specific situation during the application (Appendix A).

Cultural adaptation

The translation and cultural adaptation of the TELEGRAM questionnaire for the Brazilian Portuguese language followed the steps described below⁽⁴⁻⁶⁾.

Translation of the questionnaire to Brazilian Portuguese language

The instrument in the original version^(1,3) was distributed to two English interpreters, fluent translators in that language who did not know each other and were not aware of the protocol to develop the first Brazilian Portuguese version individually and secretly. This procedure was performed in order to generate two independent translations of the questionnaire.

Linguistic adaptation

The review group was composed of two speech-language therapists (Brazilians, fluent and knowledgeable of the English Language), who analyzed the two resulting documents and reduced the differences in the translations, adapting the text to the Brazilian culture. Thus, a new inventory called "TELEGRAM" was obtained.

Review of grammatical and idiomatic equivalences (reverse translations)

For the grammatical and idiomatic equivalence review, a copy of the protocol was forwarded to two further translators, at the same linguistic and cultural condition of the first. These - unaware of the original text - made a new version of the instrument to the English language. The same reviewer group made a new assessment of the two resulting versions, comparing them to the original in English.

Cultural adaptation

This study aimed to establish the cultural equivalence between the English and Portuguese versions of the questionnaire. Cultural equivalence is established when comprehension difficulties about the prepared questions or terms are not observed by at least 80% of the population evaluated.

After the translation and cultural adaptation, a sample calculation of 20 individuals was set for instrument validation. Thus, these individuals were invited to respond through the open questions of the instrument. Individuals were seen in routine audiologic evaluations of the Hearing Health Service accredited to the Unified Health System (SUS) with diagnosis

of hearing impairment, according to WHO⁽⁷⁾ and indication for use of HA⁽⁸⁾. The application of the instrument was carried out by a speech-language therapist with specialization in Clinical and Educational Audiology shortly after the completion of the audiological diagnosis, in order to assess the comprehension, applicability of the instrument in the context of life of individuals with hearing impairment and their contribution to the process of selection and indication of assistive resources during the adaptation of the HA.

The age of the participants in this survey ranged from 52 to 86 years (average of 71 years and 6 months). Chart 1 shows the distribution of individuals according to gender, educational level and socioeconomic classification, following Graciano et al. classification⁽⁹⁾.

RESULTS

The grammatical and idiomatic equivalence step involved the replacement of one word, resulting in the final version of the TELEGRAM (Appendix A). The item modified was Alarm-Smoke to Alarm-Siren, making the term compatible

Chart 1. Distribution of individuals according to gender, educational level and socioeconomic classification

Variable	Category	n = 20
Gender	Male	14
	Female	6
Schooling	Complete higher education	2
	Complete secondary school	4
	Incomplete Elementary II	1
	Complete Fundamental I	2
	Incomplete Fundamental I	6
	Literate	2
Class Social	Lower low class	4
	Higher low class	13
	Lower medium class	3

with the Brazilian context. Thus, examples of ambulance siren, police, security, among others, could be accessed.

In order to check the understanding of the instrument, the final version was applied in the format of interview with the 20 selected individuals and described in the methodology. The results showed that 100% of the individuals considered the instrument easy to understand, 100% reported no trouble answering the formulated questions, and 100% did not indicate repetitive questions.

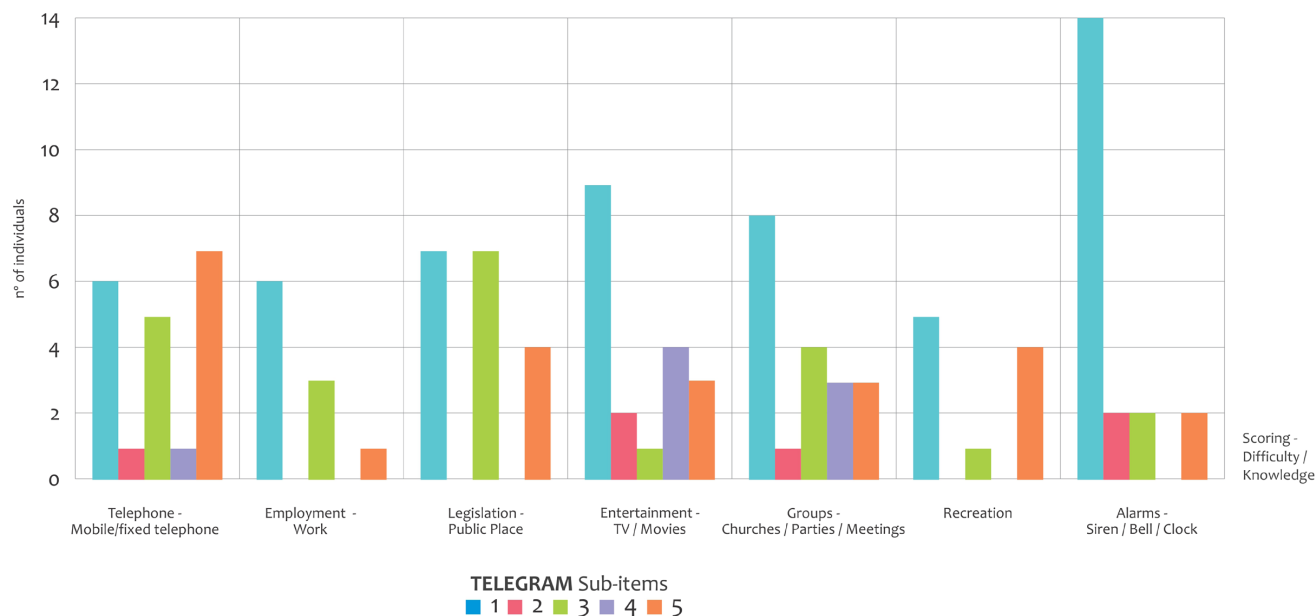
This was a pilot study aiming to adjust the translation reviewed for cultural and linguistic aspects, to enable the application on a larger scale and validation procedures in the next steps.

The responses obtained with the application of the TELEGRAM questionnaire to 20 individuals are arranged in the Graphic 1, where difficulties experienced by them in the different areas analyzed by the instrument can be observed.

Of the 20 individuals evaluated, 60% reported some difficulty using mobile phones and 55%, fixed phones, indicating the importance of the indication, for example, of the telecoil as assistive resource. Sixty percent of individuals pointed some difficulty in public places and 45%, in churches (Graphic 1).

To illustrate the application and use of the TELEGRAM in clinical practice, consider the example shown in Figure 1. Patient aged 59 years, male, recently diagnosed with severe bilateral sensorineural hearing loss. He presented needs in the areas of telephone communication, public places, parties and social gatherings, and hearing the bell and the alarm clock in his home.

Figure 1 shows that the participant scored 5 (very difficult) in the Telephone area, both mobile and fixed phones, and in the Group area, for the sub-items parties and meetings. The same was observed in Law and Groups, and the respective sub-items public place, parties and meetings. There was no score for church (Group), work and school (Work), movies (Entertainment), siren



Graphic 1. Results of the application of TELEGRAM (n° 20 individuals)

Nome: **J.C.S.** Data de Nascimento: _____ Preenchido por: _____

		T	E	L	E	G	R	A	M	
		Telefone	Emprego	Legislação	Entretenimento	Grupos	Recreação	Alarmes	Membros da Casa	
CLASSIFICAÇÃO	1 Nenhuma Dificuldade								2	Moro com Adulto com audição normal
	2									Moro com crianças pequenas
	3 Alguma Dificuldade				T			C R		Moro com adolescentes
	4									Moro com adultos com deficiência auditiva
	5 Grande Dificuldade	C F		P		F E				Moro Sozinho
		C- Celular F- Linha Fixa	T- Trabalho E- Escola	P- Lugar Público	T- TV F- Filmes	I- Igreja F- Festas E- Encontros	_____ _____ _____	S- Sirene C- Campainha R- Relógio	Confira tudo o que se aplica	

Metas Principais : _____

Recomendações _____

T _____ E _____ L _____ E _____ G _____ R _____ A _____ M _____

Figure 1. Illustrative data from the responses obtained with the application of the TELEGRAM in a clinic case. The letters and numbers filled within the scale refer to the answers provided by the evaluated individual for each situation. For example, the TELEPHONE situation, the individual indicated major difficulty at the mobile phone (M) and fixed telephone (F)

(Alarms) and Recreation area because the participant had not experienced such situations.

In the Entertainment and Alarms areas, the participant rated as 3 (some difficulty) the sub-items television, bell and clock.

When asked about household members, the participant reported that two people live in the house, and that the other adult has normal hearing. This is an important data on family orientation in relation to communication strategies.

For this individual, the professional could suggest a test with the Personal Frequency Modulation (FM) System with a receptor to-the-ear integrated to the HA, the use of the telecoil or acoustic phone to assist in the use of telephone and the HA with directional microphone to improve speech understanding amid the noise. Relate the audiogram with the TELEGRAM allows the speech-language therapist and audiologist explain hearing loss along with the individual's communication needs, which can be improved with the use of assistive technologies and guidelines regarding communication strategies.

DISCUSSION

The cross-cultural adaptation of the TELEGRAM instrument was performed with satisfactory results. As for grammatical and idiomatic equivalence, after the first evaluation of translators, the

suggestion to change the Alarm-Smoke expression to Alarm-Siren was considered. This change was part of the adaptation process, aiming at adequacy to the Brazilian culture and experience.

Graphic 1 shows the scores of TELEGRAM items of the evaluated individuals clearly demonstrating the impact of hearing impairment in everyday communication situations.

Hearing disability causes various problems such as communication difficulties, social isolation, depression and negative feelings, which can seriously affect the quality of life^(10,11). Because of hearing loss, individuals experience disadvantages in interpersonal relationships, as well as difficulties to keep informed by the media and or use such means as leisure⁽¹²⁾.

The items evaluated in the TELEGRAM showed that, among the 20 evaluated individuals, the main complaints involve factors such as the distance between listener-speaker, noise and reverberation, factors that may interfere with communication. As mentioned above, the use of the HA can reduce the difficulties of communication, but in some circumstances the HA do not compensate completely the hearing loss. In such cases, other devices, techniques and/or strategies should be considered, as for example, directional microphones, telecoils and FM system⁽¹³⁾, among the various devices available to facilitate communication of the hearing impaired people.

The care provided by health professionals to disabled people requires a more comprehensive approach. They must seek to widen out their attention by adopting auxiliary devices in order to improve the individuals' quality of life. Studies confirm the importance of continuing training to health professionals in this area⁽¹⁴⁾.

The process of selection and indication of the different HAs or AT, the evaluation must include three components: (1) evaluation of the device itself, (2) evaluation of the user in order to determine what is the most appropriate device, and (3) the measurement of benefit that the device brings to the user⁽¹⁾. In the present research, the TELEGRAM proved to be an appropriate instrument to assess global communication needs of the hearing impaired people, corroborating other studies that have used this instrument^(1,3).

Research studies have indicated the lack of instruments to investigate the evaluation process for indication and implementation of AT⁽¹⁵⁾. The authors tend to describe the theoretical constructs, observing a gap in the evaluation of the efficacy, implementation procedures and evidence. Thus, this study proposes, by means of the TELEGRAM instrument, a way of assessing and helping the indication of the use of AT.

Another study showed the implications of the use of AT, both in terms of research and practical application, particularly in healthcare⁽¹⁶⁾. This study found only one article related to the use of AT in the Speech-language therapy field. The authors suggest the need to perform further research to help strengthening the concept and details of the AT.

CONCLUSION

The TELEGRAM instrument was translated and adapted to Brazilian Portuguese language. The TELEGRAM instrument is intended for the use of hearing care professionals to obtain information on the hearing performance of hearing impaired individuals in various communication situations. This study aims to contribute to the TELEGRAM protocol during indication and selection of AT, development of communication strategies, orientation to individuals on possible technologies to aid their hearing performance, with consequent improvement in communication in public places.

Future research is needed for application of the scale in larger samples, aiming at validation and statistical analysis of the answers.

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Author contributions

RTSJ participated in the elaboration of the project, data analysis; writing of the article and guidelines at all stages of the work; ALMM, NBF, MF, MFCGM participated in the review/writing of the project and the article; ADC, TKMA, LGS and TCSA participated in the design of the project, data collection, data analysis and writing of the article.

Appendix A. TELEGRAM: Translated and adapted to the Brazilian Portuguese language

Nome: _____ Data de Nascimento: _____ Preenchido por: _____

		T	E	L	E	G	R	A	M		
		Telefone	Emprego	Legislação	Entretenimento	Grupos	Recreação	Alarmes	Membros da Casa		
CLASSIFICAÇÃO	1 Nenhuma Dificuldade										Moro com Adulto com audição normal
	2										Moro com crianças pequenas
	3 Alguma Dificuldade										Moro com adolescentes
	4										Moro com adultos com deficiência auditiva
	5 Grande Dificuldade										Moro Sozinho
		C- Celular F- Linha Fixa	T- Trabalho E- Escola	P- Lugar Público	T- TV F- Filmes	I- Igreja F- Festas E- Encontros	_____	S- Sirene C- Campanha R- Relógio	Confira tudo o que se aplica		

Metas Principais : _____

Recomendações _____

T _____ E _____ L _____ E _____ G _____ R _____ A _____ M _____

TELEGRAM - Escala de Avaliação

Orientações: O instrumento deve ser aplicado por meio de perguntas abertas sobre a vida da pessoa em cada área avaliada e seus respectivos subitens como descrito no quadro abaixo. O avaliador poderá realizar suas anotações sobre o que foi observado das necessidades de comunicação do indivíduo como complementação no item "Recomendações".

Tópico	Pergunta	Classificação
T	Você está tendo dificuldade com a comunicação por telefone ?	Dificuldade 1 = Nunca, 2 = Ocasionalmente, 3 = Muitas vezes, 4 = Sempre, 5 = Não é possível usar o telefone Use " F " para designar Linha fixa e " C " para designar Celular.
E	Você está tendo alguma dificuldade com a comunicação no seu emprego ou ambiente educacional ?	Dificuldade 1 = Nunca, 2 = Ocasionalmente, 3 = Muitas vezes, 4 = Sempre, 5 = atualmente não trabalha fora
L	Você conhece sobre a Legislação que prevê assistência para você ouvir em locais públicos ou em hotéis (quando você viaja)?	Conhecimento 1 = Sim, muito, 2 = Sim, mais ou menos, 3 = Sim, pouco, 4 = Sim, muito pouco, 5 = Nenhum
E	Você está tendo dificuldade com a audição durante as atividades de Entretenimento que pratica, como por exemplo, assistir televisão, filmes ou concertos?	Dificuldade 1 = Nunca, 2 = Ocasionalmente, 3 = Muitas vezes, 4 = Sempre, 5 = Não pratico
G	Você está tendo dificuldade com a comunicação em Grupo ?	Dificuldade 1 = Nunca, 2 = Ocasionalmente, 3 = Muitas vezes, 4 = Sempre, 5 = Não consigo ouvir a todos em grupos
R	Você está tendo dificuldade em escutar durante as atividades Recreativas , tais como esportes, e/ou outras atividades?	Dificuldade 1 = Nunca, 2 = Ocasionalmente, 3 = Muitas vezes, 4 = Sempre, 5 = Não pratico
A	Você está tendo dificuldade em ouvir Alarmes ou sinais de Alerta , como o alarme de sirene, despertador, ou a campanha?	Dificuldade 1 = Nunca, 2 = Ocasionalmente, 3 = Muitas vezes, 4 = Sempre, 5 = Não consigo ouvir os alarmes Use " S " Sirene, " C " para a Campanha, e " R " para Relógio
M	Você se comunica com Membros de sua família? Quem e quantos são?	Selecione a condição e insira o nº de indivíduos que moram na casa