

Evaluation of the Readability of Online Turkish-Language Patient Education Materials on Congenital Hearing Loss

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ABSTRACT

Objective: The aim of this study was to assess the readability of online patient education resources on congenital hearing loss written in Turkish.

Materials and Methods: We used Google Search to identify Patient Education Materials (PEM) for “congenital hearing loss”. A total of 50 websites were included initially, but after applying the inclusion and exclusion criteria, a total of 20 websites were analyzed. We divided these into two categories: Health Professionals and General Websites. The readability of the materials was calculated using the Ateşman readability formula.

Results: The mean Ateşman readability score was 61.78±13.03. Health professional websites had a mean score of 68.69±9.8, while general websites had a mean score of 53.33±11.74. Health professionals websites were found to be easier to read than the General websites (P=0.009). There were 6 easy-level articles, all of which were from health professional websites. Four articles were of a hard level and all were general websites. The remaining 10 articles were of intermediate level.

Conclusion: Although many online resources are available to provide information about congenital hearing loss, the readability level of these sources is above the easy-to-read level. To better serve parents and affected individuals, these resources should be revised to enhance their readability. Health professionals, in particular, have an opportunity to contribute more comprehensible materials.

Keywords: Congenital hearing loss, patient education materials, readability score, ateşman readability formula

INTRODUCTION

Hearing loss is an impairment of auditory function that can have lasting effects on social and linguistic development. It can develop before or after language development (1). Social development can be significantly impacted by congenital hearing loss. To avoid the condition’s long-term effects, it must be promptly diagnosed and treated.

The United States initially implemented the Newborn National Screening program to facilitate the prompt identification and intervention of congenital hearing loss in patients (2,3). Otoacoustic emission, ABR, was used for scanning. Later in 1998, the Neonatal Hearing Screening (NHS) program was recommended by the European Consensus Statement (4).

Over the subsequent years, the program expanded its reach globally. The program was started on a hospital-based basis in Turkey, first at Marmara University (Istanbul 1996) and then at Hacettepe University (Ankara 1998). The NHS program, which started as a pilot in 2011, was transformed into a national NHS program and started to be carried out in a total of 584 centers and spread all over the country (5).

The Internet has recently been seen as an important source for accessing health-related information. According to the most recent data in Turkey, internet use over the age of 16 has reached 85% (6). Parents whose children have been diagnosed with hearing loss are very likely to turn to online resources to gather information regarding the health status of their child. Initiation of treatment in children with congenital hearing loss

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as soon as possible will positively affect the child's cognitive and language development. Considering that it is a treatable disease, the importance of patient education materials about congenital hearing loss emerges.

Given the high prevalence of Internet usage among people nowadays, the Internet can be a good tool to raise awareness about congenital hearing loss and to reach a large segment of society. Online patient information resources can serve as valuable tools to aid patients in the informed consent process by providing an explanation of the indicators, benefits, and potential risks of medical practice. Due to the fact that the value of the information is contingent on the patients' ability to understand it, the legibility of this information on the Internet is crucial. Based on the guidelines provided by the American Medical Association (AMA) and the National Institutes of Health (NIH), it is recommended that patient education materials available on the internet should be composed in a manner that is accessible to individuals at or below a sixth-grade reading level (7). If the legibility of online content on a website exceeds this value, it can be considered as difficult to read and understand for an average reader. For this reason, it is important that health-related information on internet sites is suitable for the reader and carefully evaluated before use.

Readability means objectively measuring how easy or difficult a text is for the reader, based on mathematical formulas. The specific grammatical structure of each language is taken into account in the creation of these formulas. The Ateşman readability formula was constructed using data about Turkish syllables and words, and this formula aims to determine the ease of reading of Turkish texts (8). The texts are divided into five distinct levels according to the Ateşman formula: very easy, easy, medium, difficult and very difficult (Table 1). Generally, it is advisable to ensure that the texts are written in a manner that are easy or very easy to read. Texts at this level offer greater accessibility and intelligibility to the reader.

The objective of this research is to examine the comprehensibility of online patient educational resources that are written in the Turkish language about congenital hearing loss.

Table 1: Ateşman Readability Formula

Scores	Levels
90-100	very easy
70-89	easy
50-69	medium difficulty
30-49	difficult
1-29	very difficult

Table 2: Analysis of all data (without group discrimination)

	N	Minimum	Maximum	Mean	Std. Deviation	Mean±S.D (Min-Max)
Ateşman Score	20	38.00	82.60	61,7750	13,03485	61.78±13.03 (38-82.6)

MATERIAL AND METHODS

Patient Education Materials (PEM) for "congenital hearing loss" were identified through use of Google Search. When searching, the term 'congenital hearing loss' was used. In the advanced search, the selection is limited to only "full sentence" and "Turkish language". The initial 50 websites that are included in our study as a consequence of the search query. Websites that were excluded are the ones solely consist of graphics or tables, scholarly journals, videos, and websites that undergo iterative updates. Since our investigation utilized public records, it is not necessary to form an ethical commission.

The articles were divided into two categories; (1) Health Professionals and (2) General websites. Health Professionals were defined as websites belonging to institutionally operating private, public, and foundation hospitals as well as physician-owned websites. On the contrary, the term "general websites" encompassed online platforms such as newspapers and websites that provide general health information, excluding the first two categories.

Each meaningful congenital hearing loss-related text was transferred into a distinct Microsoft Word (version 2010; Microsoft, Redmond, WA) document. In order to prevent any impact on readability scores, extraneous non-academic content has been excluded from the text. This includes elements such as web page navigations, copyright notices, disclaimers, author information, feedback surveys, links, website URLs, references, figures, tables, appendices, addresses, and phone numbers.

Statistical Analyses

Using the Ateşman readability formula $(198,825-40,175 \times (\text{total syllables}/\text{total words}) - 2,610 \times (\text{total words}/\text{total sentences}))$, the determination of the readability levels of the texts was conducted. The mean, standard deviation, median, minimum, maximum value, frequency, and percentage were utilized for summarize and describe the data. The examination of variable distribution was conducted utilizing the Kolmogorov-Smirnov test. Using Kruskal-Wallis to conduct a comparative analysis of quantitative data. For statistical analysis, SPSS 28.0 was utilized.

RESULTS

After the application of inclusion and exclusion criteria, a total of 20 websites were subjected to review. Health professionals met the inclusion criteria for 11 PEM articles on their website. A comprehensive compilation of 14 articles pertaining to PEM was incorporated from various general websites.

The mean Ateşman readability score of the articles was 61.78 ± 13.03 . The minimum score observed was 38, while the maximum score recorded was determined to be 82.60 (Table 2).

While the mean score of health professionals websites was 68.69 ± 9.8 , the minimum score was 54.1 and the maximum score was 82.6. General websites mean score was 53.33 ± 11.74 , the lowest score was 38, and the highest score was 72.4 (Table 3). Health professionals websites were found to be easier to read than the General websites ($P=0.009$) (Table 4).

Although there was not a very easy level article, there were 6 easy level articles. Five of the six easy-level articles were health professional websites. There were no very difficult articles. There were four articles on the hard level. The hard level articles were all general websites. The remaining 10 articles were of intermediate level.

Table 3: The analysis obtained when both groups were examined separately

		N	Minimum	Maximum	Mean	Std. Deviation	Mean \pm S.D (Min-Max)
Health Professionals Websites	Ateşman score	11	54.10	82.60	68,6818	9,79641	68.69 \pm 9.80 (54.10-82.60)
General websites	Ateşman score	9	38.00	72.40	53,3333	11,73904	53.33 \pm 11.74 (38-72.4)

Table 4: Comparison of two groups with Mann Whitney U test

	Ateşman score
Mann-Whitney U	15.000
Wilcoxon W	60.000
Z	-2.621
Asymp. Sig. (2-tailed)	.009

DISCUSSION

This research aimed to measure the readability levels of online resources on congenital hearing loss in Turkish. Resources were evaluated in two main categories: Health professionals and General websites. The readability level of the majority of these sources was found to be above the easy-to-read level.

The era of digitalization in the field of health has begun and not only has the internet emerged as a resource for patients, but also for doctors and other medical professionals. There has been a notable rise in the participation of doctors and healthcare professionals in generating and disseminating health-related content on the internet. Consequently, patients are able to conveniently access these resources through the utilization of search engines. Approximately 50% of parents with children experiencing ear-nose-throat issues resort to online platforms to seek medical information for their children (9).

According to research, the estimated incidence rate of sensorineural hearing loss in children ranges from one to three cases per one thousand individuals (10). If sensorineural hearing loss (SNHL) with a severity of ≥ 90 dB HL is left untreated, the aforementioned phenomenon is expected to exert an adverse influence on the timely progression of speech and language abilities. The early identification and treatment of a condition are crucial, and the provision of accurate information to families is highly significant (11). Online patient

education materials can be helpful for parents to be informed correctly. It is important that the content of the educational materials is at a level that can be understood by the parents, no matter how accurate the information is.

Upon examination of the prevailing conditions in Turkey, it is evident that a significant proportion of the nation's populace, specifically 97%, possesses the ability to read and write (12). Furthermore, the utilization of the internet among individuals aged 16 and above surpasses the threshold of 85% (6). The National Newborn Screening Program was initiated in Turkey during the 2000s, mirroring the global trend. On average, the prevalence of hearing loss among children in Turkey is 2.2 per

1000 births (13). Given the annual occurrence of more than one million live births, the significance of this matter is further underscored (14).

During the course of the study that was carried out on instructional materials written in Turkish, a variety of topics were investigated. In the study, in which 54 educational materials on Substance Addiction were examined, The study revealed that the materials predominantly exhibited a high level of readability difficulty (15). In the study, in which 87 online training materials related to anaesthesiology were examined, the observation indicated that the materials consistently demonstrated a high level of difficulty in terms of readability (16). In the study in which 100 patient education materials on low back pain were examined, the materials were generally found at a moderate readability level (17). In another study examining skin cancers and online patient education materials, the materials were generally at a moderate readability level (18). Online educational materials on colorectal cancer also appear to be of medium readability (19). Duymaz et al. also reviewed online patient education materials about laryngeal cancer. The researchers reached the conclusion that the materials exhibited predominantly moderate levels of readability (20). On the other hand, in the study conducted on the online education materials related to vertigo, the materials were generally found at the level of easy readability (21). Although different results have been obtained according to the subject studied in the literature, in general, the materials are at medium and more difficult readability levels. In the present study, akin to the existing body of literature, the materials were determined to possess a moderate level of readability.

Congenital hearing loss is an important issue that should not be underestimated. Considering that parents will review the online materials with their children's conditions, the importance of the readability level of online materials with

congenital hearing loss emerges. Duymaz et al. reviewed online materials in English for hereditary hearing loss. A total of 29 articles were subjected to review and subsequently categorized into three distinct groups: professional organizations, clinical practices, and general information sources. The readability level of a text was assessed using various tools, including the Flesch Reading Ease, Flesch-Kincaid grade level, Gunning-Fog Index, Simple Measure of Gobbledygook, Coleman-Liau Index, and Automated Readability Index. They reported that the majority of the articles were fairly difficult and above difficulty level. They also reported that there was no difference in the degree of difficulty between the three categories (22). Similarly, in our study, we examined online patient education materials with congenital hearing loss in Turkish. In our study, we used the Ateşman readability formula, which is suitable for the Turkish language. We divided the websites into Health Professional and General websites. In our study, too, there was no easy-to-read material. It was mostly found at a moderate readability level. In our study, the materials prepared by the health professionals were more easily readable than the materials on the general websites. Although this is a positive thing, the Turkish language materials still often seem far from easy and very easy to read. We think that health professionals have more duties to prepare more understandable materials.

Studies on the National Screening Program in Turkey show that the age at which patients are diagnosed is getting younger . However, it is seen that the age at which patients start treatment is not yet at the desired level (23,24). It has been argued that qualified personnel who can work with parents should be trained in order to decrease the starting age for treatment (25,26). It is an undeniable fact that training qualified personnel is important. However, online materials that will be prepared at the recommended levels of readability to inform parents will also serve this purpose. In terms of parents, there will be materials that they can access whenever and as often as they want, and it will be more effective.

The present study is subject to certain limitations. Firstly, it should be noted that relying solely on the Google search engine may not provide a comprehensive representation of all users' experiences. This study does not encompass search engines other than Google. Second, the top 50 websites that meet our inclusion criteria, regardless of quality, are included. Furthermore, it is important to note that the readability score does not assess the scientific validity or accuracy of websites. In the calculation of readability scores, it is important to note that only written materials are taken into consideration. In contrast, the utilization of an online resource containing visual elements such as graphics or videos may significantly enhance comprehensibility.

CONCLUSION

The management of congenital hearing loss is contingent upon early identification and intervention. Hence, it is of utmost significance to furnish parent education materials that are both comprehensible and accessible. In light of our analysis, it

is evident that the current web-based sources would benefit from enhancing their readability in order to effectively fulfill their intended purpose.

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