ORIGINAL ARTICLE

Assessment of the readability of online texts related to specific learning disorder

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Abstract

The aim of this study was to investigate the readability and content of texts on specific learning disorder published on Turkish websites. In the study, the first three hundred websites which were accessed by writing three main word groups (dyslexia, learning disability, specific learning disorder) to the search engine in July 2019 were evaluated. Of these, chat and forum sites, commercial sales sites, the sites that contained advertising, video and pictures only and less than 10 sentences of information, and news sites that do not contain information about the disorder were excluded. One hundred and two websites remained after the exclusion criteria were applied. Websites are classified according to their makers. The readability values of the texts were calculated using the Ateşman and Bezirci-Yılmaz formulas. The contents of the text were compared according to the subject headings. There was no significant difference between the groups in terms of readability values. The readability values of the groups were found to be at the level of undergraduate education. As a result, in our study, it was observed that the readability of websites prepared for specific learning disorder was low. It was thought that this result may adversely affect the awareness about the disorder and may reduce the possibility of early diagnosis and treatment in children.

Keywords: Readability, specific learning disorder, dyslexia

Introduction

Specific Learning Disorder (SLD) is a neurodevelopmental disorder characterized by symptoms such as the inability of the individual to use his/her academic skills in the fields of reading, writing or mathematics, as well as performing less than expected learning performance from his/her cognitive level [1]. In the past, in order to describe the disorder, terms such as word blindness, dyslexia, minimal brain damage, specific developmental disorders and learning disorders have been used at different times. Studies have reported that the prevalence of SLD is between 5% and 12% in childhood [2-5]. Disorders such as attention deficit hyperactivity disorder, mood disorders, anxiety disorders, behavioral problems, motor coordination disorders and language and speech disorders are frequently associated with SLD [5,6].

Today, with the development of technological facilities, 72.9% of the population in Turkey have access to the Internet and a majority of 66.3% also use the Internet to research information on health [7,8].

However, some of the texts on the Internet are not user-friendly. In addition, the value of the information obtained makes sense with the extent to which the individual can comprehend it [9]. This shows us the importance of how readable and understandable the information is, as well as its' actuality and reliability.

The measure of readability provides numerical data about whether the text is comprehensible to the user or not, by using syllable, word and sentence features in the language. The readability of a text is influenced by quantitative values such as average word length, word frequency, number of multi-syllable words, average sentence length and number of words with more than one meaning [10]. The readability of each language can be calculated using a number of mathematical formulas developed for its unique structure. Two types of readability formulas developed by Ateşman and Bezirci-Yılmaz are used for Turkish [10-12].

If parents of children having the disorder have the opportunity to find on the Internet the adequate and accurate information about the disorder appropriate to their education levels, they may be able to better manage their concerns about the disorder and its treatment. In this way, they can better understand their children and organize their lives according to their needs. In our literature review, no study on the readability level of the texts on the websites

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on specific learning disorder was found. In this study, we aimed to investigate the readability and content of the texts on specific learning disorder published on Turkish websites.

Materials and Methods

This is a descriptive study by design. Permission was obtained from the the Education Planning Board of University of Health Sciences Konya Training and Research Hospital with the decision registration number: 13.06.2019/26-11. Google (http://www.google.com.tr), which is among the most commonly used internet search engines in Turkey was used for data collection. In July 2019, the keywords dyslexia, learning disability, specific learning disorder were searched for our study. A total of 300 websites that were returned on the first 10 pages were reviewed. Of these, chat and forum sites, commercial sales sites, the sites that contained advertising, video and pictures only and less than 10 sentences of information, and news sites that do not contain information about the disorder were excluded. The articles in the sites that were included in the research were transferred to Microsoft Word 2016 program. The headings, author information, site URLs and links in the content of the articles were removed in order not to affect the readability results. Finally, these texts were transferred to the software program and readability values and other numerical values were obtained according to Ateşman and Bezirci-Yılmaz formulas. The 102 sites that remained after the exclusion criteria were divided into three main groups. The websites of hospitals, associations and health professionals were classified as group 1, the sites of special education and rehabilitation centers and consultancy centers as group 2, and national news sites as group 3.

Ateşman Readability Formula: The formula was developed by Ateşman in 1997 by adapting the Flesch Reading Ease Formula [13] into Turkish and based on the lengths of words and sentences. According to this formula, the readability level of a text is described as very easy between 100-90, as easy between 89-70, moderately difficult between 69-50, difficult between 49-30, very difficult between 29-1 [11].

Ateşman readability formula: Readability Score = 198,825 - 40,175 x (total syllables/total words) - 2,610 x (total words/total sentences).

Bezirci-Yilmaz Readability Formula: In 2010, Bezirci and Yılmaz developed a new readability formula based on the statistical characteristics of the Turkish language, using sentence lengths and word syllable numbers in the texts. According to this formula, as the number of syllables in words and sentence lengths in texts increase, the legibility of the text becomes more difficult. The final score calculated corresponds to the grade levels of the education system in Turkey. Grades 1-8 represent primary education, grades 9-12 represent the high school, grades 12-16 represent undergraduate, grades 16 and later represent academic level [12].

$$NRV=\sqrt{(MWN\times((S3\times0.84)+(S4\times1.5)+(S5\times3.5)+(S6\times26.25)))}$$

NRV: New readability value
MWN: Mean number of words in a sentence
S3: Mean number of three-syllable words in a sentence
S4: Mean number of four-syllable words in a sentence
S5: Mean number of five-syllable words in a sentence
S6: Mean number of six-syllable words in a sentence

Statistical Analysis

All statistical analyses were performed using SPSS 21 program. Descriptive statistics of the categorical data in the study were expressed using frequency and percentage values while for numerical data, mean and standard deviation were used. Normal distribution of the data was checked using the Shapiro–Wilk test. Kruskal-Wallis test was used for numerical data comparisons between independent groups and Chi-Square test was used for categorical data comparisons. All statistical analyses performed in the study were two-tailed and had 5% significance limit and 95% confidence interval

Results

The first group consisted of 35 sites (34.3%) sites, the second group 47 sites (46.1%) and the third group 20 sites (19.6%). The mean number of words in the analyzed texts was 13.64 ± 0.41, the mean number of four-syllable words and above was 4.20 ± 0.13, the mean number of syllable numbers of words was 2.91 ± 0.1, the readability value as calculated by Bezirci-Yılmaz formula was 13.82 ± 0.41, and the readability value as calculated by Ateşman formula was found as 46.01 ± 1.16. The word numbers ($p = 0.702$), the numbers of four-syllable words and above ($p = 0.602$), the average number of syllable numbers of the words ($p = 0,200$), and the readability values calculated with Bezirci-Yılmaz ($p = 0.438$) and Ateşman ($p = 0.392$) formulas were found to be similar among the study groups (Table 1).

Table 1. Readability scores of the study groups

	All Sites n=102 Mean±Std.Err. (Min-Max)	Group 1 n=35(%34.3) Mean±Std.Err.	Group 2 n=47(%46.1) Mean±Std.Err.	Group 3 n=20(% 19.6) Mean±Std.Err.	p
Average number of words	13.64±0.41 (5.67-30.33)	13.94±0.64	13.52±0.68	13.40±0.82	0.702
Average number of words with four and more syllables	4.20±0.13 (1.34-9.53)	4.30±0.20	4.21±.22	4.00±0.25	0.602
Average number of syllables	2.91±0.1 (2.54-3.21)	2.92±.01	2.91±0.01	2.89±0.02	0.200
Bezirci-Yılmaz readability score	13.82±0.41 (4.78-28.04)	14.30±0.64	13.70±0.68	13.27±0.81	0.438
Ateşman readability score	46.01±1.16 (2.22-82.02)	44.72±1.69	46.39±1.94	47.39±2.40	0.392

According to Ateşman's readability scores of the websites, nine texts were found to be "very difficult", fifty-three texts were "difficult", thirty-nine texts were "of medium difficulty", and one text was "easy". No text was in the "very easy" range. There was no significant difference between the study groups in terms of readability intervals (p = 0.388) according to Ateşman scores (Table 2).

Table 2. Readability ranges according Ateşman

	Group 1 n=35	Group 2 n=47	Group 3 n=20	p
Difficult and above (n=62)	24	28	10	0.388
Moderate and below (n=40)	11	19	10	

When the contents of the websites were examined, ninety-nine sites (97.1%) were found to contain information about the definition and symptoms of SLD, fifty-one sites (50%) about the causes of SLD, fifty-eight sites (56.9%) about the conditions that may co-exist, forty sites (39.2%) about diagnosis process of the disorder, seventy-four sites (72.5%) about treatment and special education, and thirty-seven sites (36.3%) had information about pharmacological treatment.

The correlation between the scores of the groups according to Ateşman and Bezirci-Yılmaz readability formulas was examined. There was a negative correlation between the two categories (pearson correlation score = -0.957). The concordance between the two scoring systems was examined and the kappa value was found to be -0.374.

Discussion

As for many disorders in our country, the awareness level is low for specific learning disorder. Detecting and referring children with this disorder often starts with suspicion of the situation by class teachers and parents. In two separate studies conducted in our country in 2003 and 2009, different prevalence rates have been reported [14,15]. In addition, due to the high number of patients per physician in many medical institutions as well as long waiting times for patients to make appointments and medical visits, families often conduct research on the Internet. For this reason, the parents' attempts to recognize the disorder and get acquainted with the treatment options before seeing a professional is of significant importance [16].

The concept of readability has long been used for many years and gives information about whether a written text in the language it belongs to is suitable for the reader level [17]. There is, in general, a direct association between the education level and reading comprehension. In addition, knowing which level of education a text is written for can give us a chance to predict the legibility of the text. In our study, the readability level of the websites providing information about the SLD was found to be at the undergraduate level. This is similar to other studies conducted both in our country and throughout the world [9,16,18-20]. However, given the low level of education in our country, this finding may indicate a negative situation for readers [21]. In the studies conducted for the Turkish language, Ateşman found the average sentence length

as 9-10, Bezirci-Yılmaz as 10-11 words and the average number of syllables as 2.6 [11,12]. In our study, the average number of words was 13.64 ± 0.41, the average number of syllables was 2.91 ± 0.1, the average number of words with four syllables and above was 4.20 ± 0.13. This result is above the average of our country and corresponds to a low level of readability. The low readability of the texts related to the SLD on the Internet may cause families not to have enough information about the disorder, which may, as a consequence, decrease the possibility of early diagnosis and treatment of the patients.

Besides its readability, it is also important how comprehensive the information a text contains. Almost all of the websites in our study included the definition and symptoms of the disorder. But only fifty-eight sites had information about possible co-morbidities. It is known that SLD is frequently associated with other psychiatric disorders [22-24]. Pharmacological agents are used for the treatment most of these comorbidities. Among the texts assessed in our study, only thirty-seven sites were mentioning these treatment methods. Therefore, a delay in diagnosis and treatment may be interpreted as a risk factor for the emergence of other psychiatric disorders. A study in the United States found that about half of children referred to special education programs were diagnosed with specific learning disorder [25]. If the websites are more comprehensive and readable, the chance of early diagnosis and treatment of children at risk of SLD may increase.

According to a study conducted in 2014, health literacy in our country was found to be low [26]. Since the average levels of education and health literacy in our country are low, it is very important to reorganize the contents of the informative texts about disorders.

Our study is a valuable study in the field of child psychiatry in that it is the first to investigate the concept of readability in our country. Further studies will contribute to the awareness of the concept of readability in the field of child psychiatry. On the other hand, difficulties were faced in classifying the groups in our study due to the lack of a standardization in internet domain extensions in our country. The use of a search engine to find the websites, which returns the results based on the number of page visits might have caused some pages with valuable information on the subject being missed.

Conclusion

As a result, considering the factors that affect the legibility, the formation of the language in a plain and simple manner with shorter sentences to include people with low educational levels may raise awareness about specific learning disorder. In addition, besides language selection, the website owners can add academic level options to their websites. In this way, people can choose the option that suits their level of education so that they can better understand what they are reading. As a result, they will become more aware of their children and the difficulties that they are facing, and will have the chance to better organize their lives.

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