Acta Medica Ruha E-ISSN:2980-1184

International Journal of Medicine and Health Sciences

Original Research Article Volume: 1 Issue: 4 Year: 2023 DOI: 10.5281/zenodo.10057989

Evaluation Of The Readability Level Of Proton Pump Inhibitors Prospectuses

Proton Pompa İnhibitörleri Prospektüslerinin Okunabilirlik Düzeyinin Değerlendirilmesi

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Abstract

Introduction: The level at which texts are understandable by living people is the main indicator of the level of readability. This readability is measured based on some calculations.
Objective: Our current study aims to determine the readability level of the prospectuses of proton pump inhibitor drugs used in the market for the treatment of gastric diseases.
Method: Eighty-nine drug prospectuses were evaluated using the Ateşman and Bezirci–Yılmaz formulas used for Turkish texts.
Results: Based on Ateşman and Bezirci-Yılmaz readability formulae, it was determined that 11-12 years and undergraduate level education were required to be able to read the texts, respectively.
Conclusion: The mean scores of the prospectus texts were found to require at least high school and undergraduate education. According to the 2022 data of the Turkish Statistical Institute (TUIK), the required level of education is at a level that less than 50% of the population will perceive. Writing prospectuses taking into consideration the education level of the countries will facilitate the use of patients after prescribing and may help reduce re-admissions to the doctor due to difficulty in use.

Keywords: Prospectus, Proton pump inhibitor, Readability, Stomach diseases.

Özet

Giriş: Metinlerin yaşayan insanlar tarafından hangi düzeyde anlaşılabilir olduğu okunabilirlik düzeyinin temel belirtecidir. Bu okunabilirlik bazı hesaplamalara dayanarak ölçülür.
Amaç: Çalışmamız piyasada mide hastalıklarının tedavisinde kullanılan proton pompa inhibitörü ilaçların prospektüslerinin okunabilirlik düzeyini tespit etmeği amaçlamaktadır.
Yöntem: Seksen dokuz ilaç prospektüsü, Türkçe metinler için kullanılan Ateşman ve Bezirci–Yılmaz formülleri kullanılarak değerlendirildi.
Bulgular: Prospektüsler Ateşman ve Bezirci-Yılmaz okunabilirlik formülleri baz alındığında metinlerin okunabilmesi için sırasıyla 11-12 yıl ve lisans düzeyinde eğitim gerektiği tespit edildi.
Sonuç: Prospektüs metinlerinin puan ortalamalarının en az lise ve lisans seviyesinde eğitime ihtiyaç duyduğu saptandı. Gerekli eğitim düzeyi, Türkiye İstatistik Kurumu (TUİK)'nun 2022 verilerine göre nüfusun %50 den daha azının algılayacağı düzeydedir. Prospektüslerin ülkelerin eğitim düzeyi dikkate alınarak yazılması, reçeteleme sonrasında hastaların kullanımını kolaylaştıracak ve doktora kullanımda zorluk sebebiyle tekrar başvuruların azalmasına yardımcı olabilecektir.

Anahtar Kelimeler: Mide hastalıkları, Okunabilirlik, Prospektüs, Proton pompa inhibitörü.

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Received: 22.09.2023, Accepted: 21.11.2023, Published Online: 20.12.2023
Cite: Gül MC. Evaluation Of The Readability Level Of Proton Pump Inhibitors Prospectuses. Acta Medica Ruha. 2023;1(4):541-547. https://doi.org/10.5281/zenodo.10057989

BACKGROUND

How understandable the current written sources are for the reader is closely related to the word, number of syllables and the education level of the reader, within the framework of the language rules in which the relevant text is written (1). The readability level of the text used can be measured with some mathematical formulas. There are various studies in the literature to demonstrate the readability of the texts used in the scientific world (2). Proton pump inhibitors are often prescribed by doctors of many branches, mainly doctors dealing with diseases of the gastrointestinal tract. Patients who want to review the use of this group of drugs and the side effects that may occur after they are prescribed can read the prospectuses of the drugs at home. While reading the prospectus, patients may discontinue the use of the drug or start using it at different doses due to misunderstanding due to inadequate perception level. In this study, it was aimed to determine the readability of the prospectuses of proton pump inhibitors, which are frequently prescribed today, and to investigate the age group of the society.

METHOD

During the definition of readability, parameters such as the words that make up the sentences and the total number of syllables are very important. There are nearly 40 formulas in the world that have been created and accepted using these parameters (3). There are 2 types of readability formulas developed by the Ateşman and Bezirci–Yılmaz team for texts written in Turkish language (4,6). Our study was designed based on these formulae.

Ateşman readability formula: It is calculated as described below and a result between 0-100 is obtained. The higher the score, the easier the readability (4). Ateşman Readability Index and word frequencies are calculated automatically through the readability index website designed by using Ateşman's formulas and the class levels according to the school class levels created through the calculation are given in (Table 1)(5,6). The score obtained also indicates the level of readability required by the current text. According to Ateşman's formula, the readability level was classified in the findings section, while the first 8 grades were classified as primary school, 9-12 grades as high school, and the rest as associate, undergraduate and academic level according to the scoring in Table 1.

Readability score = 198.825 - 40.175 x word length (total syllables / total words) - 2.610 x sentence length (total words / total sentences)

Table 1. The Level Of Education According to The Ateşman Readability Formula

Score	Education level
90–100	Easily understood by students in Class 4 and below
80-89	Easily understood by 5th or 6th class students
70-79	Easily understood by 7th or 8th class students
60-69	Easily understood by 9th or 10th class students
50-59	Easily understood by 11th or 12th class students
40-49	Easily understood by associate degree students
30-39	Undergraduate level
≤29	Academic level

Bezirci-Yılmaz readability formula: The number of words in a sentence and the number of syllables in a word and the following formula are used to calculate the readability of the text in Turkey. In the 9th table of Bezirci and Yılmaz's article in which they explain the formula they developed for the calculation of the readability level of Turkish texts, it is stated to which level the texts correspond to in the Turkish education system according to the scores they receive in square root calculation (Table 2). Based on Ateşman and Bezirci-Yılmaz readability formulas,

when we look at the tables showing the readability level of the texts, the table specified by Bezirci-Yılmaz does not separately state the associate's and undergraduate level.

Readability score= √OKS x ((H3 x 0,84) + (H4 x 1,5) + (H5 x 3,5) + (H6 x 26,25))

Table 2. The level of Education to Bezirci-Yılmaz Readability Formula

Point	Education level
1-8	Primary Education
9-12	Secondary Education (high school)
12-16	Undergraduate level
16+	Academic level

OKS: average number of words; H3: average number of words with 3 syllables; H4: average number of words with 4 syllables; H5: average number of words with 5 syllables; H6: average number of words with 6 or more syllables.

Medicines and leaflets

In the boxes of medicines on the market, there is a package leaflet containing information on the use of the medicine, possible side effects and registration information. Following the use of the drug, patients read the package leaflet to evaluate the treatment that may be seen in themselves and sometimes to know the side effects that may develop before use after the drug is prescribed. In this study, 89 of the proton pump inhibitors on the market were selected according to their active ingredients and the readability level of their package inserts was calculated. The selected proton pump inhibitors were categorised into five groups as esomeprazole (n=19), lansoprazole (n=16), omeprazole (n=14), pantoprazole (n=25), and rabeprazole (n=15).

Calculations

The prospectus forms were transferred to Microsoft Word programme in electronic environment according to the group order and information about the licence was extracted with the titles before the calculation for homogenisation of the readability level. In the evaluation phase, the formula developed by Bezirci-Yılmaz was used together with the ready-made calculation made on the website inspired by the formulas developed by Ateşman, the data obtained were transferred to the Microsoft Excel 2019 programme and the fractions of the results expressing the level of education were rounded to the nearest whole number(4-7).

Work Ethics

Our study did not use human or human data, and since the collected data are open to access and use over daily internet providers in a way that does not require special permission, ethics committee approval was not required.

RESULTS

According to Ateşman formula, the average readability score was calculated as 51,9. According to this, 12 years of education is needed for the readability of prospectuses. The average Bezirci-Yılmaz readability score was calculated as 12,71 and it was determined that undergraduate level of education was required.

In terms of Ateşman formula, 16 package inserts were found to be readable with at least academic education level and 12 of 36 package inserts were found to be readable with associate degree and 24 with undergraduate education. Thirty-four prospectus forms were found to be

readable with high school education. Only 4 prospectuses were found to be readable with primary education level.

Using the Bezirci-Yılmaz formula, it was found that 15 prospectuses could be read at academic level (+16th points), 28 prospectuses at undergraduate level, 41 prospectuses at secondary education (high school) level (9th, 10th, 11th and 12th class) and 5 prospectuses at primary education level (1st-8th class) (Table 3). According to the available data, it can be said that the results of the formulae used in the study according to the package inserts are similar.

Table 3. Distribution Of Prospectuses According To Readability Levels Of Ateşman And Bezirci-Yılmaz (N=89)

Formula	Primary Education	High School	Associate degree or Undergraduate level	Academic level
Ateşman formula	4	34	36	16
Bezirci–Yılmaz formula	5	41	28	15

Considering the five active substance groups, according to the Ateşman readability scores, the drugs containing the active substance Esomeprazole required the highest level of education in terms of readability. Drugs containing the active ingredient omeprazole were the group that required the least training according to the Ateşman readability calculation among the drug groups with a readability score of 61.4. According to the Bezirci-Yılmaz formula, the drug group containing the active ingredient Pantoprazole was found to be readable with an average score of 13.1 with at least a Bachelor's degree, while the drug group containing Rabeprazole was the group requiring the least education with an average readability score of 10.7 (Table 4).

Table 4. Average Readability Scores For Proton Pump Inhibitors Drug Groups

Drug groups (N=89)	Atesman average readability score	Bezirci-Yılmaz average readability score
Esomeprazole (n=19)	49,1	12,9
Lansoprazole (n=16)	53,9	11,8
Omeprazole (n=14)	61,4	12,1
Pantoprazole (n=25)	50,7	13,1
Rabeprazole (n=15)	55,8	10,7
Total	51,9	12,7

DISCUSSION

The first formula that can calculate the readability of texts in the world literature was developed by Flesch in 1948. Flesch Reading Ease Score is based on the ratios of number of words/number of sentences and number of syllables/number of words (8). In 1952, the Gunning Fog Index was found to determine the age group addressed by the length of sentences (9). In 1969, the Mclaughlin The Simple Measure of Gobbledygook (SMOG) was designed to determine the number of words containing three or more than three syllables in texts and to calculate readability based on the United States education system using mathematical formulas (10).

There are two formulas developed by Ateşman and Bezirci- Yılmaz based on the readability of Turkish language texts (4,7). According to Ateşman, the average sentence length in Turkish is 9-10 words and word length is 2.6 syllables (4). According to the Bezirci-Yılmaz formula, the readability level of the text is calculated by means of the syllable distribution graph, which is calculated by taking into account the total number of sentences, words, syllables and words with 4+ syllables (7).

Using a simple language with simplicity in texts is essential in reducing the readability level (11). When the formulas used to calculate the readability score are analysed, most of them consist of the combination of word length and syllables per sentence. In the study administered by Eryılmaz et al. the mean number of words with four syllables or more was found to be 3.41 (12). In our study, an average of 60.8% of the words constituting the prospectus leaflets contained four or more syllables. The current situation may explain the high readability scores. By reducing the number of syllables and simplifying the content, the reading age of prospectuses can be reduced.

The number of studies evaluating the readability of medical texts written in Turkish language is quite limited. Ebem et al. evaluated the consent forms prepared for injections and intravenous interventions using the formulae of Ateşman and Bezirci-Yılmaz (13). It was shown that the readability level of the related consent forms was low and at least 11 years of education was required. In another study, patient consent forms used for ophthalmological surgical procedures were evaluated by Ay et al. and it was found that the forms could be read with an average of 11 years of education according to Ateşman's formula (14).

When the literature is examined, studies evaluating the readability level of prospectuses in Turkish are quite limited. Ay et al. In a study administered on ophthalmological drops, it was found that the readability of the package inserts of 75 drugs evaluated with both Ateşman and Bezirci-Yılmaz formulas could only be achieved with 13 years of education or in other words, undergraduate education was needed (15). In another study in which the readability of internet sites containing information for patients about colorectal cancers was evaluated, it was reported that the readability of the texts contained in the sites was above the health literacy and recommended academic level in our country (16). In a study by Dağdelen et al. evaluating the readability level of consent forms used in obstetrics and gynecologic surgeries, it was shown that an education level of 15 years or more was required to read consent forms(17).

In our study, it was determined that the package inserts of proton pump inhibitor drugs required an average of 11-12 years of education according to the Ateşman formula and a bachelor's degree according to the Bezirci-Yılmaz formula. According to 2022 Turkish Statistical Institute (TÜİK) data, the education level of more than 50% of the population is below the level that can perceive the relevant prospectuses (18).

The preparation of the prospectuses in the language in which they are written and taking into account the level of education in the country where they are used requires the doctors to provide detailed information about the use of proton pump inhibitors and their side effects to the patients while prescribing the drugs.

Lastly, the fact that the typeface and font size of the package inserts analysed in our study were ignored due to the variability according to the company placing the drug on the market, and the fact that the associate degree level was not specified separately in the calculation table of the Bezirci-Yılmaz formula when comparing the two formulas in the findings section were accepted as limitations of the study.

CONCLUSION

By making the prospectuses more readable, it is possible to facilitate the informing of patients and also to prevent legal problems that may be experienced by doctors who prescribe the drug. In addition, the creation and release of prospectuses are manufacturer-dependent and new studies are required to examine the level of education and the extent to which the prospectuses

cover characteristics such as age, mental status and visual acuity level of the readers in order to raise awareness in the sector.

Funding: There is no specific funding related to this research.

Competing Interest: The authors did not experience any conflict of interest in the writing of this article.

Author Contributions

Working Concept / Design	**:** MCG
Data collecting	**:** MCG
Data Analysis / Interpretation	**:** MCG
Writing Draft	**:** MCG
Technical Support / Material Support	**:** MCG
Critical review of content	**:** MCG
Literature Review	**:** MCG

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