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ORIGINAL

FOCUSING ON THE HEALTH LITERACY IN ATHLETES IN TURKEY: STUDYING THE READABILITY OF PACKAGE LEAFLETS OF COMMONLY USED DERMATOLOGICAL MEDICATIONS AMONG SPORTS STUDENTS

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Abstract

Introduction and Objective: Readability relates to the text's readability at a specific educational level. At home, patients are asked to study the package inserts (instructions for use) for their prescribed drugs to learn about their effects and side effects. However, different sports students frequently struggle to comprehend medicine leaflets due to a lack of knowledge or awareness. As they typically suffer from various injuries and skin diseases due to increased exposure to the sun or pollution, it is important to determine the readability level of these leaflets in this context. Thus, the present study assesses the Readability of Turkish package inserts for medications dermatologists

prescribe to sports students regularly. Materials and Method: Readability indexes created by Ateşman and Bezirci-Yılmaz, which have proven useful for analyzing Turkish literature, were utilized in the present study. Before initiating the research project, the package inserts of commonly used commercially accessible medications were gathered via Google. Antihistamines, corticosteroids, retinoic acids, and moisturizers were categorized as the most often used medications in dermatology therapy for athletes. Results: The package leaflets tested using the Bezirci-Yılmaz readability formula were comprehensible by individuals with a mean education level of 11,3±1.9 years. Based on the Ateşman readability formula, the medicine package inserts scored an average of 55,1±7.8 points and were deemed readable by persons with an 11th- to 12-year-old education level. The medications were categorized as antihistamines, steroids, retinoic acids, and moisturizing agents. A subgroup examination of students majoring in sports found no significant difference between the readability levels identified by the Bezirci-Yılmaz and Ateşman formulas. (p= 0.988, p= 0.277).Conclusion: The packaging inserts accompanying drugs must be legible. The texts for regularly used medications in dermatological treatment were found to be understandable by eleven-year-old sports students. The readability of such materials may promote patient adherence to prescribed therapies.

Keywords: Dermatology, Readability, package leaflet, sports students, Turkey

1. INTRODUCTION

In numerous regions of the world, health literacy has developed as a prevalent problem, impacting healthcare administration as a whole. Health literacy has also significantly impacted persons' self-medication [1]. In addition, self-medication has become an integral component of healthcare worldwide, including in Turkey. Especially after the Covid-19 outbreak, individuals choose to stay home and self-medicate rather than visit hospitals and clinics, particularly for common diseases and ailments [2]. According to a study by Demir et al. [3], the nation's healthcare resources cannot match the rapidly growing demand for self-medication at least occasionally. In many nations worldwide, particularly in Europe, healthcare policies encourage citizens' interest in their well-being, health, and sense of agency [4]. WHO [5] defines self-care as "what people do for themselves to establish and maintain health, prevent and treat illness." According to De Sanctis et al. [6], "Self-medication is an important aspect of self-care." Self-medication refers to taking medicines for short-term and acute diseases, and people also self-medicate for chronic diseases. According to a study by Zheng et al. [7], over sixty percent of reported illnesses over thirty weeks were treated by patients who self-medicated with over-the-counter medications; they took these medications without visiting a physician. Individuals self-medicate and often tell their friends, family members, and acquaintances to do the same. They even prescribe them medications. According to a study by Sen Tunc et al. [8], self-medication is a growing healthcare concern in Turkey because it can result in a variety of unfavorable outcomes, including antimicrobial resistance, misdiagnosis, or even delay in diagnosis of the illness, harmful drug

interactions, allergic reactions, improper use of medications, and many others. The absence of health literacy in the context of self-medication significantly influences the students in Turkey, particularly the athletes. As a result, individuals face serious consequences due to their lack of appropriate pharmaceutical understanding. Because of skin infections, environmental exposures, mechanical damage, and contact dermatitis, [9] sports students are more susceptible to dermatological problems. Therefore, the informatics on drugs related to consumer health is based on the notion that they must be easily readable and understandable, which will assist them in learning about the uses and applications of medicines so that they can easily decide to take particular drugs and common dermatological medications. According to research, many customers with non-medical backgrounds find it difficult to comprehend the written material on medications and medical documents, especially those containing sophisticated information regarding clinical studies [10].

This study assesses the language's readability on the package inserts of Turkey's most commonly used dermatological medications among college-level athletes.

At home, patients are asked to study the package inserts (instructions for use) for their prescribed drugs to learn about their effects and side effects. After reading about the negative effects of prescription medication, many patients have even stopped taking it without visiting their doctor; this is particularly prevalent in the everyday practice of doctors. Hence, package inserts alerting patients about a particular medication must be legible to the average individual. Yet, because sports students are typically less concerned with health literacy, their ability to comprehend medication pamphlets is severely impaired. This study assesses the Readability of Turkish package inserts for medications regularly prescribed by dermatologists to athletic students.

The objectives of this study include the following:

- To determine the impact of written text styles and words chosen on the package leaflets of the commonly used dermatological drugs among sports students in Turkey.
- To analyze the readability of the text written on the package leaflets of the commonly used dermatological drugs among sports students in Turkey.
- To determine the readability level of sports students who commonly use dermatological drugs in Turkey.

The primary issue discovered in the present study is the readability of the text written on the package inserts of regularly used dermatological medicines among college-level athletes. Numerous researchers have emphasized this topic in the past. This study is of major importance regarding the readability of dermatological drug instructions and relevant information. The readability of the package inserts is essential for the logical use and safety of medications after they have been prescribed by a physician or pharmacist or for self-medication. The current study investigated the effect of readability on regularly used dermatological medications among Turkish

athletes. The Turkish agency for pharmaceuticals and medical devices has mandated that all medications include a package insert giving pertinent information about the drug. The leaflet must adhere to the agency-mandated packaging standards for its interior and external packaging. This study will also motivate educational institutions to enhance health literacy among athletes and other students, enhancing their ability to self-medicate. Typically, sports students are exposed to sunshine and pollution, which may result in various dermatological conditions, prompting them to seek dermatologist treatment. Hence, if sports students encounter the problem of leaflet legibility, they may be unable to increase their performance. Hence, the government and other organizations can adopt various measures to enhance health literacy among sports students and ensure the formulation and implementation of crucial policies to increase health literacy among sports students.

2. LITERATURE REVIEW

In the first part of the 20th century, academics became interested in determining the readability of written texts for individuals with a given level of education. The term "readability" was developed as a result of these studies. The term "readability" is used to classify a document as readable by people with a given level of education. Flesch developed one of the first and most influential readability formulas in 1948 [11]. "The Flesch Reading Ease score is a commonly used and dependable readability test that provides a score between 0 and 100, with higher scores indicating literature that is easier to read" [12]. Readability formulae are based on parameters such as the number of words in a sentence and the number of syllables in words in a given text. It is well-known that writings with lengthy sentences composed of lengthy words are more difficult to comprehend. This implies that all pharmaceutical medications must be evaluated for readability and pass clinical testing and assessment before receiving a readability score.

A study contends that the focus of readability stems from the concepts and understanding of the function of the leaflets inside the medications, mostly for communication [7]. These ideas are derived from a biomedical standpoint. The patient information leaflets tell patients about their medications [13]. Our study also aims to reduce the time and effort required to visit a doctor for common medical conditions, such as dermatological issues. The packaging inserts also give healthcare providers medicolegal protection and information regarding clinical research and investigation [14]. According to the research conducted by Barkley [15], package inserts for prescription treatments substantially impact the behavioral, cognitive, and emotional alterations of patients, particularly those who are forgetful, illogical, inept, and docile. Another commonly accepted fact regarding the goal of medicine package inserts is that they aim to empower consumers rather than correct them [16]. A consumer advocacy agenda has prompted this objective.

By conceiving and contrasting the aim of information written or printed on the package leaflets of pharmaceuticals as consumer empowerment values, such as their resourcefulness, rationality, reflexivity, and competency [17], the goal of the written or printed information can be understood. The

information on the leaflets must be easily accessible, intelligible, and easy to recall for this communication to be effective [18]. A drug's package insert contains essential information about the medication. A successful and comprehensive review of the information given on package leaflets should examine three crucial factors: first, the content must be accessible; second, it must be comprehensive and complete; and third, it must have a lasting influence [19]. There must be a theoretical foundation, a full clinical examination, and proof regarding the readability of the written information on package inserts [20]. This exam guarantees that patients, consumers, or customers can read and comprehend the presented information. Symptoms of the disease, allergic reactions, preventive methods, applicability, acceptability, comprehensibility, cultural appropriateness, etc., are key concepts in the readability test.

Several research studies, for instance, have indicated that many patients, particularly those from lower-income or middle-income groups, developing and underdeveloped countries, and especially those with lower literacy rates, find it difficult to read and comprehend the text on the package leaflets of pharmaceutical drugs [21]. Poor knowledge and comprehension of pharmaceutical information will harm the nation's healthcare system. They may also have detrimental effects on patients [22]. This has increased the necessity for the wording on medicine package leaflets to be easily accessible and comprehendible by persons with average or lower literacy levels. The ability of the reader to grasp a text reduces as the quantity of complex and difficult words, phrases, and sentences increases, according to a study by Rori et al. [23]. Readability is a notion derived from kindergarten to grade 12 education. Readability measures have traditionally been obtained from the length of words, phrases, and sentences [24]. To a greater extent, the readability of a subject is enhanced by substituting simpler and more common words. Yet, this concept of readability differs slightly from the conventional approach because healthcare phrases and sentences are difficult to read and comprehend. The readability of healthcare information hence demands further expertise [25]. The package leaflet for a particular drug comprises difficult-to-understand terminology and complicated material involving clinical psychology, physiology, and pharmacology-related investigation and research that is tough for a layperson to read and comprehend.

Clinical language medical terminology is acknowledged as a specialized language that must be learned through clinical experience and education [26]. Patients can misinterpret the information on the package leaflet of a drug if they lack the requisite expertise or cannot comprehend it, which could be a major worry for the healthcare industry and their patients. Unreadable medical terminology hinders patients' ability to self-medicate and administer self-care. According to the study conducted by Sung and Chi [27], consumer self-medication terminologies combine medical phrases and the consumer's everyday language vocabulary used to describe ailments and treatments. The vocabulary used by consumers differs significantly from that of medical professionals. Consumers frequently use the terms brain, blood, and heart, which correspond to the medical terms pathology, physiology, and cardiology. In light of these factors, streamlining the medical information on

medicine leaflets represents a formidable challenge for the nation's healthcare industry. Individuals' health literacy significantly influences the reading of drug package inserts. It has been discovered that individuals with higher levels of health literacy can read drug package inserts more efficiently than those with lower levels of health literacy [28]. This study also contributes significantly to advancing knowledge regarding readability concerns among sports students in the context of package inserts for dermatological drugs.

3. MATERIALS AND METHOD

Readability indexes developed by Ateşman and Bezirci-Ylmaz [29, 30] were utilized to analyze Turkish texts in the present study.

Before initiating the research project, the package inserts of commonly used commercially accessible medications were gathered via Google. Antihistamines, corticosteroids, retinoic acids, and moisturizers were categorized as the most frequently used medications in dermatology. Information on various regularly used dermatological drugs was gathered using the Google search engine; it was determined that practically all selected drugs have package inserts with the required information about the drug. Using the readability test, each of the packaging inserts was examined. In the readability test, the amount of frequently used or unusual terms for the targeted audience, i.e., students in our study, the length of words and sentences printed in package leaflets, and the percentage of polysyllabic words, were studied and evaluated.

3.1 Eligibility Criteria

- **Inclusion Criteria**

This study will include sports students at least 18 years old and willing to participate. The selected sports students must have completed 11th or 12th grade and be Turkish citizens. This study also includes the leaflets of dermatological drugs such as antihistamines, steroids, and retinoic acids.

- **Exclusion Criteria**

Students of sports younger than 18 years old are omitted from this study. But, any sports student with a higher than 12th-grade academic level is also excluded from this study. Lastly, this study does not contain package inserts for drugs other than dermatological medications.

3.2 Definition of Key Terms

- **Readability**

The readability of a text is its capacity to be read and comprehended through its linguistic characteristics. Readability focuses on the comprehension of a book rather than the speed with which it can be read. Readability also pertains to the text's content, including its textual structures,

complexity, and word sophistication, all related to its complexity. Readability is determined by the reader's background knowledge and reading ability [31].

- **Dermatology**

Dermatology is a discipline of medicine that focuses on skin and skin-related conditions and disorders [32].

- **Antihistamines**

Antihistamines are a type of dermatological medication that is used primarily to prevent or stop the activity of histamine. They alleviate allergies and symptoms, such as high fever reactions to bug bites, stings, and conjunctivitis [33].

- **Steroids and Retinoic acids**

The steroid medication used in dermatology contains active carbon compounds with carbon atom rings. These anti-inflammatory medications are used to treat a variety of skin disorders. Steroids are typically accessible through ointments, creams, and other solutions [34].

Dermatological medications containing retinoic acid are essential for maintaining healthy skin, but only in minute quantities. They include vitamin A, which aids in the development and growth of skin cells [35].

- **Moisturizers**

Moisturizers are the most popular dermatological medication. They smooth and soften the skin by adding moisture [36].

- **Package Leaflets**

The package inserts are the handouts that come with every drug or medicine and contain all the relevant information for the end user [37].

4. Results

5. Table 1. Ateşman readability formula scores and the corresponding education levels.

Score	School level
90–100	Readable at a primary school 4th-grade level and lower.
80–89	Readable at a 5th or 6th-grade level.
70–79	Readable at a 7th or 8th-grade level.
60–69	Readable at a 9th or 10th-grade level.
50–59	Readable at an 11th or 12th-grade level.
40–49	Readable at a 13th to 15th-grade level.
30–39	Readable at an undergraduate education (16th grade) level.
≤29	Readable at a postgraduate education (>16th grade) level.

The Ateşman readability formula yields a score within the 0 to 100 points range, with higher values suggesting more readability. Ateşman released a table containing the reading difficulty of a text related to a specific

education level based on a defined formula (Table 1).

The calculation method of the Ateşman readability formula is as follows: Readability score = 198.825 – 40.175 x word length (total syllables / total words) – 2.610 x sentence length (total words / total sentences)

Bezirci-Ylmaz devised a second formula for the number of words in sentences and syllables in words. The results of this algorithm represent the reading difficulty of a certain grade level (Table 2).

Table 2. School level corresponds to the score/grade calculated using the Bezirci-Yılmaz readability formula.

Score / Grade	School level
1–8	Primary school
9–12	Secondary Education (High School)
12–16	Undergraduate
16+	Academic level

The Clinical Trials Ethics Committee of Afyonkarahisar Health Sciences University approved permission for the trial. No approval was requested from the ethics committee (2023/6) because no human or animal subjects participated in the study.

The package leaflets tested using the Bezirci-Ylmaz readability formula were comprehensible by individuals with a mean education level of 11.3±1.9 years. The medications were categorized as antihistamines, steroids, retinoic acids, and moisturizing agents. A subgroup analysis found no statistically significant difference (p= 0.988) between the readability levels of the various groups.

Based on the Ateşman readability formula, the medicine package inserts scored an average of 55.1±7.8 points and were deemed readable by persons with an 11th- to 12-year-old education level. In a subgroup study utilizing the Ateşman readability formula, no statistically significant differences in readability were discovered across the three subgroups (p= 0.277).

Table 3. Readability scores of package leaflets

	Antihistamines (n:15)	Steroids (n:15)	Retinoic acids and Moisturizers (n:15)	Total (n:45)	P
Bezirci-Yılmaz	11.1 ± 1.6	11.5 ± 1.9	11.3 ± 2.2	11.3 ± 1.9	0.988[a]
Ateşman	57.8 ± 7.8	54.4 ± 8.1	53.0 ±7.4	55.1 ± 7.8	0.277[a]

[a] Kruskal Wallis

Mean, standard deviation and median were descriptive statistics, while categorical variables were expressed as numbers and percentages. The Kolmogorov-Smirnov test assessed the data's adherence to the normal distribution. The Kruskal-Wallis test assessed the correlation between variables that did not adhere to the normal distribution. The results were analyzed using a 95 percent confidence interval and an alpha significance level of 0.05. Using IBM SPSS Statistics, all study data were examined (Version 23.0. Armonk, NY: IBM Corp.).

6. Discussion

The Ateşman Readability Index and the Bezirci-Ylmaz Readability formula, both scientifically demonstrated validity and reliability, were used in the present study to evaluate the readability of package leaflets for commonly used dermatological medications among Turkish students of sports [29, 30]. Few studies have analyzed the Readability of Turkish writings within the medical area. Using the Ateşman reading index and the Bezirci-Ylmaz readability formulas [38], ifci et al. concluded in a study conducted in 2020 that Turkish websites about substance dependence were, on average, readable by those with a 14-year educational background.

Kent et al. [39] analyzed the readability level of websites connected to dizziness using the Ateşman and etinkaya readability formulas. They found that the relevant texts were, on average, legible by those with an educational background of 8–9 years. Ozduran et al. analyzed the readability of lumbar pain-related websites. Based on the Ateşman Readability index [40], they reported that the websites were legible by those with 9–10 years of schooling. Although Kent et al. and Ozduran et al. found the instructive writings on websites to be easier to read than we did, these texts nevertheless require a high level of education.

Ebem et al. [41] assessed 90 intramuscular and intravenous injection permission forms utilizing the Ateşman readability index and the Bezirci-Ylmaz readability formula. Many found the permission documents to be difficult to read. In one of the studies most similar to ours, Ay et al. [42] tested the legibility of the Turkish box inserts for 75 distinct eye drops. They found them readable with an average of 13 years of education, similar to the present study's findings.

One of the reference studies in this sector undertaken by the American Medical Association utilizing seven distinct formulas in English showed that consent forms for invasive treatments are readable at a 15-year average education level. Considering the average level of education in the United States, it was suggested that permission forms be written at least sixth-grade level [43]. Considering the average education level of 6.51 years in Turkey, as stated by a 2016 survey, relevant medical books should have a minimum reading level of fifth or sixth grade [44], particularly for sports students. In the context of sports students, the educational level of the package inserts in the present study was around 11 years, which is regarded as pretty high.

A study examining the instructions for use and product characteristics summaries of 69 drugs in Turkey reported an average reading level of 15 years of education [45], which is higher than the reading level identified in the current study. Nonetheless, the average level of education was rather high because the study contained directions for patient usage and a summary of product characteristics designed for clinicians. The study also revealed that the instructions for use were substantially simpler for the sports students to comprehend than the product synopsis. The present study only considered concise product information.

7. RESEARCH IMPLICATIONS

The current investigation has both theoretical and practical ramifications. Theoretically, the study and prior literature contribute to dermatological medication and the readability of the package inserts of pharmaceutical products in the setting of athletic students. The practical value of the study involves its application to healthcare professionals, including physicians, pharmacists, and clinical researchers in particular. They can acquire insight into the significance of the readability of the written material in the prescription information leaflets for their patients. This research is especially essential for policymakers, particularly healthcare officials, as they may improve package leaflets' readability, comprehensiveness, and clarity.

8. LIMITATIONS AND FUTURE RESEARCH

Although this research is quite exhaustive, it also has certain shortcomings. Due to the ease of access to data, this study has been undertaken in Turkey, which restricts its applicability to the Turkish context alone and not to the worldwide level. Due to researcher bias, the study was conducted using a qualitative research approach; instead, the researcher could lie and combine qualitative and quantitative methods; in a qualitative approach, the study could review peer-reviewed articles and relevant case studies to examine the effect of readability on medical drugs and its impact on self-medication. Due to the incompetence of the researchers, the scope of this study was also limited to sports students to establish the readability concerns of package leaflets for the linked pharmaceuticals, limiting the intended audience. Future research may also target different audiences, such as adult athletes, their coaches, and lower-level medical personnel, to evaluate the readability of package inserts for regularly used pharmaceuticals.

Similarly, this study concentrated solely on the readability of package leaflets for dermatological prescriptions. These treatments are widely administered to sports students, with little attention paid to the readability of package leaflets for other connected medications. This issue could be overcome in future studies if Ateşman and Bezirci-Yılmaz used the package inserts of additional drugs to analyze Turkish texts.

9. CONCLUSION

The box inserts for the regularly used dermatological medications investigated in the study include vital information. This information is useful for athletes who take these medications. The package inserts can aid in delivering more information, which can be accomplished through individual and group therapy. They can promote compliance, leading to greater patient satisfaction with their self-medication. The package inserts accompanying pharmaceuticals must be easily accessible to ensure that the drugs are used correctly and that the patient receives all of their benefits; by reading the inserts, the patient can also avoid experiencing any adverse side effects. In the current investigation, materials for regularly used medications in dermatological practice were understandable to individuals with an 11-year education level. The readability of such materials may promote patient

adherence to prescribed therapies. In this context, a greater emphasis must be placed on the health literacy of sports students.

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