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ORIGINAL RESEARCH

Calculating reading ease score of patient package inserts in Iran

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Background: The patient package inserts (PPIs), which contain the necessary information about medications intended for patients, need to be expressed in a clear language comprehensible to everyone.

Objective: This study aimed to evaluate the readability and understandability of the drug package inserts for the inexpert people.

Methods: The readability of the 158 PPIs of the 33 drugs, registered and manufactured in Iran, was calculated. The main criterion for selecting PPIs to include in this study was of those top-selling drugs during the year 2015 according to the Social Security Organization in Iran. The PPIs were collected from the pharmacies of the three major cities, namely, Tabriz, Ardabil and Meshgin Shahr. Then, using the Flesch–Dayani readability (FDR) tool adjusted for the Persian language, the average number of the words and syllables was counted to calculate and grade the readability score of the selected PPIs.

Results: This study showed that the average FDR readability score for all the 33 drugs is 52.52, which are graded 10th–11th. Of the PPIs, 70.89% were difficult to read, and on average, the readability of the PPIs was five times difficult than the standard ones. Only 13.92% PPIs were suitable for the 5th–7th grade, and 15.19% of the package inserts ranked in the 8th–9th reading grade.

Conclusion: A considerable number of the PPIs in Iran have low readability level and were not suitable for the inexpert readers. Since the treatment cost is very high, people tend to use medications arbitrarily or simply use old prescriptions. This study suggests the necessity of a major improvement in the readability level of the PPIs in order to ensure the usefulness of the PPIs to the majority of the consumers.

Keywords: Flesch–Dayani indicator, drug package insert, patient package inserts, readability, pharmaceutical brochures, leaflet, drug guide, Flesch–Dayani readability

Introduction

The Patient package insert (PPI) is an important source of medication information for the physicians and the patients.[1] It is also an essential part of the modern drug distribution systems, as well as a tool for the patient education and health policy.[2] The PPIs provide a great deal of information in the related field in the developing countries, as in these countries, access to the latest developments and up-to-date information is restricted.[3] The evidence show that the information provided in the PPIs may meet the information needed by the pharmacists or the physicians, but not necessarily of those needed by the patients.[4] The patients usually do not find the information they are looking for in the package inserts, and above that, the language used in the package inserts

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is not readable for them.[5–7] Most of the patients try to read the package inserts for the information such as therapeutic indications, dosage instruction, contraindications, usage, warnings, ingredients, mechanism and side effects.[8,9] Some of the patients are not aware of the exact use of the PPIs.[9] Sometimes, even some people rely on the PPIs' information in order to avoid visiting a proper doctor and also avoid paying the high health expenditures; for example, in a country like Iran where the people's income is low/middle, the arbitrary use of medications such as antibiotics, anti-inflammatory medications and nonsteroidal anti-inflammatory drugs (NSAIDs) is high, because the people cannot afford the treatment expenditures.[10,11] However, the patients aware of their inadequate knowledge about the side effects and unpredicted consequences of the drugs,[12] they do not show any interests in reading a professional and scientific text to get more information because of its unreadability, especially those with a lower level of literacy. Therefore, the PPIs for both the over-the-counter and prescription medicines must be written in a way to be read and understood easily by everyone who requires. The suggested reading level in the literatures for general patient information is the 5th–6th level.[13,14] The rules and regulations for the PPI issued by the Food and Drug Organization in Iran mandate the acceptable level of readability and understandability, not mentioning any direct reference to a constant grading. In the Persian literature, the suggested grade would have been the 5th–6th reading level.[10]

The results of the studies show that the package leaflets for the prescription medicines are difficult to read, difficult to understand and even they sometimes confuse and make the patients hesitant to act.[8] Despite the emphasis on the fact that the patients have the right to receive the medical information in a simple language, it is unclear to what extent the PPIs have taken into consideration this issue. The preliminary literature review has revealed that there is a research gap regarding the evaluation of the PPIs and the pharmaceutical brochures in Iran; the only evaluation done before was on the Iranian pamphlets about the patient educational leaflets in a hospital setting.[10] To fill this research gap, the preset study aimed at evaluating the reading ease of the PPIs of the top-selling medications in Iran.

Methods

This cross-sectional study was carried out to assess the readability of the PPIs of the top-selling medications from March 2015 to September 2015 according to the Social Security Organization in Iran. The criteria for selecting the drugs were as follows: 1) being available in a solid form; 2) being registered in the drug generic of the Iran Food and Drug Administration (IRFDA); 3) being listed as one of the top-selling drugs according to the Social Security Organization and 4) being available in the local markets/pharmacies.

Data collection

The PPIs were gathered from the pharmacies of the three big cities: Tabriz, Ardabil and Meshgin Shahr during November 1, 2015, and March 30, 2015 (Table S1). A total number of 158 PPIs for 33 top-selling drugs were collected and assessed to provide readability score (Table S2).The PPIs belonged to 43 pharmaceutical manufacturers (names are kept confidential) and 11 treatment groups (Table S3). Among the various readability measures, the Flesch formula is one of the reliable and most used indicators for grading the reading levels. This study used the Flesch–Dayani indicator,[15] the Flesch's Persian-adjusted version, for measuring and ranking the readability of the texts.

Scoring methods

The Flesch–Dayani readability ease (FDRE) formula was used to measure the readability of the PPIs. The Flesh formula is calculated by detracting the number of the length of the sentences (SL) and the length of the words/syllables (WL) from the constant number 206.835. Dayani[28] redefined the constant number from 206.835 to 262.835 for the Persian text readability level. In this study, from each package insert, a sample of 100 words was randomly chosen. Then, the SL and the WL were counted manually and inserted into the Flesch–Dayani formula for calculation as follows:

$$\text{Flesch} - \text{Dayani formula} = [(262.835) - 0.846\text{WL}) - 1.015\text{SL})$$

$$\text{SL} = \frac{\text{Number of words in text}}{\text{Number of sentences in text}}$$

$$\text{WL} = \frac{\text{Number of letters in text}}{\text{Number of words in text}}$$

According to the FDRE formula, a proper text should contain shorter sentences, fewer words and shorter syllables. The score between 60 and 70 is considered as "standard" and scores ≥70 rank as "fairly easy" to "very easy".[16] The Flesch reading ease table shows the description of the scores based on the Flesch reading ease assessment. The results of the calculations were compared to the table of readability (Table S4). The average score was calculated to find the readability of the PPIs in the treatment/medication groups and a single medication from the others.

The data obtained were subject to analysis using the Microsoft Office Excel 2010. The average, maximum and minimum readability scores were gained to be reported.

This study is approved by the ethics committee of Research Department with the reference number TBZMED. REC.1394.140.

Results

The research shows that the average Flesch–Dayani readability (FDR) score for all the 33 top-selling drugs is 52.5, which are graded from 10th to 11th level of reading (Table 1). Approximately 70.9% of the PPIs had a reading difficulty, ranging from fairly difficult to very difficult, based on the Flesch reading ease formula. Only 13.9% of the PPIs were suitable for the 5th–7th grade, and 15.2% of the PPIs were graded in the 8th–9th reading level (Table 2). There was no consistency in the readability level of either a same drug with various PPIs or all drugs of a specific factory. Among all the 158 PPIs, the most readable PPIs belonged to calcium D (FDR = 97.9) and the most difficult PPIs also belonged to calcium D (FDR = 7.34) (Table S2).

Evaluation based on the order of the generic name of the drugs showed that, on average, the ferrous sulfate with only one PPI and the readability score of FDR = 72.5 had the maximum reading ease among the 33 drugs and the captopril with totally three PPIs and the average score of FDR = 35.5 had the minimum readability score (Table 1).

However, the groupwise classification of the reading ease scores showed that the PPIs in the medication group of "Nutrition and Vitamins" with the average score of FDR = 61.8 were the easiest to read among the other pharmaceutical brochures. The PPIs of the medications in the group of

Table 1 Average FDR score of a drug with number of available PPIs from different factories based on the order of generic name of drugs

Order	Generic name	Number of PPIs	Average FDR score	Predicted FDR grade
1	Captopril 25	4	35.5	College grade
2	Calcium supplements D	6	36.1	College grade
3	Diclofenac 50	3	36.7	College grade
4	Metformin hydrochloride 500	10	41.8	College grade
5	Sodium valproate	3	43.4	College grade
6	Losartan potassium 25	6	43.5	College grade
7	Losartan potassium 50	6	43.5	College grade
8	Nitroglycerin	6	44.6	College grade
9	Amoxicillin	2	45.7	College grade
10	Hydrochlorothiazide	2	46.7	College grade
11	Diclofenac	5	48.1	College grade
12	Nitroglycerin 2.6	7	48.3	College grade
13	Glibenclamide	5	49.1	College grade
14	Loratadine 10	5	49.1	College grade
15	Ranitidine	6	51.8	10th–11th grade
16	Vitamin B1 substances	6	54.1	10th–11th grade
17	Metoprolol 50	6	54.1	10th–11th grade
18	Ibuprofen	5	54.9	10th–11th grade
19	Acetaminophen + codeine	3	54.9	10th–11th grade
20	Clidinium-C	2	54.9	10th–11th grade
21	Alprazolam 0.5	7	56.2	10th–11th grade
22	Amlodipine besilate 5	13	57.9	10th–11th grade
23	Spironolactone	2	58	10th–11th grade
24	Cephalexin 500	7	58.6	10th–11th grade
25	Gemfibrozil 300	7	58.8	10th–11th grade
26	Folic acid	2	58.9	10th–11th grade
27	Adult cold	3	58.9	10th–11th grade
28	Propranolol hydrochloride 10	5	59.6	10th–11th grade
29	Triamterene-H	1	61.5	8th–9th grade
30	Fluoxetine hydrochloride 20	4	63.6	8th–9th grade
31	Omeprazole 20	7	63.9	8th–9th grade
32	Furosemide	1	68.2	8th–9th grade
33	Ferrous sulfate	1	72.5	7th grade

Notes: N = 33. Average = 52.5. Maximum = 72.5. Minimum = 35.5.
Abbreviations: FDR, Flesch–Dayani readability; PPI, patient package insert.

antiepileptics with the average FDR = 43.4, antidiabetics with the FDR = 45.4 and antihistamines with the FDR = 49.1 were ranked as the most difficult to read groups of the medications. None of the PPIs with the groupwise classification met the standard level, i.e., grade 5 or 6 (Table 3).

To conclude, only five (3.2%) PPIs contained an easy to read and understandable package insert, suitable for the grade 5 or 6, which not necessarily we should consider them as a group of drugs (Table 2). Meanwhile, the average reading ease of the group of the medicines titled "Nutritional agent and Vitamins" with the FDR = 61.8 (Table 3) and a grade = 8–9 was ranked as the standard one (Table S4). The study also pointed out a deviation on the readability level among the pharmaceutical brochures of the studied factories (Table S2).

Discussion

The PPIs are the first and the most available source of information for the patients who take the medications. The readable and understandable PPIs positively enhance the patients' knowledge and consequently help the correct use of the medications. This study evaluated the readability of the PPIs for the top-selling drugs in Iran. This was the first study of this sort to assess the readability of the package inserts in Iran. This study revealed that there is no consistency in the readability of the PPIs for the prescribed and over-the-counter drugs in Iran. The readability degree for a medicine that is manufactured by different factories varies from each other, and also, all the medicines in a particular treatment group were different in terms of their level of readability.

This study also found that neither the prescribed drugs in the specific treatment groups nor the PPIs of the over-the-counter drugs have been designed easy to understand or read. Whereas the recommended reading level for all the patient education materials is the 5th–6th reading grade, the average reading ease level for the Persian PPIs was scored 10th–11th, i.e., FDRE score of 52.5, which is almost five times lower (difficult) than the recommended one.

The package inserts of the antidepressants followed by the nutritional agents and vitamins were the easiest comparing to other medications; however, they were graded 8th, which is two levels difficult than the standard level.

The language readability of the PPIs for the treatment of the chronic diseases, such as gastrointestinal, cardiovascular, antibacterial and anxiolytic sedatives, hypnotics and antipsychotics; anti-inflammatory drugs and antipyretics, was not suitable for the inexpert readers, while all of them are the medications listed not only as the top leading cause of death worldwide by World Health Organization (WHO)[17] but also as the high-cost treatment diseases. People with such chronic

Table 2 Rate of reading ease score and grade of all pharmaceutical brochures/PPIs

Reading ease score	Description	Predicted reading grade	Number of package inserts	Estimated percentage
90–100	Very easy	5th grade	1	0.63
80–90	Easy	6th grade	4	2.53
70–80	Fairly easy	7th grade	17	10.7
60–70	Standard	8th–9th grade	24	15.2
50–60	Fairly difficult	10th–11th grade	40	25.3
30–50	Difficult	College grade	55	34.8
0–30	Very difficult	College graduate	17	10.7

Abbreviation: PPI, patient package insert.

Table 3 Average reading ease score for PPIs based on the treatment group of drugs

Order	Treatment group	Number of drugs	Number of PPI	Average *R* score
1	Nutritional agents and vitamins	3	9	61.8
2	Gastrointestinal drugs	3	14	56.9
3	Electrolytes	1	6	56.9
4	Cardiovascular drugs	13	66	52.3
5	Antidepressants	1	4	52.3
6	Antibacterials	2	9	52.1
7	Analgesics, anti-inflammatory drugs and antipyretics	5	19	50.7
8	Anxiolytic sedatives, hypnotics and antipsychotics	1	7	50.7
9	Antihistamines	1	5	49.1
10	Antidiabetics	2	15	45.4
11	Antiepileptics	1	3	43.4

Abbreviation: PPI, patient package insert.

diseases mostly tend to use the medications on their own in order to tackle the high treatment cost.

In this study, the greatest number of the PPIs and the most difficult ones belong to the cardiovascular drugs. The average score of reading ease for cardiovascular medications was 52.3, which were graded 10th–11th (fairly difficult). However, there is a relationship between the right usage of cardiovascular drugs and patients' outcomes. Misunderstanding of the medication usage instructions and defect in intake of drugs make significant damage on health. A systematic review of hypertension drugs before 2000 also demonstrated that a few number of PPIs meet all evaluation criteria and are written in plain language.[18]

NSAIDs are known as the most prescribed and most used drugs through the world, which are sold with or without a prescription in the pharmacies.[19] The NSAIDs help to manage the pain and the inflammation, but they have side effects on the heart, hypertension, arthritis and digestive system. The evidence indicate that there is a significant connection between the NSAIDs and the heart attack even if they are used for a short period of time and in a minimum dosage.[20] Therefore, in the present study, the guidelines for this group of the medications have been written with a fairly difficult, difficult and a very difficult level through the PPIs. It should be noted that the literacy and knowledge of the patients about the correct usage of the drugs and their feedback are vital in case of any side effect and a suspicious reaction. Therefore, it is necessary that the package inserts are written in simple language and meet the literacy needs of the public community. The latest clinical findings about a specific drug should be mentioned in the package inserts. The PPIs need to be inspected in certain intervals, for instance annually. It is suggested to add the latest discovered information leaflet to the medicine box/packs when they are delivered to the patients or when the prescription is booked in a pharmacy. Owing to some difficulties of the ever-changing nature of the up-to-date information about the medicines, adding a new copy of the PPI or information to the prescriptions of the patients might be a feasible solution.

The evaluation of readability of the patient leaflets in the UK shows that the package leaflets reading grade was <8 and were well designed.[21]

Based on the average FDR score, the reading ease of the diabetic medicines' PPIs in the present study was graded difficult. A study of the same group of the medicine (diabetic) in Qatar also suggested that the average reading ease of the diabetic medicines is 37.7 (±15.85), which is very difficult. The authors of that study also found that only 2.2% of the PPIs possess the acceptable readability level.[7] In India also, it was revealed that the diabetic medicines' PPIs are unclear and led to the medication misuse.[22]

The proton pump inhibitor drugs such as omeprazole are the widely used medicines, and they have many side effects. A recent research group even revealed that although their use around the world is growing and expanding, their use is dangerous and even a lower dose and a shorter period time of intake may lead to death. This study group recommended that the use of these drugs must be under the physician's watch and full control.[23]

On average, the reading ease of the Iranian most prescribed and top-selling drugs was approximately five times difficult than the recommended readability score for the patients. The readability of the PPIs of the medicines was inconsistent from one drug to another, as well as from one factory to another. It means that there is no audit for the package inserts' readability and content. This is the first study about the readability of the Iranian drugs' PPI; however, Ahmadzadeh and Ahmadzadeh[10] also studied the readability of the patient leaflets distributed in the hospitals and found that the majority of such information resources have been provided at the college level, based on the Flesh reading ease formula, and exceed the patients' understandability and health literacy. In the USA also, study of ~63 PPIs showed that PPIs are provided higher than the recommended level in ~10th grade and need assessment and change.[24] Earlier studies also suggested the same significant message that the readability of the PPIs are higher than the patients' level of literacy.[20] Charbonneau[13] assessed the readability of the hormone therapy PPIs and found them to be higher than the patients' health literacy level of US population.

However, in marked contrast, the readability assessment of the PPIs in Germany revealed that PPIs' readability is generally suitable for everyone.[25] The majority of the research outputs regarding the readability of the PPIs indicate that reading ease score of the PPIs is higher than the reading and understanding level of the people. The findings of this work agree with the earlier studies conducted by Al-Aqeel[26] and Sawalha et al.[27] The findings also verify that the readability of the written drug information is higher than the readers' understanding ability.[2,13]

This research along with the previous researches points out that the most obvious right of the patients that is a proper access to the understandable medical information is overlooked in Iran, as well as the most part of the world, even in the developed countries. The readability level of a considerable number of the PPIs in Iran is poor for the inexpert people.

There is no auditing carried out to make sure that the package inserts are readable and comprehensible, which in a way leads to the drug misuse among the people and provides opportunity for the medication trade under advertisement without evidence.

Since the treatment cost is extremely high in Iran, the people tend to use the medications on their own or simply follow the old prescriptions. When the PPIs are poor in terms of their information and their readability, they will incline to use the inaccurate advertised drug information. To solve this problem, the Food and Drug Administration and the related organizations must intervene through the continuous assessment of PPIs for better readability and information content. The extension of the drug licenses for the pharmaceutical companies should be subject to the provision of the PPIs, considering the continuous control of the quality and easy to read contents of the PPIs.

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Disclosure

The authors report no conflicts of interest in this work.

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Supplementary materials

Table S1 List of high-selling drugs announced by the Social Security Organization in Iran

Drugs
Losartan potassium 25
Metformin hydrochloride 500
Glibenclamide
Metoprolol 50
Diclofenac 25
Ranitidine
Calcium supplements
Amlodipine besylate 5
Nitroglycerin 2.6
Adult cold
Nitroglycerin 6.4
Propranolol hydrochloride 10
Amoxicillin 500
Omeprazole 20
Acetaminophen + codeine
Captopril 25
Clidinium-C
Diclofenac 50
Ferrous sulfate
Folic acid
Furosemide
Hydrochlorothiazide
Ibuprofen
Spironolactone
Triamterene-H
Sodium valproate
Fluoxetine hydrochloride 20
Vitamin B1 substances 300
Alprazolam 0.5
Loratadine 10
Losartan potassium 50
Cephalexin 500
Gemfibrozil 300

Table S2 Readability score for all 158 package inserts

Order	Drugs' generic name	FDR score
1	Acetaminophen 1	42
2	Acetaminophen 2	74
3	Acetaminophen 3	48.8
4	Adult cold 1	56.4
5	Adult cold 2	80.1
6	Adult cold 3	40.3
7	Alprazolam 1	42
8	Alprazolam 2	45.4
9	Alprazolam 3	48.8
10	Alprazolam 4	57.2
11	Alprazolam 5	76.7
12	Alprazolam 6	55.6
13	Alprazolam 7	67.4
14	Amlodipin 1	63.2
15	Amlodipin 10	59.8
16	Amlodipin 11	45.4
17	Amlodipin 12	77.4

(*Continued*)

Table S2 (*Continued*)

Order	Drugs' generic name	FDR score
18	Amlodipin 13	48.8
19	Amlodipin 2	42.9
20	Amlodipin 3	70.8
21	Amlodipin 4	35.2
22	Amlodipin 5	46.2
23	Amlodipin 6	45.4
24	Amlodipin 7	69
25	Amlodipin 8	56.4
26	Amlodipin 9	82.6
27	Amoxicillin 1	58
28	Amoxicillin 2	33.4
29	Calcium d1	9.9
30	Calcium d2	11.6
31	Calcium d3	7.3
32	Calcium d4	41.2
33	Calcium d5	48.7
34	Calcium d6	97.9
35	Captopril 1	45.4
36	Captopril 2	37.8
37	Captopril 3	29.3
38	Cefalexin 1	71.6
39	Cefalexin 2	62.3
40	Cefalexin 3	46.2
41	Cefalexin 4	51.2
42	Cefalexin 5	56.4
43	Cefalexin 6	55.6
44	Cefalexin 7	66.6
45	Clidinium C1	59.7
46	Clidinium C2	46.3
47	Clidinium C3	58.9
48	Captopril 4	29.3
49	Diclofenac 25-1	32.7
50	Diclofenac 25-2	32.7
51	Diclofenac 25-3	67.4
52	Diclofenac 25-4	63.2
53	Diclofenac 25-5	44.6
54	Diclofenac 50-1	44.6
55	Diclofenac 50-2	32.7
56	Diclofenac 50-3	32.7
57	Ferrous sulfate	72.5
58	Fluoxetine 1	52.2
59	Fluoxetine 2	72.9
60	Fluoxetine 3	60.6
61	Fluoxetine 4	69.1
62	Furosemide	68.2
63	Folic acid 1	55.6
64	Folic acid 2	62.2
65	Gemfibrozil 1	73.3
66	Gemfibrozil 2	68.2
67	Gemfibrozil 3	58.9
68	Gemfibrozil 4	47.1
69	Gemfibrozil 5	34.4
70	Gemfibrozil 6	53
71	Gemfibrozil 7	76.7
72	Glibenclamide 1	42.9
73	Glibenclamide 2	53
74	Glibenclamide 3	42. 9

(*Continued*)

Table S2 (*Continued*)

Order	Drugs' generic name	FDR score
75	Glibenclamide 4	56.4
76	Glibenclamide 5	50. 9
77	Hydrochlorothiazide 1	42
78	Hydrochlorothiazide 2	51.3
79	Ibuprofen 1	64.9
80	Ibuprofen 2	59.8
81	Ibuprofen 3	47.1
82	Ibuprofen 4	47.9
83	Loratadine 1	37.8
84	Loratadine 2	17.5
85	Loratadine 3	64.9
86	Loratadine 4	72.5
87	Loratadine 5	53
88	Losartan potassium 25-1	13.3
89	Losartan potassium 25-2	43.7
90	Losartan potassium 25-3	42.9
91	Losartan potassium 25-4	50.5
92	Losartan potassium 25-5	69.9
93	Losartan potassium 25-6	41
94	Losartan potassium 50-1	13.3
95	Losartan potassium 50-2	43.7
96	Losartan potassium 50-3	42.9
97	Losartan potassium 50-4	50.5
98	Losartan potassium 50-5	69.9
99	Losartan potassium 50-6	41
100	Metformin hydrochloride 1	56.42
101	Metformin hydrochloride 10	28.5
102	Metformin hydrochloride 2	44.6
103	Metformin hydrochloride 3	45.4
104	Metformin hydrochloride 4	42
105	Metformin hydrochloride 5	23.4
106	Metformin hydrochloride 6	45.4
107	Metformin hydrochloride 7	38.6
108	Metformin hydrochloride 8	59.8
109	Metformin hydrochloride 9	33.6
110	Metoprolol 1	52.2
111	Metoprolol 2	51.3
112	Metoprolol 3	47.9
113	Metoprolol 4	42. 9
114	Metoprolol 5	60.6
115	Metoprolol 6	69.9
116	Nitroglycerin 2.6-1	28.5
117	Nitroglycerin 2.6-2	42
118	Nitroglycerin 2.6-3	70.8
119	Nitroglycerin 2.6-4	59.8
120	Nitroglycerin 2.6-5	47.9
121	Nitroglycerin 2.6-6	70.7
122	Nitroglycerin 2.6-7	18.3
123	Nitroglycerin 6.4-1	18.3
124	Nitroglycerin 6.4-2	42
125	Nitroglycerin 6.4-3	70.8
126	Nitroglycerin 6.4-4	59.8
127	Nitroglycerin 6.4-5	47.9
128	Nitroglycerin 6.4-6	28.5
129	Omeprazole 1	83.5
130	Omeprazole 2	83.5
131	Omeprazole 3	54.7

(*Continued*)

Table S2 (*Continued*)

Order	Drugs' generic name	FDR score
132	Omeprazole 4	58.1
133	Omeprazole 5	23.4
134	Omeprazole 6	72.49
135	Omeprazole 7	71.6
136	Propranolol hydrochloride 1	76.7
137	Propranolol hydrochloride 2	53.9
138	Propranolol hydrochloride 3	46.2
139	Propranolol hydrochloride 4	60.6
140	Propranolol hydrochloride 5	60.6
141	Ranitidine 1	42
142	Ranitidine 2	49.5
143	Ranitidine 3	37.8
144	Ranitidine 4	51.2
145	Ranitidine 5	56.4
146	Ranitidine 6	74.2
147	Spironolactone 1	64.9
148	Spironolactone 2	51.2
149	Triamterene-H	61.5
150	Sodium valproate 1	15.8
151	Sodium valproate 2	55.6
152	Sodium valproate 3	58.9
153	Vitamin B11	26.8
154	Vitamin B12	57.3
155	Vitamin B13	58
156	Vitamin B14	53.9
157	Vitamin B15	66.5
158	Vitamin B16	62.3

Abbreviation: FDR, Flesch–Dayani reading.

Table S3 List of all 33 drugs with their treatment group

Order	Generic name	Medication group
1	Losartan potassium	Cardiovascular drugs
2	Metformin hydrochloride	Antidiabetics
3	Glibenclamide	Antidiabetics
4	Metoprolol	Cardiovascular drugs
5	Diclofenac	Analgesics, anti-inflammatory drugs and antipyretics
6	Ranitidine	Gastrointestinal drugs
7	Calcium supplements	Electrolytes
8	Amlodipine besylate	Cardiovascular drugs
9	Nitroglycerin	Cardiovascular drugs
10	Adult cold	Analgesics, anti-inflammatory drugs and antipyretics
11	Nitroglycerin	Cardiovascular drugs
12	Propranolol hydrochloride	Cardiovascular drugs
13	Amoxicillin	Antibacterials
14	Omeprazole	Gastrointestinal drugs
15	Acetaminophen + codeine	Analgesics, anti-inflammatory drugs and antipyretics
16	Captopril	Cardiovascular drugs
17	Clidinium-C	Gastrointestinal drugs
18	Diclofenac	Analgesics, anti-inflammatory drugs and antipyretics
19	Ferrous sulfate	Nutritional agents and vitamins
20	Folic acid	Nutritional agents and vitamins
21	Furosemide	Cardiovascular drugs
22	Hydrochlorothiazide	Cardiovascular drugs
23	Ibuprofen	Analgesics, anti-inflammatory drugs and antipyretics
24	Spironolactone	Cardiovascular drugs

(*Continued*)

Table S3 (*Continued*)

Order	Generic name	Medication group
25	Triamterene-H	Cardiovascular drugs
26	Sodium valproate	Antiepileptics
27	Fluoxetine hydrochloride	Antidepressants
28	Vitamin B1 substances	Nutritional agents and vitamins
29	Alprazolam	Anxiolytic sedatives, hypnotics and antipsychotics
30	Loratadine	Antihistamines
31	Losartan potassium	Cardiovascular drugs
32	Cephalexin	Antibacterials
33	Gemfibrozil	Cardiovascular drugs

Table S4 Flesch reading ease table

Reading ease score	Description	Predicted reading grade
90–100	Very easy	5th grade
80–90	Easy	6th grade
70–80	Fairly easy	7th grade
60–70	Standard	8th–9th grade
50–60	Fairly difficult	10th–11th grade
30–50	Difficult	College grade
0–30	Very difficult	College graduate