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READING DIFFICULTY OF CONSUMER MEDICINE INFORMATION (CMI) LEAFLETS FOR FIVE CHRONIC AILMENTS IN GHANA.

Gyasi, W. K.[1], and Dwumoh, J. S.[2]
Department of Communication Studies, University of Cape Coast, Ghana.
Department of Agricultural Economics and Extension, University of Cape Coast, Ghana.
[1]william.gyasi@ucc.edu.gh
[2]joseph.dwumoh001@stu.ucc.edu.gh

ABSTRACT

Purpose: This study examined the reading difficulty of Consumer Medicine Information leaflets of five chronic-disease medicines.

Design/ Methodology/ Approach: In this descriptive, cross-sectional study, 192 leaflets were randomly downloaded from the World Wide Web: Asthma (35), Cancer (42), Diabetes (41), HIV (29), and Hypertension (45). Text from each 'leaflet' was analysed using the Simple Measure of Gobbledygook (SMOG), Flesch Reading Ease, and Gunning Fog indexes.

Findings: Consistently, the difficulty of the texts exceeded the recommended difficulty levels. A comparison of mean scores showed leaflets for HIV medication were the most difficult to read because they were written at grade levels too high for the average literate adult.

Research Limitations: Readability indexes are suited to only prose. They neither measure how well-organised the text is, nor indicate the suitability of typographical features, such as illustrations, typeface, appeal of presentation, and use of white space. Readability scores do not account for readers' backgrounds, exposure, and motivation.

Practical implication: Developing user-friendly consumer medicine information leaflets can reduce the need for extensive explanations, allowing healthcare providers to allocate their time more efficiently.

Social Implication: Improving the readability of Consumer Medicine Information leaflets can enhance health literacy, leading to better health outcomes and reduced healthcare costs associated with medication errors.

Originality/Value: While readability indices have been widely used, their application specifically to Consumer Medicine Information leaflets for chronic ailments such as diabetes, hypertension, asthma, arthritis, and heart disease in Ghana is novel. Chronic ailments require continuous and often complex medication regimens, making readability particularly crucial.

Keywords: *Chronic diseases. communication. health literacy. patient. readability*

INTRODUCTION

Chronic diseases are a major health and development challenge of the 21st century (Fekadu, et al., 2021). In 2019, non-communicable diseases claimed over 41 million lives globally representing 71% of fatalities (Ramesh & Kosalram, 2023). Rising numbers of people living with chronic diseases indicate the need to provide patients with sufficient information to allow them to manage

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those ailments in ways that fit their lifestyles because adequate communication with patients and their families is essential to good healthcare (Payne, 2002). Package leaflets (PL), also known as Consumer Medicine Information leaflets (CMI), are enclosed in medicine packs to provide essential facts that consumers need to know before, during, and after they take any medicine (National Prescribing Service Limited, 2019; Leuck, 2016). These documents are often difficult to read and understand, especially for those who need them most.

It is increasingly difficult for overwhelmed primary healthcare providers to expend adequate amounts of time on chronic disease patients and their caregivers. Written information could ensure that pertinent advice is targeted effectively (Petterson, 1994). Printed information offers some advantages over verbal communication; for example, distressed patients may not fully understand or recall information provided by healthcare providers in a face-to-face setting. Furthermore, once provided, written information becomes an ever-present reference source during the treatment, keeping patients more aware of what to expect and affording them the capacity to make informed decisions. Written information is good for patients (Flinton et al., 2018). Yet, health information can overwhelm even individuals with advanced literacy skills. Therefore, the prevalence of poor health literacy (HL), and poorly readable health and medicine information material together would be counterproductive to efforts to support persons living with chronic diseases.

In the developing world, where there are critical constraints to accessing healthcare, and where health literacy may be especially low, providing any sort of written health information with poor readability is dangerous. One way to tackle this challenge is to improve the reader-friendliness of CMI, and one such method is based on the assessment of text readability. The authors found that research in Ghana on the readability of written health information materials was critically scanty. It appeared that this scarcity was more so in the case of written medicine information materials that accompany chronic disease medication. In this study, we evaluated the reading difficulty of package leaflets of five groups of chronic disease medications available in Ghana using three readability formulae. We compared reading difficulty among the groups of package leaflets.

THEORETICAL FRAMEWORK

The orientation of this study is rooted in Health Literacy (HL) Theory. The use of health literacy as a term is traced to 1974 when it was originally used as a learning goal in elementary schools and referred to the relationship between the education system, the healthcare system, and mass communication (American Medical Association, 2005). In the last decade of the 20th century, the concept was introduced into the published healthcare knowledge base. From then, the emphasis on health literacy evolved to centre on the health literacy skills of individuals (Cutilli & Bennett, 2009).

In the earliest conceptualisation of health literacy, the attention was on the capacity for or the degree to which individuals apply fundamental numeracy and reading skills to access, process, and comprehend health-related information that they require to make informed decisions (Parker & Ratzan, 2010). Subsequently, the World Health Organisation broadened the focus to describe "the cognitive and social skills that determine the motivation and ability of individuals to gain access

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to, understand, and use information in ways that promote and maintain good health" (World Health Organization (WHO), 1998, p. 10). Some definitions of health literacy focus on health promotion. For instance, Nutbeam (2000) theorises that health literacy encompasses the "personal, cognitive, and social skills" based on which individuals can access, comprehend, and utilise information to promote good health. other definitions bring to the fore the idea that health literacy evolves along individuals' life courses (Mancuso, 2008). Related to this evolving quality of health literacy is the idea that HL is a dynamic state; Zarcadoolas, Pleasant and Greer (2005) define HL as a wide range of skills that people develop, thus highlighting not only the dynamic nature of HL but also the individual agency involved in HL development.

More germane to the present study is those theories and conceptualisations of HL that focus on systemic factors. In this regard, a concept of HL that is particularly apropos is that of the Institute of Medicine (2011), that health literacy has consequences for the entire healthcare effort and is founded on the interface between an individual's competencies and the health settings, education structures, and general socio-cultural milieu within which that individual is embedded. Berkman, Davis and McCormack, (2010) assert that health literacy depends "upon individual and system factors, which also include the communication skills, knowledge, and culture of both the professional and lay person, the context as well as the demands of the health care and public health system." It is this theoretical and operational conceptualisation that drives the present work. The authors approach this work from the perspective that while health literacy primarily involves individual capacity, there are conditions and systems in the healthcare context that could be made to accommodate or complement such individual ability. From this shared responsibility perspective, the authors of the present work contend that media of health communication, such as package leaflets or consumer medicine information can be designed to accommodate or complement the literacy of the average adult health seeker. Approaching health literacy from such a perspective allows for health contexts to be designed to actively counter unhelpful assumptions. Some of these assumptions are characterised as misconceptions by Parnell (2018) are that: 1) patients' affirmative claims of having understood health information and instructions are actual indicators of comprehension, 2) using plain language in healthcare settings (in lieu of medical jargon) is condescending to well-educated patients, 3) only persons with low education (or cannot read and write) have low health literacy skills, 4) patients will voluntarily admit to being unable to read provided health materials, and 5) number of years of formal schooling necessarily signals high health literacy.

As the capacity of an individual to get, process, and understand basic health information and services to make sound health decisions (Institute of Medicine, Board on Neuroscience and Behavioural Health & Committee on Health Literacy, 2004), health literacy is vital to individuals' acting on health information; it also is a key factor in medicine-taking behaviour (Coulter & Ellins, 2007). HL affects a person's ability to engage in self-care and chronic disease management. Limited health literacy has been linked with people skipping preventative procedures, poorly managing chronic diseases, being hospitalised more, and paying higher healthcare costs (US Department of Health and Human Services, 2019). Despite its importance, HL across the world is low. Some estimate that low HL may be as prevalent as 47% in developed countries, and worse in

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developing countries (Munsour et al., 2017). The "challenges in reading and understanding written medicine information leaflets may represent one cause for the high rates of medication errors, such as poor adherence which attenuates optimum medicine benefit" (Alotaibi et al., 2016, p. 123). Moreover, persons with limited health literacy are more likely to have chronic ailments but lesser ability to effectively manage these illnesses (US Department of Health and Human Services, 2019).

METHODS AND MATERIALS

This study was a non-experimental, descriptive research. Five chronic diseases were selected for this study: Asthma, Cancer, Diabetes, HIV, and Hypertension. These were designated Groups 1 to 5, respectively. The researchers randomly selected and downloaded from the World Wide Web a total of 195 digital copies of CMI/PL for commercially available medicines for chronic ailments. No effort was made to control the representation of any one manufacturer's information leaflets in the samples. However, care was taken to ensure that no one leaflet for any medication was duplicated in the samples. The files were grouped according to disease and coded.

The entire text from individual Package leaflets (PL) was copied in turned into an online readability calculator. Not cleaning the text before testing possibly resulted in deviations in reading difficulty by up to two grade levels (Zhou et al., 2017). We run tests using the Flesch Reading Ease (FRE) index, the Gunning FOG index, and the Simple Measure of Gobbledygook (SMOG) index. We analysed the data using both descriptive and inferential statistics.

Informed by the results of tests for normality of distribution in data sets and homogeneity of variance, we run a one-way analysis of variance to compare the SMOG and FRE data, and the robust Welch's ANOVA on the Gunning Fog (Tavakoli, 2012). We applied the post hoc Tukey-Kramer test to the SMOG and FRE data, and the Games-Howell post-hoc test to the Gunning Fog data (Cramer & Howitt, 2004; Tavakoli, 2012). We calculated eta squared for scores of each of the three readability indexes (Ellis 2010). We interpreted eta squared results according to Cohen's (1988) effect size benchmarks. According to these benchmarks, $\eta^2 \geq 0.01 < 0.06$ is small; $\eta^2 \geq 0.06 < 0.14$ is medium; and, $\eta^2 \geq 0.14$ is a large effect size.

RESULTS AND DISCUSSION

Readability levels CMI for five chronic diseases

Table 1 presents statistics describing the readability of the 5 groups of CMI as measured using the readability indices. The mean, as a measure of central tendency was used to describe cases, except where the Shapiro-Wilk test indicated non-normal distribution. In such cases, the median was used.

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Table 1: Descriptive statistics of the readability of CMI for five chronic diseases

CMI Group	Readability index	Mean	Std. dev.	Median	IQR	Shapiro-Wilk Test of Normality		
						Stat.	df	Sig.
Asthma	SMOG	9.48	0.87	9.50	1.1	0.98	34	0.85
	FRE	56.70	4.92	56.5	6.0	0.99	34	0.91
	Fog	11.59	0.80	11.70	1.3	0.97	34	0.50
Cancer	SMOG	9.75	0.66	9.90	0.9	0.97	41	0.43
	FRE	54.50	4.47	54.10	6.7	0.99	41	0.85
	Fog	12.28	0.82	12.30	1.2	0.97	41	0.27
Diabetes	SMOG	9.90	0.74	9.9	1.3	0.97	40	0.34
	FRE	53.58	3.76	53.25	5.9	0.98	40	0.79
	Fog	12.75	1.15	12.85	2.0	0.93	40	0.01
HIV	SMOG	10.23	0.93	10.25	1.2	0.91	28	0.03
	FRE	49.79	6.29	50.10	8.2	0.98	28	0.83
	Fog	12.72	0.99	12.85	1.4	0.97	28	0.67
Hypertension	SMOG	9.69	0.60	9.60	0.7	0.96	44	0.13
	FRE	55.46	4.23	56.25	6.0	0.96	44	0.14
	Fog	12.44	0.83	12.45	1.1	0.96	44	0.12

On the SMOG index (see Table 1), the CMI with the lowest mean readability score were those for Asthma medication (Mean=9.48, SD= 0.87), while the HIV CMI scored the highest median readability (Median= 10.25, IQR= 1.2). On the whole, though, it can be observed from Table 1 that the mean readability scores of all CMI on the SMOG index were approximately 10. This indicates that on average, all the CMI were written to suit the reading ability of a 10th Grade student in the US School system. It is recommended that patient education materials and general-purpose documents be written not above the 5th Grade reading level (The Joint Commission, 2010) and Grade 8 level (Cutts, 2013), respectively. This means that the CMI for all diseases was difficult to read, according to the Simple Measure of Gobbledygook (SMOG) index.

On the other hand, according to the mean readability scores on the FRE scale (see Table 1), the CMI for Asthma (Mean= 56.70, SD= 4.92), cancer (Mean= 54.50, SD= 4.47), and hypertension (Mean= 55.46, SD= 4.23) are *fairly difficult* to read, while the mean score for the HIV CMI (mean= 49.79, SD= 6.29) indicates that most of these documents are *difficult* to read. Meanwhile, the score for the diabetes CMI (mean 53.58, SD= 3.76) reveals that these leaflets would make for fairly difficult reading for the average person.

According to www.readabilityformulas.com, the ideal score for readability on the Gunning Fog index is 7 or 8. The website continues to state that anything written above a score of 12 is practically too difficult for most people to read. Judging by these standards, the CMI for Asthma (Mean=11.59, SD= 0.80), Cancer (Mean=12.28, SD= 0.82), HIV (Mean=12.72, SD= 0.99), and Hypertension (Mean=12.44, SD= 0.83) medications are inaccessible to most people in terms of

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reading ability. With a median of 12.85 (IQR= 2.0), the CMI for diabetes medication was also found too difficult to read on the Gunning Fog index.

The foregoing shows that CMI for the five chronic diseases is poorly written; they are not suited to the reading abilities of most people. This finding agrees with most readability studies on health communication tools such as CMI and PLs. This situation presents a grave implication: in regions of limited reading ability and health literacy, such as Ghana, most people living with chronic diseases may not have access to well-presented written information that would afford them self-management of their life-altering conditions. Such a lapse in communication due to poor readability of CMI may contribute to medication errors, limiting the benefits of medicines (Alotaibi et al., 2016).

Differences in reading difficulty between CMI for five chronic diseases

Variances were homogenous among CMI groups on the SMOG index [F(4, 182)= 1.197, p=0.314] and also on the Flesch Reading Ease index [F(4,182)= 1.681, p=0.156]. For this reason, the classic omnibus analysis of variance (ANOVA) procedure was employed for the SMOG mean scores and also the FRE mean scores. The variances were heteroscedastic [F(4,182)= 3.298, p= 0.012] among the groups on the Gunning Fog index. Therefore, the more robust Welch's ANOVA was employed to compare group means for the Fog index. Table 3 presents the results of the ANOVA, while Table 4 presents results from the Welch test of equality of means.

Table 2: One-way ANOVA results for SMOG Index and FRE index mean scores.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
SMOG Score	Between Groups	9.575	4	2.394	4.261	0.003
	Within Groups	102.232	182	.562		
	Total	111.806	186			
Flesch Reading Ease Score	Between Groups	845.152	4	211.288	9.638	0.000
	Within Groups	3989.830	182	21.922		
	Total	4834.983	186			

Table 3 shows that at p=0.05, the differences between the mean scores for the five groups of CMI were significant in at least some cases. This was true for mean scores from both the SMOG index (p=0.003) and the FRE index (p=0.000). These results mean that although the CMI are generally difficult to read for most people, the difference in the reading difficulty levels of at least some CMI is statistically significant across the 5 groups of documents. The finding agrees with the study of Monkman et al. (2020) who claimed that medication information is often difficult to read and not suitable for consumers This meaning applies to both SMOG and FRE scores.

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Table 3: Robust Tests of Equality of Means for Gunning Fog Index Scores

	Statistic[a]	df1	df2	Sig.
Welch	9.606	4	86.451	0.000

a. Asymptotically F distributed.

According to the information in Table 4, there is a statistically significant difference (p= 0.000) between the means of at least some CMI as measured on the Fog index. This means that while all the five groups of CMI are generally difficult for the average person to read, some are statistically more difficult to read than others.

The Tukey-Kramer post hoc test showed that the Asthma CMI was statistically more readable than CMI for HIV medication as measured on the SMOG index. Also, on the same index, the CMI for hypertension medication was easier to read than those for HIV medication. Meanwhile, as measured by the Flesch Reading Ease index, CMI/PLs for asthma medication were statistically easier to read than those for diabetes and HIV. PLs for cancer medicine were easier to read than those for HIV; PLs for diabetes medication were easier to read than those for HIV; and PLs for hypertension medication were found easier to read than those for HIV.

As for scores from the Gunning Fog index, The Games-Howell post hoc test showed cancer CMI more difficult than asthma CMI, diabetes more difficult than asthma, HIV more difficult than asthma, and hypertension more difficult than asthma. Asthma is the least difficult to read. No differences were detected between any other pairs of means. Both post hoc tests appear to agree that CMI/PLs for HIV medication may be the most difficult to read among the five groups tested. Mullen, (2018) asserted that low reading level text and simple memory cues for fitting medications into daily life (e.g. meals, sleep routine) appeared to enhance self-management behaviours among an HIV cohort. Moreover, it appears that the leaflets for asthma medication were the most reader-friendly among the otherwise generally difficult Consumer Medicine Information (CMI) tested.

Statistical significance notwithstanding, eta squared tests showed that it was only on the SMOG scale that the magnitude of the effect of membership in the independent variable (Disease CMI) on the dependent variable (readability) was medium (η^2= 0.086) (see Table 5). η^2= 0.086 signifies that only 8.6% of the variation in the readability scores on the SMOG index is accounted for by variability in the CMI. This means that, regardless of statistical significance, the differences in reading difficulty among the CMI as measured on the SMOG scale are only significant to a medium degree in practical terms.

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Table 4: Eta squared results for SMOG scale scores

Tests of Between-Subjects effects						
Dependent Variable: SMOG Score						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9.575[a]	4	2.394	4.261	0.003	0.086
Intercept	17523.664	1	17523.664	31196.810	0.000	0.994
DISEASE	9.575	4	2.394	4.261	0.003	0.086
Error	102.232	182	0.562			
Total	18030.150	187				
Corrected Total	111.806	186				

[a.] R Squared = 0.086 (Adjusted R Squared = 0.066)

In contrast, it was observed from eta squared analysis of the scores from the FRE scale that the magnitude of effect, or effect size, was large (η^2=0.175) and that it was not trivial (see Table 6). 17.5% of variation in the readability scores as measured on the FRE index was explained by variation in the CMI. This means that, in practical terms and according to the FRE scale, the differences in the reading difficulty among the various CMI are substantive, this is in alignment with Georgsson and Carlsson (2020) argued that many clients may experience difficulties reading written information and health literacy is an important concept that can have a substantial consequence on the health of the patient.

Table 5: Eta squared results for FRE scale scores

Tests of Between-Subjects Effects						
Dependent Variable: Flesch Reading Ease Score						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	845.152[a]	4	211.288	9.638	0.000	0.175
Intercept	531225.363	1	531225.363	24232.363	0.000	0.993
DISEASE	845.152	4	211.288	9.638	0.000	0.175
Error	3989.830	182	21.922			
Total	554585.660	187				
Corrected Total	4834.983	186				

[a.] R Squared = 0.175 (Adjusted R Squared = 0.157)

Similarly, it was observed from eta squared analysis of the scores from the Gunning-Fog scale that the magnitude of effect, or effect size, was large (η^2=0.163) (see Table 7). 16.3% of differences in the reading difficulty levels as measured on the Gunning-Fog index were explained by differences in the CMI. This means that, in practical terms and according to the Gunning-Fog scale, the differences in the reading difficulty among the various CMI are substantive.

Patients who are given consumer medicine information have been found to have improved knowledge about their medication generally, consistent with Schubbe et al. (2020) concluded that

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patients are more likely to be content with their treatment and are also more aware of possible side effects of medicines. Consumer Medicine Information (CMI) has been shown to improve compliance with a prescription regime (Im & Huh, 2022).

Table 6: Eta squared results for Gunning-Fog index scores

Tests of Between-Subjects Effects						
Dependent Variable: Gunning Fog Index Score						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	30.346[a]	4	7.587	8.892	0.000	0.163
Intercept	27810.419	1	27810.419	32594.541	0.000	0.994
DISEASE	30.346	4	7.587	8.892	0.000	0.163
Error	155.287	182	0.853			
Total	28748.110	187				
Corrected Total	185.633	186				

[a.] R Squared = 0.163 (Adjusted R Squared = 0.145)

Based on the effect size estimates for scores from both the FRE index and the Gunning-Fog, it appears that the differences in reading difficulties detected among CMI for the various chronic diseases may be felt in the real world.

Word characteristics for the five groups of CMI

Syllables per word averaged approximately 2 across all five groups of CMI. However, the HIV CMI recorded the highest average percentage multiple (3 or more) syllables per word (Mean 17.38, SD= 2.688), while cancer CMI recorded the lowest percentage multiple (3 or more) syllables per word (Mean= 14.99, SD= 1.530). The HIV CMI having the highest mean percentage of 3 or more syllables per word is consistent with the finding of McCarthy et al. (2023) that it was persistently more difficult to read than all the other CMI on all the indexes.

Summary of findings

According to the SMOG, FRE, and Gunning-Fog indexes, the CMI for asthma, cancer, diabetes, HIV, and hypertension were too difficult to read for the average person. The difficulty levels of the CMI of the five diseases suggest that patients who are given these PL/CMI will not be afforded improved knowledge about their medication. This situation reduces the likelihood of patients being content with their treatment and also being aware of possible side effects of medicines (Furlan, & Power, 2020). CMI has been shown to improve compliance with a prescription regime (Mullen, et al., 2018). However, the high difficulty levels of the studied CMI cannot be expected to encourage compliance with the prescription regimes therein.

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There were statistically significant differences between some of the CMI/PL of the five diseases on all the indexes; the HIV CMI consistently came out most difficult while the leaflets for asthma came up consistently easiest to read. This has serious implications for people living with HIV. Since it is acknowledged that it is possible for health information to overwhelm even individuals with advanced literacy skills (US Department of Health and Human Services, 2019), the unacceptably high difficulty level of the HIV CMI would be expected to present significant challenges to the average person.

The differences between the readability of the CMI/PLs were only medium on the SMOG. However, on the FRE and Gunning-Fog indexes, the differences found in the readability scores were large. This means that the difficulty in reading the various CMI/PLs will be felt by the average person in the real world. This finding is important because, as asserted by Gyasi (2013) in a study of the readability of malaria medication CMI, failure to provide the failure to render written health information in a comprehensible manner could have serious adverse consequences.

Sentence lengths among the various CMI were found to be below the recommended upper limit of 20 words per sentence. Therefore, sentence lengths of the various CMI/PLs were discounted as contributing to the poor readability of the documents.

There was indication though that syllable count may have contributed to the reading difficulties of the various documents. The HIV CMI had the highest mean percentage multiple syllable counts of all the groups of documents tested and this coincided with those CMI being the most difficult to read among all the documents tested.

CONCLUSION

The medicine information leaflets for the five chronic diseases are difficult to read. They would likely provide comprehension challenges to the average Ghanaian. While these materials are easily obtained by members of the Ghanaian public who live with the chronic ailments concerned, they might not be necessarily useful to most Ghanaians are health communication tool. Most patients who use these medications likely still need careful medical advice to make the best use of these medications to promote their quality of life and mitigate potential drug-related problems.

Practical Implications

The practical implications of reading difficulty in consumer medicine information leaflets for chronic ailments in Ghana are far-reaching. Developing user-friendly consumer medicine information leaflets can reduce the need for extensive explanations, allowing healthcare providers to allocate their time more efficiently.

Simplifying the language and format can improve comprehension, leading to better adherence and health outcomes. Providing clear, concise, and easy-to-understand instructions can reduce the risk of medication errors and enhance patient safety.

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Social Implications

The readability of consumer medicine information leaflets for chronic ailments in Ghana has profound social implications. Improving the readability of Consumer Medicine Information leaflets can enhance health literacy, leading to better health outcomes and reduced healthcare costs associated with medication errors.

Simplifying the language and presentation of Consumer Medicine Information leaflets can promote health equity, ensuring that all patients, regardless of their educational background, have equal access to essential medical information.

Addressing reading difficulties can significantly enhance health literacy, promote equity in healthcare, improve chronic disease management, empower patients, bolster public health education, build trust in healthcare providers, reduce healthcare costs, and ensure cultural sensitivity.

Recommendation

It is recommended that healthcare practitioners be sensitised to findings such as the ones in this paper; healthcare providers must understand that medicine information leaflets, while useful, may not be comprehensible to most patients. The object of such sensitisation is to promote clear, measured communication between healthcare personnel and patients with chronic ailments about medications. It is also recommended that the Ministry of Health (Ghana), the Ghana Pharmacy Council, and the Pharmaceutical Society of Ghana supply ongoing public education about the need for patients to consult professional health personnel even if patients feel that they can read medicine information leaflets. Such consultations should help patients confirm their understanding of Consumer Medicine Information (CMI) information.

While readability indices have been widely used, their application specifically to Consumer Medicine Information leaflets for chronic ailments such as diabetes, hypertension, asthma, arthritis, and heart disease in Ghana is novel. Chronic ailments require continuous and often complex medication regimens, making readability particularly crucial. This study is also novel in the sense that if focuses on Ghana; there is a dearth of such research in African and Ghanaian contexts.

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