READABILITY OF HIV/AIDS INFORMATION MANUALS IN GHANA

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Abstract

This paper examined the readability of some medical information documents for HIV/AIDS patients in Ghana. The SMOG readability formula was used to determine the reading levels of the documents which were obtained through convenience sampling technique. One sample T-test was used to determine whether there were statistically significant differences in the readability of the sampled HIV/AIDS literature compared to a standard 8th grade recommended for public documents. The bootstrapping technique was employed in this evaluation to ensure robust estimates of significant or p-value, standard errors and the confident intervals. The study revealed that the leaflets were generally difficult to comprehend when compared to the standard readability score of public reading materials. The study concluded that it is prudent such documents are written in plane language in order that the target readers would benefit from the information carried by these documents.

Key Words: readability, healthcare, HIV/AIDS, SMOG, patients, leaflets

Introduction

Effective healthcare delivery depends to a large extent on effective clinician-patient communication. In fact, 'health literacy' has been described as the currency for

improving the quality of health and healthcare (Paasche-orlow, Parker, Gazmarian, & Rudd 2004). Good clinician-patient communication is demonstrated when patients are able to understand the health information and treatment recommendations they receive and feel comfortable enough to ask questions or admit when they do not understand something (Barret, Candidate, & Puryear, 2006) In other words, health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.

The dimensions of effective healthcare delivery portray that its success is based on interactions between patients' skill levels and the demands of healthcare and social systems (Kaphingst, Weaver, Wray, Brown, Buskirk & Kneuter, 2014). From the angle of patient skills, attributes such as education level easily comes to the fore. On the other hand, the ease of reading information provided by the healthcare organisations becomes important. If a patient's literacy is low and information provided to assist in healthcare delivery is written such that it is beyond the reading ability of the patient, then effective communication is hampered. This demonstrates the interaction effect of patients' skill level and those of healthcare systems. It is known that healthcare is usually poor among poorer communities usually due to their inability to afford healthcare delivery. Yet, poorer communities are likely to be the least educated within any society. Therefore, effective healthcare communication is probably of greater concern amongst poor societies.

Although general healthcare communication must be encouraged, special emphasis should be placed more on some disease conditions than on others, depending on the effect of that disease condition on the individual and the society at large. For example, certain ailments carry strong stigmatisation with enormous effect on the economy when curative measures are put in place. HIV/AIDS is one of such diseases with strong stigmatisation. It has been indicated that unlike other chronic infections, HIV and AIDS have been associated with fear, ignorance and denial, leading to stigmatization and discrimination against infected and affected persons (Letamo, 2004). Stigma isolates Persons Living with HIV and AIDS (hence forth will be known as PLWHA) from their families and communities and this could affect their overall quality of life (Rankin, Brennan, Schells, Laviwa, & Rankin. 2005; Campbell, Nair, Maimane & Nicholson, 2007; Mcinnes & Haglund, 2011). Stigma and discrimination nurture secrecy which adversely affects prevention and treatment efforts and could intensify the impact of the epidemic (Rankin, et al. 2005)

At the onset of the HIV and AIDS pandemic, the disease was mainly found among groups (homosexuals, injection drug users, and sex workers) who were already socially marginalized and discriminated against (Letamo, 2004). PLWHA may become

implicitly associated with stigmatized behaviours, regardless of how they actually became infected. Since stigma is often rooted in social attitudes, HIV-infected persons are habitually ostracized, rejected, shunned and may experience violence (Letamo, 2004). The associated stigmatisation makes it challenging for PLWHAs to seek necessary medical help.

Nevertheless, there is indication that some PLWHA have made efforts to seek treatment (Dako-Gyekye, Dako-Gyekye, & Asampong, 2015). A common aspect of HIV treatment is counselling which could be offered orally or written. Whichever form it takes, counselling must be easily understood by the PLWHA to help them manage the stigma and live meaningful lives. What if the counselling offered, especially in written form, is not easy to read? Will not the PLWHA who are already traumatised by their disease condition coupled with societal rejection give up on their own selves, thinking that their condition is beyond repair?

On the other hand, those not living with HIV/AIDS could be helped to desist from the stigmatisation by being educated about the condition. In fact, several people stigmatise those with HIV/AIDS because of misconceptions about the disease. For example, many people think that they can be infected with the disease through casual contact such as eating together. In this instance also, education plays a critical role. A relatively cheaper way, it seems, will be to publish literature and make it available to the masses to read. This approach could be further enhanced through the use of webpages since a lot more people seem to be used to reading materials from the electronic gadgets (phones, PDAs, computers etc.). Yet, even with this approach, the efforts will be futile if readers cannot easily read and comprehend what they read. Therefore, healthcare documents are provided to assist (1) PLWHA to seek medical help and (2) those not living with HIV/AIDS, must for certainty be readable (Adam, Eltorai, Han, Truntzer & Daniels, 2015).

Readability has been defined as the total sum of all those elements within a given piece of printed material that affects the success a group of readers have with it (Flesch, 1949) The success is the extent to which they understand it, read it at an optimal speed, and find it interesting.

To be able to quantify the ease (or difficulty) of reading a text, mathematical formulas derived from regression studies have been employed, termed 'readability indexes or formulas.' Simply put, readability formulas are based on vocabulary difficulty and syntactic complexity. Vocabulary difficulty refers to the degree to which a text contains words that are unfamiliar and/or difficult to understand (Bailin & Grafstein, 2016). Syntactic complexity in contrast, refers to the degree to which the sentences in a text

have complicated grammatical structures. That is, the longer a word is, the more difficult it is to comprehend.

In nearly 100 years of its usage, readability formulas have undergone criticisms and have necessitated the formulation of new indexes over time to make up for shortfalls in earlier formulas. As a result, over 200 indexes are in existence currently (Bailin & Grafstein, 2016). While some are classical in nature focusing on syntactic features such as word length (e.g. Flesch reading ease, SMOG, Fog, and Fry), others are anchored on cognitive theories in science. Still, others are based on statistical modelling techniques (Benjamin, 2012).

In evaluating healthcare materials, the SMOG readability index has been suggested to be the most suitable (Wang et al., 2013). The SMOG (Simple Measure of Gobbledygook) is a readability formula which predicts the years of formal education needed to understand or comprehend a particular text. This readability formula was created by G. Harry McLaughlin in 1969. The SMOG readability formula was propounded to deal with the lapses in other readability formulas like the Gunning Fog. This formula was developed specifically for checking health messages, but has been applied to language learning texts (Hedman, 2008). Although the SMOG readability formula is seen as being too simplistic, it is preferred in evaluating the difficulty of the language of customer health related materials (Fitzsmmons, Michael, Hulley, & Scott, 2010). According to McLaughlin (1969), the researcher should select 10 successive sentences at the beginning of the text, 10 from the middle, and 10 from the end, and count every polysyllabic word and take the square root of the total. The result obtained after this process, represents the reading grade that a person should attain to understand the text.

Although there have been many earlier works on the readability of healthcare literature even within the field of HIV/AIDS (Adam et al., 2015; AlKhali, Shukk, Patel. Sanghvi, & Hubbi, 2015; Baccini, Iverson, & Caputi, 2010; Cheng & Dunn, 2015; Hadden et al., 2016) there is limited work within the context of Ghana. Except for an earlier work reported by Gyasi (2013), there has not been any. Even so, Gyasi (2013) employed the Flesch and Fog readability indexes although the SMOG index has been shown to be the best alternative to evaluate the readability of healthcare literature (Wang, Miller, Ph, Ph, & Schimih, 2013). In addition, his work was not related to HIV/AIDS but rather malaria information leaflets. Therefore, this paper builds on this earlier effort by applying the SMOG readability index to evaluate the readability of HIV/AIDS information manual.

Purpose of the Study

One major factor militating against efficient management of HIV/AIDS is stigmatization (Letamo, 2004). Education is one major key that can extenuate this canker (Corcoran & Ahmad, 2016). Over the years, several approaches to education have been taken. These include radio, television and internet programmes aimed at helping both PLWHA and those who are not, to understand this condition. Recently in Ghana, information leaflets have become a major source of education on HIV/AIDS. These leaflets are shared at programmes organised to educate the public on HIV/AIDS as well as other social gatherings such as funerals and parties.

If these leaflets will achieve the purpose for which they are designed, it is important that the authors take into consideration the need to write them in a manner that will be readable to the readers. This is important because in Ghana, studies reveal that there is a downward trend in the linguistic proficiency of Ghanaians in general. Many school leavers including students in Ghanaian schools, colleges and universities can hardly comprehend what they read (Owusu-Ansah, 2010). To this end, the purpose of this paper was guided by the following research questions:

1. How readable are HIV/AIDS information documents in Ghana?

2. Is there statistically significant difference in the readability of HIV/AIDS information documents compared to standard of 8th grade recommended for public documents?

Review of Related Literature

Adequate literature has been published in the field of readability of healthcare material. With respect to HIV/AIDS, an earlier researcher measured the readability of Australian based informed consent documents employing the SMOG and Fog indexes (Buccini et al., 2010). Using a total of 200 consent documents, the researcher discovered that the HIV/AIDS informed consent documents were, on average, written at a grade 13 reading level. This was above recommended grade reading age of 8. Earlier, the readability in 136 HIV/AIDS educational items using the SMOG Index was evaluated (Wells, 1994). The result was similar to the findings of Buccini et al. (2010).

In other healthcare material, aside those related to HIV/AIDS, Corcoran & Ahmad (2016) investigated the readability and suitability of sexual health promotion leaflets using the SMOG and Fry indexes. These authors found that the leaflets were at an average reading level of grade 9, which was above recommended reading level of 6-8. Corroborating this finding, Hadden, Brince, Schnaekel, Couch, Stephenson, and Wyrick (2016) evaluated the readability of patient education material in hand surgery

using the multiple readability tools. Although they found improvement in readability over earlier studies, the readability was still above recommended reading grade levels. Similar findings have been reported elsewhere (Carol & Hosei, 2008; Kasabwala, Misra, Hansberg, Agarwall, Baredes, Setzen & Anderdon, 2013; Morony, Flynn, Mccaffy, Jansen & Webster, 2015; Suleiman, Lin, Constantine, Ballonof, Lin, & Constantine, 2016).

As technology keeps growing, more and more individuals have gotten used to fishing for healthcare information from the internet. Hence, a number of researchers have evaluated the readability of online healthcare material. For example, Adam et al. (2015) evaluated whether the American Orthopaedic Society for Sports Medicine (AOSSM) website's patient education material meet recommended readability guidelines for medical information. Using Flesch-Kincaid readability index, these authors found that the average readability of all 65 articles was of grade level of 10 which was above recommended readability of sixth grade level. Similar findings using Flesch indexes have been reported, all indicating corpora of texts that are above the readability of the target population (AlKhali et al., 2015; Cheng & Dunn, 2015; Evans, Chao, Leon, Finney, & Fraser, 2016; Mcinnes & Haglund, 2011).

Readability of HIV/AIDS Educational Materials

Health literacy is an essential component of the current healthcare delivery system and management of personal health (Wilson, 2009). Patient Health Materials are written materials that provide information about the condition and treatment for a patient. These materials range from brochures, pamphlets, manuals, and comic books, among others. According to Wilson (2009), although there are many factors that affect health literacy, reading level is one that has a major influence and impact on the overall ability of health literacy to achieve its intended purpose of equipping patient or people with the needed information concerning health. This is similar to the idea of Angela and Singh (2001) that while accuracy of the materials is not in question, their readability may determine the degree to which patients actually benefit from reading them. Assessment of the readability of patient education materials is a vital component of health education (Wilson, 2009). In his assessment using Flesch reading scale and SMOG readability formulae, Wilson (2009) discovered that patient educational documents had high readability score that requires ninth to twelfth grade level in order for readers to comprehend them. This finding is consistent in the literature about printed material on HIV/AIDS with high readability score above their intended readers. Such oblivion of readability in the preparation of printed documents for patients and people about major health issues like HIV/AIDS stripped those documents of their ability to inform and influence patients' attitudes, behaviours and decisions about health.

HIV/AIDS is an epidemic that attacks the immune system causing infested person to suffer numerous related diseases that can eventually culminate death if not properly handled. For several decades, HIV was a major pandemic that faced the health sector with rising records of mortality and infections in Africa and many other parts of the world. The mode of transmission of the virus is sex, infested blood transfusion, mother to child, among others. Even though many health interventions have been discovered to cure the diseases, HIV is still dreaded by many in society.

According to Joseph, et al. (2010), the disease infected young adults more than any other age group. The statistics in 2007 showed that out of the 1.7 billion people who were infected by HIV, 5.4 million were between the ages of 15 to 24. Moreover, about 45 per cent of the new infection in that same year was the same age group. It is therefore observed that young adults remain at the centre of the HIV/AIDS epidemic in terms of vulnerability, impact and potential change. This age group is therefore more likely to be the target of HIV/AIDS communication. However, as observed by Angela and Singh (2001), although patient educational documents are written accurately, many patients do not fully understand them. The authors argued that while the reading level of the materials may be appropriate, the readability level is not. The readability is related to writing style, and is the ease with which a patient can understand or comprehend written materials. While accuracy of the materials is not in question, their readability may determine the degree to which patients actually benefit from reading them. As stated by Johnson, Mailloux, and Fisher (1997) documents developed for Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS) education have been assessed as having excessive readability levels, thus 11.2-14 (cited Hochhauser, 1987; Wells, 1991).

According to Wells (1994), the reading difficulty of many HIV/AIDS brochures and pamphlets limits their effectiveness. Using SMOG Index, Wells discovered that the medium of communication determines the level of readability, in that the comic books and brochures are more readable than books and pamphlets on HIV/AIDS. Also, his findings revealed that depending on the target audience, the material readability may differ. For instance, while documents targeting HIV antibody test seekers, the general community and sexually active adults have a more difficult reading grade of 12.1, that of materials for ethnic minorities average a more readable of 9.2 score. However, the author could not find a significant correlation between HIV documents producers and the readability of the materials; nevertheless, he discovered that documents from AIDS specific organisation are more readable than those from other organisations. The author concluded that an understanding of the literacy of target audiences is needed to produce

documents with appropriate reading levels, and that policies to influence producer organizations may result in the creation of more readable documents.

Again, Singh (2000) analysed the brochures related to HIV/AIDS to determine if they were written at a level appropriate for the target audience and the extent to which they incorporated variables identified in the research literature as facilitating comprehension. Using SMOG readability formula, the author discovered that the brochures were written beyond the reading level of intended audiences. With the aid of Readability Assessment Instrument (RAIN), Singh (2000) observed that though the documents incorporated more variables that are proposed to facilitate comprehension, the author however states that the variables were not used to the extent necessary to ensure that readers would be able to read and understand them. He therefore, recommends that HIV/AIDS brochures be rewritten with readability in mind and comprehension variables incorporated for effective communication with audience.

Johnson, Mailloux, and Fisher (1997) studied the readability educational materials on HIV/AIDS distributed to drug users. Collecting eduacational materials from four sites (Anchorage, Columbus/Dayton, Denver, and Long Beach) and using Flesch Kincaid, Flesch ease and Gunning Fog readability formulae, the authors discovered even though the educational documents were accessible; the readability levels of the materials were high thereby rendering the materials inaccessible to readers in terms of understanding the content of the documents.

Joseph et al (2010) conducted a comparative study to evaluate the readability and test-retest reliability of a questionnaire designed to assess the attitudes, beliefs, behaviours and sources of information about HIV/AIDS among young adults recruited from universities in the United States of America (USA), Turkey and South Africa. The psychometric instrument developed has five major subscales: demographic, HIV/AIDS attitudes and beliefs, HIV risk sexual behaviour, alcohol and drug use, and HIV sources of information. The authors discovered that the instrument's readability evaluation revealed a Flesch-Kincaid score (literacy difficulty level of the questionnaire) of 8.4, indicating that respondents would need an eighth-grade reading level to understand the survey. The overall test-retest reliability coefficients for the items on the demographic subscale were generally high (0.893–0.997). Similarly, high test-retest reliability was obtained for the HIV risk sexual behaviour (0.738–0.996) and the alcohol and drug use (0.562–1.000) subscales. Much lower test-retest reliability was obtained for the HIV/AIDS attitudes and beliefs (0.32–0.80), and sources of information about HIV/AIDS (0.370–0.892) subscales. The authors' findings revealed that the readability of instrument used to assess HIV/AIDS was difficulty to read especially when correlated with the target audience who were mainly youth. Joseph et al (2010) also

observed that in many countries around the world, HIV prevention education is generally communicated through advertisements on the radio, television, on billboards and in print media. The type of message communicated, used by the media, and the level of intensity of the prevention education, varies from country to country. Therefore, the authors find cross-cultural comparison of young adults' HIV/AIDS attitudes, beliefs and sources of information about the disease can provide opportunities for sharing exchanges on intervention approaches or may suggest the universality or otherwise of specific HIV risk behaviours.

It is obvious that while other channel of communication such as the broadcast and internet can be used to reach patients and people about HIV/AIDS information, the print media remains a concrete channel mostly resorted to, to reach audiences with information. Notwithstanding the accuracy and other plausible features of the educational materials of HIV/AIDS, the readability of such materials is a major determiner of the benefits that readers derive from the materials. To compromise the readability of brochures, pamphlets and other printed media, is to strip them of their ability to inform and educate the audience on key issues about HIV/AIDS. It is therefore vital to add to the extant literature how the readability of HIV/AIDS manual is to readers, especially in the Ghanaian context. Moreover, the fact that HIV/AIDS affects all age groups, with the ages of 15-24 being the highest victims, indicates that determining the readability of such documents will have to take into account the socio-demographic features of the audience and therefore a call for producers to produce highly readable texts to meet the varying needs of the audience.

Methodology

The study was quantitative. The convenience sampling technique was employed as the sampling procedure for this study. The convenience sampling procedure was used because the sample frame for all HIV/AIDS related literature was practically impossible to determine. That is, the total number of different reading documents in Ghana on HIV/AIDS cannot be determined. A lack of known sampling frame makes the use of probability sampling techniques impossible. Hence, literature that were readily available were used. Although this limited the making of inferences from the findings of this study to any other literature on HIV/AIDS, it served a useful stepping stone. As has been explained elsewhere, the purpose for this paper was to draw inferences from the process which produced the results realised in this study (Hayes, 2005). Although the use of non-probability sampling techniques has been criticised due to its inherent inability to generalise findings to the population, it has been aptly indicated that when a researcher's interest is to process inference, the sampling procedure takes a back seat when interpreting the results (Hayes, 2005).

Hard copies of eight reading documents (pamphlets, leaflets, and books) were obtained from Ghana AIDS Commission in the Cape Coast Metropolis of the Central Region of Ghana. Portions of the documents were selected using earlier described approach by Flesch (1949) which is selecting portions at the beginning, middle and endings of each document. The selected texts of each of the documents were first converted to electronic form by typing them, using Microsoft's Word processor. The electronic documents were then proof-read to ensure that all punctuations were same as in the original hard-copies. The typed documents were then copied into an online readability calculator to calculate its readability (www.webpagefx.com). This online calculator was used because it is very accurate and popular. Microsoft's Word processor was not used to compute the readability scores because of its inability to compute SMOG readability scores.

The SMOG readability scores were used for this analysis because (as has been indicated earlier) it is suggested to be the most accurate of all the classical readability formulas designed for healthcare documents (Benjamin, 2012). In addition, because almost all readability assessments of health documents have used this index, using the same index in this study provides a common ground for comparison.

With the help of IBM Statistical Products and Services Solutions (SPSS) version 23.0, frequencies, percentages, means, and standard deviations were used to describe readability, and the number of years required to read and understand.

One sample T-test was used to evaluate research question 2 which was to determine whether there was statistically significant difference in the readability of sampled HIV/AIDS literature compared to standard of 8th grade recommended for public documents. Bootstrapping technique was employed in this evaluation to ensure robust estimates of significant or p-value, standard errors and the confident intervals (Tabachnick & Fidell, 2013; Field, 2013).

Results and Discussion

Research question 1: How readable are the sampled HIV/AIDS literature?

The findings indicate that the eight materials on HIV/AIDS were between 'fairly easy' to read and 'fairly difficult' to read (see page 22). On the average, the readability of all eight documents put together (composite) was graded as standard to read, with a SMOG score of 7.8. Two of the eight documents were readable even to class six pupils. The most difficult could be read by SHS 1 leavers.

This finding seems to indicate improvement over the readability of health documents reported earlier by Gyasi (2013) on malaria medicine information leaflets. He found all leaflets difficult to read, some even requiring college degree.

Research question 2: Is there statistically significant difference in the readability of sampled HIV/AIDS literature compared to standard of 8th grade recommended for public documents?

Results from the one sample T-test with bootstrapping presents the findings to answer this question (see page 22). The result shows that the readability of the eight documents were standard, not statistically too different from 8th grade reading level. Although this is good, it has been suggested that readers prefer to read at a level below their own reading level (Cutts, 2013). This rule of thumb is particularly useful for developing countries like Ghana with lower literacy rate compared to other developed lands for which a grade level of eight has been indicated to be appropriate. In addition, since HIV/AIDS affects all groups of people, old and young alike, the readability of any material that offers help to improve treatment and reduce stigmatisation must particularly be easy to read. Having readable HIV/AIDS information literature will help adjust people's perception about the disease and those suffering from it, thereby reducing the stigmatisation and enhance willingness on the part of sufferers to seek medical help.

The relatively high readability recorded for these documents could be due to the use of mono and disyllabic words, coupled with short sentences. This is the case because the SMOG index uses these syntactic features such as sentence length as variables in its calculations. Commenting the need to use short sentences and the effect of long sentences, it has been opined that long sentences give the reader too much to cope with (Cutts, 2013). That is, unless they are of simple construction, long sentences cause confusion because they demand so much effort and short-term memory. Hence, it appears that the authors of these literature used simple, short and even familiar words in their sentence constructions.

Conclusion

The objective of this paper was to evaluate the readability of eight healthcare literature on HIV/AIDS used in the Cape Coast Metropolis of Ghana. It was found that the healthcare literature was, on the average, of standard readability. There was no significant difference in the readability of these literature compared to recommended readability level of 8th graders for documents meant for the public such as the ones evaluated in this work.

Although the finding is commendable, compared to earlier work on the readability of malaria drugs information leaflets in Ghana, it is suggested here that these and other healthcare literature could further be made more readable since the literacy rate in Ghana is relatively lower compared to other developed countries. Making the literature more readable will enhance knowledge about HIV/AIDS, and help to adjust negative perceptions of those suffering from the disease. This will lead to reduced stigmatisation and boost sufferers' confidence to be open in order to seek needed medical assistance.

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Table 1: Readability of eight materials on HIV/AIDS

Material	SMOG score	Difficulty
A	5.80	Fairly Easy
B	5.60	Fairly Easy
C	8.10	Standard
D	8.60	Fairly Difficult
E	9.30	Fairly difficult
F	9.90	Fairly difficult
G	7.00	Standard
H	8.10	Standard
Composite	**7.80**	**Standard**

1. n = 8.

Source: Field Data (Gyasi, 2016).

Table 2: One sample T-test wit bootstrapping of readability of HIV/AIDS literature

Test Value = 8					
T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
-.363	7	.73	-.20	-1.50	1.10