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A PILOT INVESTIGATION INTO THE READABILITY OF SESOTHO HEALTH INFORMATION PAMPHLETS

ABSTRACT

Printed patient health communication in South Africa is under pressure for various reasons, one being ignorance of the level of health literacy of patients. This pilot study investigated the readability of Sesotho pamphlets given to Sesotho-speaking patients with chronic diseases in the public health sector. Findings obtained through readability tests indicate that the reading level of pamphlets handed to patients is too high, requiring the reader to have had a reading education of approximately nine years or more. This means it is written on a level requiring secondary education, while many people did not complete primary education. The South African context dictates that material should not be written at a level higher than Grade 7 (seven years of schooling), since 21% of the inhabitants of the Free State province has a literacy level (based on years of schooling completed) of Grade 7 or lower.

Keywords: health communication; health information pamphlets; readability; health literacy; Sesotho; Flesch Reading Ease; Flesch-Kincaid Grade level; Fry Assessment Interpretation; Coleman-Liau Index

INTRODUCTION

Patients visiting public healthcare services are often handed health information pamphlets to explain or provide more information about a specific health problem. These pamphlets normally originate from sponsoring non-governmental organisations (NGOs) or the Departments of Health, either provincially or nationally. This study, as part of a larger project aimed at designing a health literacy test for Sesotho speakers, investigated whether Sesotho health information pamphlets have an acceptable readability level for patients to access the information contained therein.

Health literacy encompasses the personal characteristics and social resources needed for individuals and communities to access, understand, appraise and use information and services to make decisions about health. From this definition, it is clear to see why readability assessment forms an integral part of the majority of health literacy tests, such as REALM (Arozullah *et al.* 2007), TOFLHA (Parker *et al.* 1995), or

Newest vital sign (Weiss *et al.* 2005). Since a patient must be able to access (mostly through reading) the information contained in health pamphlets, it is important to ascertain whether the readability of these pamphlets is on an accessible level (ideally at a readability level 7 or lower to accommodate possible low schooling levels).

Although research in the field of health literacy has blossomed worldwide, somehow this development largely passed the African continent. The eluded focus needs to be understood within the context of the continent being home to some of the world's most impoverished populations, facing an ever-increasing threat of chronic conditions (Economist Intelligence Unit 2011). At present, African healthcare needs are being delivered within an insufficient healthcare infrastructure, where skilled healthcare workers and essential medicines are in short supply (Economist Intelligence Unit 2011).

South Africa cannot divorce itself from Africa. Apart from being part of the unique circumstances of this continent, the South African healthcare sector's current unequal distribution of resources has been influenced by its political past (Gaede & Eagar 2014; Sibiya & Gwele 2013). The public sector forms the largest healthcare system in the country, with the majority of the population relying on a public healthcare system that has a disproportionately lower amount of financial and human resources at its disposal relative to the private sector (Atabuga 2013; Coovadia *et al.* 2009).

To worsen the context, the overburdened South African public healthcare system is faced by the following leading causes of YLL (years of life lost) across the county, namely tuberculosis, HIV-related conditions, cerebrovascular diseases, ischaemic heart disease and diabetes (Groenewald *et al.* 2014). Forming part of this scenario is the fact that multi-morbidity affects a substantial number of South Africans, with a skewed distribution towards the poor (Atabuga 2013). Due to these complicating factors, teaching those with chronic conditions to manage their health will be key to avoid overreliance on the public healthcare system (Economist Intelligence Unit 2011).

The provision of health information pamphlets in hard copy to assist in teaching patients about health related topics is a well-known practice, also in resource-restricted health systems such as South Africa (Wasserman *et al.* 2010). In order for printed pamphlets to be successful, they should be tailor made to address all patients, and especially those of low literacy (Wilson *et al.* 2012).

The culturally rich and ethnically diverse population of South Africa, home to 11 official languages, creates unique challenges for researchers and healthcare workers alike when attempting to address readability assessment of health pamphlets. Almost half of all Sesotho-speaking South Africans reside in the Free State province, where 63% of the population speaks Sesotho (SouthAfrica.info 2015). This pilot study only investigated the readability of Sesotho pamphlets, but it would contribute considerably to the accessibility of health information if similar studies were undertaken for other indigenous languages. However, the question remains whether such tests would be feasible, taking into consideration the time factor and cost, as readability levels would have to be measured in the remaining nine official languages of South Africa.

In order to address the literacy needs of the majority language group in the Free State, investigation is indicated into the readability assessment of health information pamphlets in Sesotho used at a provincial level. This investigation forms a first step towards the construction of a context-specific health literacy test for Sesotho speakers.

METHODOLOGY

Making use of a quantitative descriptive design as a first step in the creation of a Sesotho health literacy test, an identification was made of existing print pamphlets available in the public health sector. The range of documents collected consisted of all printed Sesotho health pamphlets addressing chronic diseases that were electronically available from the Free State Department of Health Management, as well as hard copies from public health clinics within one of the five districts (namely, the Mangaung Metro) within the province. Table 1 depicts the sample used within the project. No duplication of any pamphlets occurred.

TABLE 1: SAMPLING OF PAMPHLETS

Collection site	Source	Pamphlet content (n=number of pamphlets)
Free State Department of Health (DoH) Management	Electronic data	HIV-related (n=5)
Freedom Square	Hard copy	TB (n=1)
		HIV-related (n=1)
Westdene	Hard copy	HIV-related (n=1)
Opkoms	Hard copy	TB (n=1)
		HIV-related (n=1)
		Epilepsy (n=1)
MUCPP	Hard copy	HIV-related (n=3)
Mmabana	Hard copy	HIV-related (n=1)
TOTAL:		n=15

This pilot phase was limited to 15 available Sesotho health pamphlets. No other Sesotho health pamphlets could be found within the confines of the identified sites.

A general method of measuring the readability of print material, which has been used over the years, is the use of readability assessments such as SMOG (Simple Measure of Gobbledygook), the Gunning Fog Index and the Dale-Chall Readability Formula. Since readability determination appears to be a handy indication of text difficulty, it is widely used in preparation of informational texts, also in healthcare (Basara & Juergens 1994).

Grade levels calculated by the various readability assessments can vary considerably, yet these do provide some indication of text difficulty.

Although each assessment has a specific way to calculate statistically a readability score for a particular written text, the measurements have almost all of the following aspects in common, albeit in various formulae: a calculation of the number of syllables, words and/or sentences; these values are then equalised to a grade level as used in high-income countries. This grade level means that a person should have at least completed a certain grade (number of years) of school education to be able to fully understand the information. Text creators often resort to “simplifying” the texts by using shorter words and/or sentences in the hope that this would make for more “readable” texts (Begeny & Greene 2014). To complicate matters, South Africa, a middle-income country, is affected by the impact of the contextual factors discussed above. The South African Census of 2011 indicated that 19% of the population have had no schooling or have a primary school education of Grade 7 or lower, whereas the comparative percentage for the Free State province is 21% (Statistics South Africa 2012).

Research has established that if adults and children read at their individual reading level, fluency and comprehension increases (Burke & Greenberg 2010). In general, reading assessment tools aim to determine vocabulary difficulty and syntactic complexity (Bailin & Grafstein 2001). However, word difficulty cannot be exactly equated to the length of the word, as familiarity with the specific word, textual coherence, typography and layout, amongst other factors, are not taken into account. Despite these obvious impediments, readability assessments give an indication of a text’s difficulty, based only on semantic factors.

In a comparison across various languages (including English, Chinese and Hungarian) using SMOG, the Flesch-Kincaid and the Flesch Reading Ease formulae, Taylor (2012) found comparable results for these three instruments. In another study, Burke and Greenberg (2010) found comparable results between the Flesch-Kincaid and Fry methods. The finding that various readability assessments can be used for determining readability was supported by other studies, amongst which that of Aleligay *et al.* (2008). Normally, the Flesch Reading Ease assessments and the Fry Readability Graph are used to determine the readability of various types of health material in English.

Concerning the use of these readability tests for languages other than English, Kondilis *et al.* (2010) noted that although the Greek language is more complex, with longer syllables, than other Romance languages, they could still use an adapted Flesch-Kincaid assessment to evaluate the readability of public health information pamphlets. This strengthens the case of using a generic word and syllable count for determining readability. In South Africa, no readability test exists that was specifically designed for the Sesotho language. Yet, since the Flesch Reading Ease, Flesch-Kincaid, Fry and Coleman-Liau Index determinations depend upon word and sentence length, these tests could hypothetically be applied to Sesotho texts. This can be done as the syntax of Sesotho does not differ much from Standard English, on which these assessment methods are based. In Sesotho, a basic sentence structure is: subject + subject concord (expressing gender) + verb + object/adverb. From this it is clear that

the structure of subject + verb + object or expansion of subject is followed, which is similar to Standard English.

Calculation of readability assessments

The Flesch Reading Ease Readability Formula is calculated as follows: Reading Ease (RE) = $206.835 - (1.015 \times \text{average sentence length}) - (84.6 \times \text{average number of syllables per word})$. This gives a result ranging from 0 to 100, where the higher numbers indicate a more “readable” text. A score of 90 – 100 is considered to represent a reading passage that is very easy to read, while a score of 60 to 69 represents a passage that is of standard difficulty, and a score of 59 or lower indicates a passage that is fairly difficult to difficult to read. A score of between 90 and 100 on this scale indicates that a person with at least five years of schooling will understand it, whereas a RE of 30 indicates that tertiary education is required. The Flesch-Kincaid readability assessment, a variant of the Flesch Readability Ease assessment, is calculated as follows: $[(0.39 \times \text{average number of words per sentence}) + (11.8 \times \text{average number of syllables per word}) - 15.59]$ (Aleligay *et al.* 2008).

The Fry readability determination is a non-weighted assessment done by reading a value from a chart corresponding to the average sentence length and the average number of syllables per 100 words in samples taken from a text. Normally one should take three samples of 100 words each from a text, but due to the brevity of the pamphlets, the full text was used for the Fry calculations in this study.

Another useful assessment method is the Coleman-Liau Index, which makes use of word length and sentence length. The Coleman-Liau Index is calculated as follows: $[(0.0588 \times \text{average number of letters per 100 words}) - (0.296 \times \text{average number of sentences per 100 words}) - 15.8]$. This Index gives an indication of the number of years of education a person would need to understand the contents of the material. The benefit of this method is that it focuses on word length in terms of number of characters and not syllables, which makes it more applicable to languages other than English.

All the samples collected (see Table 1) were reproduced electronically so that a Sesotho speaker could insert markers to break down the words into syllables. Manual checks were performed by a third independent party to ensure the correctness of the reproductions and markers. Manual calculations were done by two independent researchers, using the formulae above to determine the various indices.

RESULTS

Table 2 reflects the basic statistics for each analysed pamphlet.

TABLE 2: THE BASIC STATISTICS FOR EACH ANALYSED PAMPHLET

Pamphlet content (Collection site)	Character count	Syllable count	Word count	Sentence count	Characters per word	Syllables per word	Words per sentence
HIV-Counselling (DoH)	1081	443	247	17	4.4	1.8	14.5
HIV-ARV (DoH)	1400	587	361	25	3.9	1.6	14.4
HIV-ARV2 (DoH)	498	216	104	9	4.8	2.1	11.6
HIV8 (DoH)	2446	952	546	41	4.5	1.7	13.3
HIV-PMTCT2 (DoH)	1090	438	242	15	4.5	1.8	16.1
HIV-PMTCT (Freedom Square)	1949	805	470	22	4.1	1.7	21.4
TB2 (Freedom Square)	970	430	257	17	3.8	1.7	15.1
HIV5 (Westdene)	1116	480	275	14	4.1	1.7	19.6
TB1 (Opkoms)	770	347	213	9	3.7	1.6	23.7
HIV1 (Opkoms)	803	320	187	11	4.3	1.7	17
Epilepsy (Opkoms)	1359	588	327	15	4.2	1.8	21.8
HIV2 (MUCPP)	562	243	134	9	4.2	1.8	14.9
HIV-AIDS and relations 3 (MUCPP)	502	212	121	8	4.1	1.8	15.1
HIV-AIDS 4 (MUCPP)	1000	418	244	11	4.1	1.7	22.2
HIV6 (Mmabana)	524	207	120	11	4.4	1.7	10.9

It is evident from Table 2 that there is quite a variation in content length (number of words) per pamphlet, yet the syllable count was fairly stable across all pamphlets. Results for readability calculations are provided in Table 3.

TABLE 3: COMBINED RESULTS FOR READABILITY ASSESSMENTS

Pamphlet content (Collection site)	Flesch Reading Ease value	Interpretation	Flesch-Kincaid Grade level value	Interpretation (years of education required)	Fry Assessment Interpretation (years of education required)	Coleman-Liau Index values	Interpretation (years of education required)
HIV -Counselling (DoH)	40.4	Difficult	11.3	> 11	> 12	7.9	8
HIV-ARV (DoH)	53.5	Fairly difficult	9.3	> 9	> 12	5	5
HIV-ARV2 (DoH)	19.4	Very difficult	13.4	> 13	> 12	9.8	9
HIV8 (DoH)	43.8	Difficult	10.2	> 10	> 12	8.5	9
HIV-PMTCT2 (DoH)	38.2	Difficult	11.9	> 11	> 12	8.8	9
HIV-PMTCT (Freedom Square)	40.2	Difficult	13	> 13	> 12	7.2	7
TB2 (Freedom Square)	25	Very difficult	10.3	> 10	> 12	4.5	5
HIV6 (Mmabana)	52	Fairly difficult	9.5	> 9	> 12	7.4	7
HIV5 (Westdene)	43.1	Difficult	12.7	> 12	> 12	6.6	7
TB1 (Opkoms)	47.4	Difficult	12.9	> 12	12	4.7	5
HIV1 (Opkoms)	45.8	Difficult	11.2	> 11	> 12	7.7	8
Epilepsy (Opkoms)	32.4	Difficult	14.1	> 14	> 12	7.3	7
HIV2 (MUCPP)	24.2	Very confusing	14.8	> 14	> 12	7.5	8
HIV-AIDS4 (MUCPP)	31	Difficult	12.5	> 12	> 12	8.3	8
HIV-AIDS and relations3 (MUCPP)	47.8	Difficult	10.8	> 10	> 12	8	8

It is apparent from Table 3 (the combined results for the four readability assessments) that the Flesch Reading Ease evaluation of the various pamphlets ranges from “fairly difficult” to “very confusing”, which is an indication that the material is prepared at a level that requires high school education or even tertiary level reading ability. The “easiest” pamphlet yielded a RE of 53, which is at the upper end of difficulty.

The majority of these analyses yielded RE values of between 30 and 40, which is an expression of difficult reading material.

The Flesch-Kincaid Grade level findings correspond more or less to the results obtained from the Flesch Reading Ease assessments, in that the lowest level required as indicated by this index is more than nine years of schooling. This puts the readability demands at a high school level at a minimum. Seven of the 15 pamphlets analysed indicated an education level of 12 years or higher, which implies that tertiary training is necessary to understand the content.

Contrary to the previous two assessments that are weighted for English, the Fry assessment is not weighted and simply calculates readability on the basis of the relationship between the average number of sentences and the average number of syllables per 100 words. These findings indicated all material to be at a readability level requiring education of 12 years or more. However, the language structure of Sesotho could have contributed to this high reading, as Sesotho has many monosyllabic and single letter words, which could have elevated the counting of syllables/100 words.

However, weighted for English, the Coleman-Liau Index assessments generally yielded lower readability scores than the other three instruments. This assessment, contrary to the Fry assessment, looks at the number of letters per 100 words and not the number of syllables, which is more in line with the Sesotho word and language structure. Yet, the majority of the texts analysed (8 out of 15) yielded a grade classification of Grade 8, which is equal to the first year of high school.

DISCUSSION

Written health information provided to patients can only be used in full if it is written at a level that the recipient can understand; therefore, material should be prepared at a suitable level. Yet, as found by Aleligay *et al.* (2008), internationally most educational health material is written at a Grade 10 level, which means the reader must have completed at least ten years of schooling to be able to understand the material. In a South African context, where 32% of the population has had no or very little schooling (Statistics South Africa 2012), it is clear that material prepared for reading at this level will be too difficult for many patients who visit clinics. Even the recommendation of Aleligay *et al.* (2008) that health material should be prepared at a fifth to sixth grade level might prove to be too high for the specific context in South Africa.

This study is the first phase towards the construction of a context-specific health literacy test for Sesotho speakers, in which several informational pamphlets on chronic diseases were subjected to four different readability assessments to give an indication of the level of text difficulty. Although these readings cannot be seen as a precise indication of the text's difficulty, it does provide an indication of the standard of schooling required to read and understand the information contained in the pamphlets. The patient's understanding will be tested in a follow-up leg of the research.

The results reflected above indicate that for the Flesch Reading Ease, Flesch-Kincaid Grade level assessment and the Fry calculations, a person would need to have had

Grade 9 and even tertiary education to understand the content. Although also weighted for English, the Coleman-Liau Index makes use of word length in terms of the number of characters and sentence length in terms of the number of words per 100 word samples. In considering word length, it is deemed a more reliable way of assessing the readability of Sesotho texts, as the Sesotho language has many monosyllabic words, contrary to English. These results indicate that only three texts are written at a Grade 5 level, while four texts are at a Grade 7 level, five at a Grade 8 level, and three at a Grade 9 level (see Table 3).

CONCLUSION

Through this investigation, it was endeavoured to obtain a theoretical assessment of the readability of various pamphlets handed to patients diagnosed with chronic diseases at public health clinics in the Free State province. With the exception of the Fry assessment, the other three assessments are all weighted for English. The Coleman-Liau Index is based on word length and sentence length, and could for this reason be a more reliable test for assessing readability difficulty of Sesotho texts as the Sesotho language displays many monosyllabic and single letter words in its sentence structure.

Although no readability test exists for the Sesotho language, the four assessments yielded results that could indicate that the text difficulty is in general too high for the reading level of the patients. From the research, it is clear that a readability test for Sesotho health information material would have to include in its structure a concession for monosyllabic and single letter words if a reliable indication of readability is desired.

This was a first investigation into the texts, and the understanding of the texts will be tested in follow-up research. This project not only contributes to health communication knowledge, but could also contribute to better patient information processes, which could positively affect the health outcomes of Sesotho-speaking patients, who form the majority population group in the Free State.

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