An implementation pathway for matching education material with the literacy level of dialysis patients

Julie E. Owen, Jacinda Kohne, Lee Douglas, Tim D. Hewitson and Rachael Baldwin


Submitted March 2009 Accepted June 2009

Abstract
Comprehension of pre-dialysis education material is essential for the successful transition of patients to any dialysis programme. Our own observations suggested that the reading ability of many patients is below that required for comprehending printed healthcare material, highlighting that patient literacy levels (LL) should be considered when developing education materials. In this paper we describe implementation of a pathway that can be used to ensure that patient education material is appropriately matched to the LL of patients.

The sequential steps in this pathway are: Collection of written material, Testing the LL of patients with the ‘Rapid Estimate of Adult Literacy in Medicine’ (REALM), determining the readability of patient brochures using the Gunning FOG Index & Fry Graph (FG), evaluating the level of comprehension required using the Suitability Assessment of Materials (SAM), and finally, modifying brochures to match.

Testing of our patient population with REALM indicated that the LL of our patients corresponded to 7-8 years of schooling. Conversely, the two readability tests showed that year 10 (FOG) and year 10 (FG) was required for comprehension of our written material. SAM indicated that 4 brochures were superior (year 4 LL required) and 3 were adequate (year 6-7 LL required). To address these deficiencies, brochures were modified to improve readability. After brochure modification, FOG decreased to Year 8, FG decreased to year 8 LL and all 7 brochures achieved superior (Year 4).

By modifying our education brochures we have ensured that they meet the LL of our patients. This more effectively delivers information required by patients to understand the treatment and lifestyle regime required for their disease treatment. On-going use of this pathway is recommended.

Introduction
An important part of any dialysis service is the provision of pre-dialysis education programmes. In this service, pre-dialysis education for metropolitan areas consists of two education sessions, two review sessions and one or more visits to dialysis units. The introductory education session provides an overview of renal failure and treatment regimes. At the first review, recorded details are checked and individual questions answered. The second education session provides an insight into dialysis lifestyle and support, with the second medical review planning dialysis education and access. The decision on dialysis modality is made during the pre-dialysis education program, after clinical assessment and consultation. Those patients commencing dialysis visit the dialysis units to meet the staff. Most patients attend the introductory session and first interview on a single day, likewise the lifestyle session and second review sessions are held on the same day, a fortnight later. As part of this programme, patients are provided with written education material on the first day. This material explains many of the details about dialysis, and serves as a basis for the final sessions (Owen et al., 2006).

Comprehension of pre-dialysis education material is therefore essential for the successful understanding of patients with regard to their choice for transition from end-stage kidney disease to dialysis. However, we increasingly recognise that the literacy level of dialysis patients may be an obstacle to their receiving proper pre-dialysis education (Kleinpeter, 2003). Patients with limited literacy skills may struggle to understand health information, such as consent forms, treatment regimens, and written instructions (Aldridge, 2004). The average adult in the United States is unable to read a book above the eight grade level (Doak, 1996). A large percentage of dialysis patients are older than 65 years.

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An implementation pathway for matching education material with the literacy level of dialysis patients

and are particularly at risk as 10% of people above 65 years read below grade 4 (Doak 1996). A study by the Australian Bureau of Statistics show that only half of the Australian population have the literacy skills to deal with the demands of everyday life and work (Perrin 1998). This is often at conflict with written patient information. For example, over the counter medication instructions have been assessed at requiring Year 10 reading level (Aldridge 2004).

Several studies have highlighted the disparity between the readability of patient material and patient literacy levels (Hearth-Holmes et al., 1997; Powers, 1988; Davis et al., 1990) and that comprehension of information is a prerequisite for patient compliance (Doak 1996). Indeed, Baker (1998) has shown that illiteracy is associated with poor health outcomes, which can lead to a greater use of health care resources, more frequent outpatients attendances and hospital admissions. Anecdotally, our own observations suggested that the reading ability of many patients is below that required for comprehending printed healthcare material, highlighting that patient literacy levels should be considered when developing education materials.

In this paper we describe implementation of a pathway and process to ensure that our patient education material is appropriately matched to the literacy levels of patients.

Methods

A schema for matching patient education material to the literacy of a patient population is summarised in Fig 1. The sequential steps in this pathway are: (1) Collection of written material, (2) Testing the literacy level of the patient population, (3) Determining the readability of patient brochures, and finally, (4) Modifying brochures to match the literacy level. The following tools were used to complete this process.

Testing the literacy level of our patients

Reading is a complex process that involves the combination of language and thinking skills. A patient’s ability to ‘decode’ information and their basic level of literacy can be measured by using The Rapid Estimate of Adult Literacy in Medicine (REALM) a test devised and validated by Davis et al., 1993. The REALM test is a tool for analysing the complexity of any piece of writing. To do this FOG uses a mathematical formula that takes into account the average sentence length and the number of polysyllabic words in the passage of text. The calculated figure is

![Diagram](image-url)
An implementation pathway for matching education material with the literacy level of dialysis patients

Edward Fry in 1968 designed the FRY readability formula to assess the readability of texts. This was modified in 1977. The FRY readability formula has been used extensively in healthcare (Jaffrey 2004, Berland et al 2001, Cutil 2006). The Fry Graph (FG) takes a similar approach, estimating readability by counting the number of sentences and the number of syllables in three one hundred word passages of text. Results are expressed as the number of sentences and syllables per one hundred words. These are then plotted on the fry graph (FG), with the intersection being defined as the reading level. Again, the final number is an approximation of the number of years of education needed to understand the written material.

Tests such as FOG and FG assess only the capacity to decode but not understand. A patient’s ability to understand a word does not necessarily mean that they fully comprehend its meaning; reading and comprehension rely on different skills.

Testing the literacy level of our patient population
Of the 254 patients that attempted REALM, 152 patients completed the testing, the remaining 102 patients being excluded due to insufficient English or low vision. Median score was 52 out of a maximum of 66 (range 4-66), which indicates a literacy level of year 7-8 schooling.

Testing readability and complexity of brochures
The 7 principal brochures used in pre-dialysis education were assessed for readability using three different tools: FOG, FG and SAM. Results are summarised in Table 1.

<table>
<thead>
<tr>
<th>Brochure modification</th>
<th>Initial</th>
<th>Post-modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content limited</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leave plenty of white space</td>
<td>10 (8-12)</td>
<td>8 (7-9)</td>
</tr>
<tr>
<td>Limit the number of ideas in each brochure</td>
<td>10 (7-12)</td>
<td>8 (7-10)</td>
</tr>
<tr>
<td>Brochures made easier to read</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use examples to explain concepts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engage reader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More visual presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Include diagrams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bold headings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum 12 pt font size</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Of the 7 brochures tested, SAM indicated that 4 brochures were superior (a literacy level of year 4 required) and 3 were adequate (literacy level of year 6-7 required).

Table 1: Readability of the seven pre-dialysis education brochures as assessed by FOG, FG and SAM (year of education).

<table>
<thead>
<tr>
<th>Brochure modification</th>
<th>Initial</th>
<th>Post-modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOG</td>
<td>10 (8-12)</td>
<td>8 (7-9)</td>
</tr>
<tr>
<td>FG</td>
<td>10 (7-12)</td>
<td>8 (7-10)</td>
</tr>
<tr>
<td>SAM</td>
<td>4 superior</td>
<td>7 superior</td>
</tr>
<tr>
<td></td>
<td>3 adequate</td>
<td></td>
</tr>
</tbody>
</table>

Key: FOG and FG represented as median (range). Sam represented as superior, adequate and not suitable.

Table 2: Guideline principles used for improving readability and comprehension of our patient education brochures.
Assessment after brochure modification

Reassessment of the modified brochures indicated that changes undertaken had consistently improved their readability. FOG decreased to Year 8 (range 7-9), FG decreased to year 8 (range 7–10) literacy level and all 7 brochures achieved superior (Year 4) by SAM.

Discussion

The health care community increasingly relies on written material to convey and gather information. However, written materials are often given to patients with little regard for their ability to read them, there frequently being a clear gap between the average person’s reading ability and the reading level of many instructions and documents in our society. In this paper we have described the steps we have undertaken to maximise the effective transmission of health care information to our pre-dialysis patients.

Comprehension is a complex process that requires a match in logic, language, and experience. Clearly, although written brochures in themselves are not sufficient to communicate complex medical and health care concepts, more attention must be given to the use of unexplained and unfamiliar words, the level at which the material is written and presented, and the experience of the patient, if we are to better educate our patients and their carers.

An evaluation of our commonly used written educational brochures on dialysis services found that they fell short in providing for the needs of many patients with low literacy levels. Indeed, the results of our brochure assessment strategies suggested that our patient education tools would be inappropriate for the estimated 40% of the population with limited functional literacy skills (Australian Bureau of Statistics, 2006).

These findings have important implications. A patients’ literacy level can adversely affect participation in their medical care and compliance with treatment, and severely impact efforts to provide health education.

Patients and the public in general need to be given written materials or instruction containing words they understand. Well-designed and appropriately written patient education materials can augment other educational efforts and ultimately improve patient care. Improving the readability of our brochures does not guarantee that patients will understand or use education materials. However, these simple strategies increase the likelihood that the materials will be useable.

Written education material is not in itself only part of the solution to health care communication. A multidisciplinary and multi-sensory approach is required with written material used to supplement and reinforce verbal and visual messages. However, by modifying our education brochures we have ensured that they meet the literacy level of our patients. This more effectively delivers information required by patients to understand the treatment and lifestyle regime required for their disease treatment.

It was assumed that matching written material to patients reading level would be advantageous; this study did not specifically measure the effect of this brochure modification on patient comprehension. Future studies may wish to measure this effect. We contend that on going evaluation of these factors is an important part of the management of all patients with end-stage kidney disease.

Acknowledgement

The authors are grateful for the commitment and assistance of the NWDS staff in implementing this project.

References


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