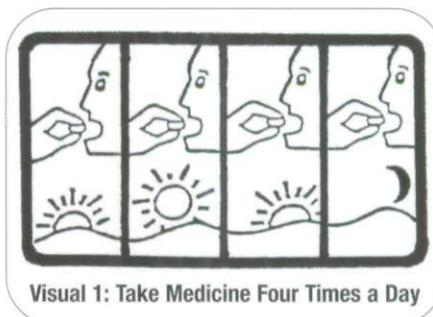


# Using Visuals to Communicate Medicine Information to Patients with Low Literacy

**T**he patient was adamant that she had taken her medicine as instructed, pointing to the visual (Visual 1) illustrating the instructions to endorse this. Via an interpreter, she communicated that she took her tablet three times during the day and once at night (which was correct), but only on those days when the sun was shining (not on cloudy days) and the moon was visible (depending on both cloud cover and phases of the moon).



Visual 1: Take Medicine Four Times a Day

Another patient who had been diagnosed with a vaginal infection, and who had received a cream to be inserted vaginally, reported no improvement in her infection. On further questioning, we found out that she had been rubbing the cream on the side of her leg “just like the picture tells me to do” (Visual 2).



Visual 2: Insert into the Vagina

Are pictures a so-called universal language? Maybe, but pictures are open to interpretation and potentially disastrous outcomes, when misinterpretation influences subsequent actions such as taking medicines. This fascinating area of research and practice has continued to interest and enthrall me over the years, and just when I think I have heard it all, along comes another “oh wow, how did he get that?” interpretation. Using visuals has many advantages (Doak, Doak & Root, 1996). Visual presentations are more persuasive, emotions are easily stimulated via the visual sense initiating a rapid response, memory systems in the brain favor visual storage, and materials including visuals are more user-friendly. Their usefulness is even more apparent in people with poor reading skills.

We proudly call South Africa the “Rainbow Nation.” The name speaks for itself in describing the incredible diversity of its people. We have 11 official languages and 8 different African ethnic groups, each with its own culture, language and customs, and each with its unique perception and understanding of allopathic medicine. Literacy is a major challenge in South Africa with approximately 40% of South Africans aged 15 years and over having less than 7 years of formal schooling (grade 7 is often used as a minimum education level indicator of sustainable functional literacy) and 18% having no schooling at all, with the lowest functional literacy rate occurring in the Black population (Statistics South Africa, 2001).

**By: Ros Dowse**

*Ros Dowse is an associate professor of pharmaceuticals in the Faculty of Pharmacy, Rhodes University, Grahamstown, South Africa.*

(E-mail: r.dowse@ru.ac.za)

Apart from the nursing profession, the majority of doctors and pharmacists in South Africa are of a different culture from the average public health sector patient, with language constituting the most common communication barrier. In fact, it has been estimated that cross-cultural communication occurs approximately 80% of the time in health-care consultations (Adams, 1991). Unlike developed countries, where the problems with literacy and communication often occur with minority patients groups, in South Africa the reverse situation applies. Together, all these factors constitute a real challenge to effective patient-health care provider communication.

Medicine-taking behavior is complex, multi-factorial, and depends on a dynamic interaction of several factors, including cognitive, behavioral, social, environmental, and physiologic factors (World Health Organization, 2003). However, a minimum requirement for appropriate medicine taking is a basic understanding of the medication instructions, and the ability to recall this information. Studies in patients with limited reading skills have demonstrated the value of visuals in enhancing understanding and recall of written or verbal information (Mansoor & Dowse, 2003; Dowse & Ehlers, 2005; Houts, Doak, Doak, & Loscalzo, 2006), but their use is not a strategy generally accepted and adopted by health authorities. Instead, using visuals to communicate information to low-literate patients appears to be restricted to relatively small-scale local initiatives, which are often driven by one person who is passionate about their effectiveness. These initiatives are not usually sustainable in the long term.

We live in an age in which visual communication permeates every aspect of our lives, and often assume that visuals can be easily recognized by all and can convey their meaning with little or no dependence on language, cultural background, or education. However, research has dispelled this assumption. Cross-cultural testing has clearly shown that pictures do not necessarily communicate the same concepts to all groups, even when the pictured objects are easily recognizable. For example, it will be obvious to you, the reader, that the glasses in Visual 3 contain (a) a cocktail, beer, and wine respectively, and the slash is communicating a prohibitive message, i.e. do not drink alcohol when taking this medicine. However, many South Africans do not drink alcohol from glasses shaped such as these, and, therefore do not recognize them as containing alcohol. They may interpret the liquid inside them as, variously, water, juice, or milk. We identified easily recognizable containers in which alcohol is typically sold and modified the image accordingly, which had a significant impact on improving interpretation.



**Visual 3: Do Not Drink Alcohol While Taking Medicine**



**Visual 4: Take with Meals**

Similarly, insight into eating habits resulted in improved communication of the instruction in Visual 4. Focus group discussions resulted in a change in the appearance of the food, from the depiction of a typical Westernized place setting (a) to a bowl with food, and a spoon as the eating utensil (b). The empty plate is a source of confusion, with some giving the exact opposite interpretation of “do not take medicine with meals.” The knife and fork have been the source of many interesting comments such as: “you must eat food with a knife and fork; you must take the tablet/cut the tablet with a knife and fork; the person is too sick to eat and must be fed by someone else; or set the table and then take medicine.”



**Visual 5: Store Medicine in the Refrigerator**

Some medicines such as selected eye drops, insulin, and liquid penicillin-based products should be stored at a low temperature in the refrigerator. The refrigerator (Visual 5) is often regarded as an ordinary cupboard in the kitchen. It should, however, be considered that many people in South Africa do not have refrigerators and, therefore, will not recognize this image. These latter three visuals (visuals 3, 4 and 5) emphasize the importance of insight into local living conditions, eating and drinking habits, and collaborating with the target population in the design process.

Accurate interpretation also requires a degree of visual-literacy, which refers to the ability to create and use visual symbols for communicating and thinking. It requires learning the conventions of representing three-dimensional reality on a two-dimensional surface. These are skills that are frequently neglected in formal curricula, and are normally acquired informally through constant exposure to pictorial material and the mass media.

In the absence of books and other forms of visual media, this learning process is compromised, pictorial conventions remain unlearned and visual images that effectively communicate a message to one person may prove meaningless to another. For example, in Visual 2, the convention of using a dotted line, which suggests an activity occurring behind a solid surface, was clearly not understood, resulting in the pictured activity being interpreted as one that was happening on the surface, i.e. rubbing cream on the side of the leg. Many people also interpret this visual incorrectly to mean that an injection should be given in the side of the leg.

The single slash from top left to lower right denoting the “do not” command (e.g., in Visual 3) is an abstract symbol based on road sign convention. Lack of familiarity with this graphic convention is clearly apparent in many of the people we interviewed who only had minimal education. In fact, they often ignored its presence totally or seem to regard it as an integral part of the picture, dividing the image into two halves. In modifying this visual, we replaced the single slash with a cross which seemed to be a much more effective and noticeable prohibitive symbol.

## Steps in Reading Visuals

Four main steps have been identified in reading visuals (Doak, Doak, & Root, 1996), including deciding to look or read, finding the message, locating and integrating relevant details and finally interpreting the information. When designing visuals, keep these steps in mind.

## Deciding to Look or Read

Poor readers are easily overwhelmed when faced with the task of trying to make sense of a visual. Given their poorly developed visual-literacy skills, a relatively greater degree of concentration is required to encode the message, making the task much more demanding than for the skilled reader. This is particularly apparent when the image is complex as is the case with Visual 6, which is a busy, complicated picture containing a number of graphic conventions and messages to be encoded. It commonly elicits a rapid response of a shrug of the shoulders, a shake of the head, and no attempt at an answer. This visual contains many problems for our poorer readers. The tablet container is most commonly thought to be a trashcan as public sector patients usually receive their medicine in plastic resealable packets. The ‘Rx’ convention, used to symbolize medicine, is familiar mainly to those involved in health care and only serves to increase the amount of confusing detail in the picture.



**Visual 6: Do Not Store Near Heat or in Sunlight**

## Finding the Message

The graphic convention used in Visual 6 to portray heat is highly abstract and does not represent any familiar, easily identifiable sources of heat such as a fire or the sun. Abstractions of physical phenomena are a common source of confusion, for example, using lines or arrows to indicate sunshine or wind; horizontal lines and clouds of dust to suggest a running figure, or lines to portray shaking a bottle. These are all codes that have to be learned.

Skilled readers systematically scan a visual to find the central concept and quickly identify the principal features. On the other hand, the eyes of poor readers wander about the page randomly without finding the central focus of the visual, and they tend to miss the main message.

People with poor visual-literacy skills have difficulty identifying body parts when they are depicted in isolation, detached from the body as a whole, and this was overtly obvious with Visual 7a. When handed the visual, many people rotate it a couple of times and look at it from all angles in order to try and gain some perspective. It is commonly identified as an orifice somewhere on the body and its interpretation appears to be highly education-dependent. Visual 7b, however, provides a context for the body part and directs the viewer’s attention to the ear by using an arrow as a visual cue.



**Visual 7: Place Drops in the Ear**

## Locating and Integrating Relevant Details

Skilled readers are able to locate and separate key points from details, unlike poor readers who may focus on a detail. Those with less developed visual-literacy skills tend to hone in on one detail and describe it, and appear reluctant to let their attention venture elsewhere in the image. For example, typical responses when testing Visual 8 included interpretations of a baby sleeping, a woman holding a ball to her breasts, a woman holding a head, or a hand holding something. These responses reflect an inability to “see” the entire image that the individual components were illustrating, i.e. a breastfeeding woman. Some individuals correctly described the breastfeeding woman, but could not integrate this with the image and, therefore, their responses were merely a description of what they saw. The visual also confused many people, who did not recognize the profile as being part of a head and thought that the hand depicted a snake.



**Visual 8: Do Not Take This Medicine if Breastfeeding**

Others realized the need to integrate the messages from the two visuals, but came up with the incorrect meaning as in: “breastfeed the baby before giving it medicine,” “take tablets before breastfeeding,” “give the baby tablets before breastfeeding,” “do not give medicine to the baby,” and “it is good to breastfeed the baby but wrong to give the baby tablets.”

## Interpreting the Information

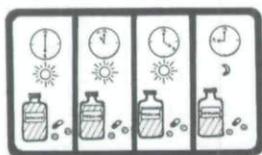
Lastly, skilled readers quickly interpret the information to arrive at a meaning, whereas poor readers are slow to interpret perceptual information and tend to interpret literally. They often find it difficult to match the logic contained in the message with their own experience, and unless the message can be rapidly understood, they lose interest easily.

As with Visual 1, literal interpretation of Visual 9 resulted in a number of people becoming worried about the night sky: "if I do not see a moon and stars, do I still take the medicine?" Some people from isolated rural communities were unable to identify the image of a person sleeping on a bed, as their beds were unlike the one shown and some slept on the floor. An additional problem here is the image of the moon and the star, which is an inappropriate one as it is too similar to the Muslim symbol, a reminder to us to ensure both cultural and religious acceptance of any symbols used. My favorite interpretation of this visual was "this medicine will make you go to the moon!"



**Visual 9: Take Medicine at Night**

One of the most variable aspects of a multiple daily medication regimen is the time at which each dose is taken and the time interval between doses. Ideally this should be a constant interval, with the doses equally spaced, but very few people adhere to this out of ignorance, confusion, or forgetfulness. One of the most successful images we introduced into the visuals developed for our local population was the image of a clock face (Visual 10). In practice, no hands appear on the clock as the specific time should be filled in by the pharmacist when discussing the regimen with the patient. Visual 10 shows how we modified Visual 1 to incorporate clock faces. This is a most successful visual as it describes a concrete course of action to be followed, whereas abstract concepts, such as "this medicine may make you feel drowsy," are a lot harder to portray and may, in fact, communicate a message that is unfamiliar to many people.



**Visual 10: Take Four Times a Day**

## Conclusions

Level of education is an extremely poor predictor of functional and visual-literacy skills. The educational system under the apartheid government (pre-1994) was fragmented and inconsistent across the various population groups. The high variability and generally poorer quality of black education resulted in large inconsistencies in the skills of students at various levels. Many educational opportunities exist in South Africa to improve literacy skills via adult education programs. The past decade has resulted in an enormously improved enrollment in formal schooling programs.

Our work with Black South African adults has been fascinating, heartening, frustrating, and depressing. What has amazed and heartened

us are the people with minimal education, who catch onto the idea of using visuals as communication aids, after initial prompting, literally "fly" in their ability to interpret the messages. The depressing aspect of this is the incredible intelligence in this country which remains untapped due to the inequities of the past. On the other hand, equally amazing—and dismaying—are the numbers of better educated people, who remain confounded by the visuals and offer dangerously incorrect interpretations, which could lead to serious negative health consequences.

Developing visuals for a low-literate population is a complex process which must take education, visual-literacy, culture, and way of life into account. Developers of such materials must work in collaboration with representatives of the target population, as this affords valuable insight into the most appropriate, culturally acceptable, and familiar images to use. The design process is inevitably a lengthy one, involving a multi-stage iterative process of designing, testing, modifying, and retesting, before a final acceptable version of the visual is obtained.

No matter how "perfect" the final product, visuals should never be used as the sole means of communication, as they do not convey the level of detail needed for acceptable comprehension of medicine information. They are not intended to be interpreted by the patient in isolation from the text without verbal explanation. One of the major disincentives to their use is the possibility of misinterpretation, which may translate into incorrect medicine taking. Explaining medicine-related information verbally, while concomitantly referring to materials containing visuals, should provide a good basis for informing the low-literate patient, with the visuals serving as a valuable aid in stimulating recall of information.

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