Original Research

Development and evaluation of pictograms on medication labels for patients with limited literacy skills in a culturally diverse multiethnic population

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Abstract

Background: Much of the migrant workforce in Qatar is of low literacy level and does not understand Arabic or English, presenting a significant challenge to health care professionals. Medicine labels are typically in Arabic and English and are therefore poorly understood by these migrant workers.
Objective: To develop pictograms illustrating selected medicine label instructions and to evaluate comprehension of the pictograms or conventional text supported with verbal instructions in foreign workers with low literacy skills.
Methods: A range of common labeling instructions were identified and pictograms depicting these were developed using visual concepts and ideas from the literature. The process involved a consultative approach with input from the researchers, a local graphic artist, and members of the target population. The final set was evaluated for comprehension in participants who were randomized to one of three study groups: text plus verbal instructions, pictogram-only label, and pictogram with verbal instructions. One-way ANOVA and Chi-square tests were used to assess differences between group variables. Statistical significance was set at $P \leq 0.05$.
Results: Of 23 label instructions screened, 11 were selected for the study. A total of 123 participants took part in this study. Pictogram plus verbal instructions group achieved better results in interpreting the majority of the label instructions ($P \leq 0.05$). The best interpreted pictograms with verbal instructions included: "Take two tablets three times a day," "Take one tablet in the morning and one tablet at night," and "Instill one drop in the eye." The worst interpreted pictograms with verbal instructions were: "Do not take with dairy products" and "Do not use by mouth." Some pictograms were difficult to interpret even when accompanied with verbal instructions, suggesting the need to thoroughly pilot them among users prior to implementation.
Conclusion: Medication labels consisting of simple pictorials supported by verbal instructions were better comprehended by individuals with low literacy skills than labels with written plus verbal instructions in a

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language that the individual did not understand. Further, pictogram-only labels were the least comprehended types of medicine labels among the participants.

Background

Medicines constitute an integral component of health care, but their inappropriate use could result in adverse events and/or non-adherence which can lead to several consequences, including increased rates of emergency department or clinic visits, health care costs, hospitalizations, and even death.[1–8] Similarly, inappropriate use of prescribed medications due to patient's low literacy or lack of understanding of usage instructions can equally result in similar serious consequences, which are largely preventable.[9–11] Often the only information available to patients in guiding safe and effective use of medicines is that appearing on the medicine label. Understanding this information is critical to safe and effective use of medicines. However, studies and reports have repeatedly documented a high prevalence of patients who misinterpret simple label instructions and auxiliary warnings.[9,11–13] This risk for misinterpretation is further exacerbated in patients who are elderly, have disabilities, possess limited literacy skills, and in those who cannot read and understand the language of the label.[14–21] Research has also found an association between inadequate health literacy and poor health outcomes.[14,21] Medicine labeling is being viewed as a major cause of many medication errors and adverse outcomes[9,11,22] resulting in global and regional health care organizations turning their attention to supporting patients' ability to read and understand health information by improving the quality of medicine labeling.[19,23,24]

In Qatar, the continued need for utilizing foreign workers in the oil and gas industry as well as other economic sectors presents unique challenges to the health care system. Much of the migrant workforce is unskilled and many are illiterate, especially in the languages used in health communication (i.e. Arabic and English). These workers are apparently dislocated from their usual social support network and are culturally displaced. Cultural orientation, including both social and language competency, is a significant determinant of the health of individual workers. The International Labor Organization (ILO) and the World Health Organization (WHO) strive to ensure that workers have access to sustainable health and social support (Social Health Protection) and to develop healthy workplaces.[25]

The quality and clarity of the communication process in interactions between the health care professional and the patient is core to facilitating the patient's understanding of the need for and adherence to treatment, and nowhere is this more important than at the point of dispensing medications where total responsibility is transferred to the patient. It has been reported that 40–80% of information communicated verbally in a didactic fashion during a health care consultation is forgotten almost immediately.[26] However the use of written and visual material has been associated with better retention following counseling compared with the standard verbal counseling experience.[16,22] Visual aids or pictograms that illustrate a range of medicine-taking instructions have been shown to improve medicine-related knowledge and understanding, which arguably could lead to empowerment and improved adherence to medication, especially among high-risk groups including those with limited literacy skills.[15,16,22,24,27–35] Although incorporating pictograms as part of medication labels would most probably add cost to the manufacturer or to the implementing health authority, the benefits of abating potential serious consequences such as increased visits to emergency departments, non-adherence, hospitalization and mortality would likely offset the cost.

Medicine labels in Qatar are written in both Arabic and English, languages which the majority of foreign workers in the country are unable to understand. Due to high workload in pharmacies, minimal or no verbal instructions are provided with medicines, which could create problems when the patient is illiterate and the only instructions they receive are in the written form. Pictorial aids constitute a more "universal language" than text; they minimize the amount of reading, clarify information and have a positive effect on recall and memory as well as improving adherence to prescribed regimens.[14,16,31–33] Pictograms included on labels have resulted in improved comprehension as well as recall and acceptability of information in