

Health literacy: A barrier to pharmacist–patient communication and medication adherence

Lucy Nkukuma Ngoh

Abstract

Objectives: To present a summary of the existing literature on medication non-adherence, health literacy, and use of written patient information in health care and pharmacy in particular.

Data sources: Searches of Medline, PubMed, and International Pharmaceutical Abstracts databases were conducted using one or more of the following terms: *adherence/nonadherence, compliance/noncompliance, printed/written information, literacy, patient education, communication, and health literacy*. These terms were combined with the following search terms: *drug information, readability, medication/drug, patient, pharmacy/pharmacist, and prescription*. References of pertinent articles were hand searched to retrieve additional articles.

Data extraction: By the author.

Data synthesis: Articles were grouped and summarized into three broad categories (nonadherence, health literacy, and communicating health information to patients), with an emphasis on the use of written patient information in health care and pharmacy practice in particular. The complexities inherent in nonadherence behavior, health literacy, and patient education are summarized, and suggestions for enhancing medication adherence, especially for patients with low health literacy skills, are provided.

Conclusion: The health literacy skills of American adults have not changed considerably during the previous decade. This makes use of written patient medication information in pharmacy practice problematic for some patients. Limited health literacy has been associated with poorer health, medication nonadherence, medication errors, higher medical expenses, and increased hospitalization. A need exists for identifying patients with limited health literacy and tailoring medication counseling to their needs.

Keywords: Health literacy, medication adherence, pharmacist–patient communication.

Pharmacy Today. 2009(Aug);15(8):45–57.

Lucy Nkukuma Ngoh, PhD, is Associate Professor of Pharmacy Administration, College of Pharmacy, Ferris State University, Big Rapids, MI.

Correspondence: Lucy Ngoh, PhD, College of Pharmacy, Ferris State University, 220 Ferris Dr., Big Rapids, MI 49307. Fax: 231-591-3829. E-mail: ngohl@ferris.edu

Continuing pharmacy education (CPE) credits: See learning objectives below and assessment questions at the end of this article, which is ACPE universal activity number 202-000-09-219-H04-P in APhA's educational offerings. To take the CPE test for this article online, go to www.pharmacist.com/education, and follow the links to the APhA CPE Center.

Disclosure: The author and APhA's editorial staff declare no conflicts of interest or financial interests in any product or service mentioned in this article, including grants, employment, gifts, stock holdings, or honoraria.

Published concurrently in *Pharmacy Today* and the *Journal of the American Pharmacists Association (JAPhA)* (available online at www.japha.org).

The reference section for this article is available in the *JAPhA* version (available online at www.japha.org).

Learning objectives

- Describe the rate of adherence to prescribed medication regimens.
- List the consequences of medication nonadherence.
- Define health literacy and its prevalence.
- Describe ways to assess patients' health literacy status.
- Describe strategies for improving communication with patients, especially those with limited health literacy skills.
- Evaluate the readability of written patient information materials by hand.
- List at least six recommendations for using pictorial aids in health communication.

ACPE Activity Type: Knowledge-Based

Patients' nonadherence with medical and medication recommendations is a major public health problem.¹⁻⁹ Nonadherence is encountered in varying degrees in all areas of U.S. health care, involving an estimated 38% of patients on short-term treatment, 43% of patients on long-term treatment, and 75% of patients advised to make lifestyle changes.¹⁰ Health, behavioral, and social scientists have accumulated substantial literature on the prevalence of poor adherence, its determinants, and interventions during the previous 4 decades.^{1,11} Social, economic, medical, and behavioral factors have all been shown to affect adherence.^{12,13} Although other variables such as pharmacologic and psychosocial factors contribute to nonadherence,¹⁴ problems with patient adherence and medical errors may also be based on poor understanding of health information.^{2,15} For many patients, lack of health literacy skills is a major obstacle to effective health communication.^{2,16}

Reviews of more than 300 studies have shown that health information cannot be understood by many patients.¹⁷ This communication mismatch has been associated with patients being less knowledgeable about their diseases,^{1,11,12,18-20} more likely

to have poorer health outcomes,^{2,13,15,21-23} and more likely to be hospitalized.²⁴⁻²⁶

Objectives

The goal of this article is to present a summary of the existing literature on health literacy and its effect on medication nonadherence and pharmacist-patient communications and the use of written patient information in health care and pharmacy.

Search strategy

Potentially relevant articles were identified by searching the Medline, PubMed, and International Pharmaceutical Abstracts databases using the following terms: *adherence/nonadherence, compliance/noncompliance, printed/written information, literacy, patient education, communication, and health literacy*. These terms were combined with the following search terms: *drug information, readability, medication/drug, patient, pharmacy/pharmacist, and prescription*. References of pertinent articles were hand searched to retrieve additional articles. The selection was limited to English-language articles published from 1990 through 2006.

Medication adherence

Compliance was defined more than 2 decades ago as "the extent to which a person's behavior (in terms of taking medications, following diets or executing other life-style changes) coincides with medical or health advice."³ This term was later criticized for implying paternalism. The terms *adherence* and *concordance* have replaced compliance. Adherence is favored because of its connotation that the patient-provider relationship is based on respect and collaboration.²⁷ It also includes the patient in the determination and success of therapy more accurately than the term compliance.¹ The World Health Organization has adopted the following definition of adherence: "The extent to which a person's behavior, taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider."²⁸ In the literature, the terms adherence and compliance have been used interchangeably²⁹; adherence will be used in this article.

Costs of nonadherence

Underuse of medications caused by problems with adherence or persistence (i.e., the length of time patients continue to take medications as directed) exacts a tremendous toll on patients' health and the nation's economy. Approximately 125,000 deaths annually are attributed to nonadherence, and up to 11% of hospital admissions and 40% of nursing home admissions can be attributed to lack of adherence with medication therapy.¹² Medication-related problems, some of which are caused by nonadherence, costs U.S. society an estimated \$177 billion annually in total direct and indirect health care costs.³⁰ Medication nonadherence is also costly for pharmacies and the pharmaceutical industry. Some 140 million prescriptions, valued at \$2.8 billion, go unfilled annually.¹² Furthermore, medication nonadherence is involved in an estimated 30 to 50% of cases in which medications do not produce their therapeutic goals, thereby reducing treatment benefits and confounding clinicians' assessments.³¹

At a Glance

Synopsis: The current work summarizes the complexities of health literacy, medication nonadherence, and patient education and provides suggestions for promoting medication adherence, particularly among patients with low health literacy skills. Pharmacists play a key role in recognizing patients with low health literacy skills and providing strategies to enhance understanding and adherence in this population. For medication information to be understood and adherence to be promoted, pharmacists should speak clearly and slowly, use appropriate vocabulary, avoid medical jargon, explain the specific steps of the regimen, review the most important details, and encourage patients to ask questions. Simplified written instructions and/or visual aids should also be used to enhance patient recall.

Analysis: *Although no single intervention strategy can improve the medication adherence of all patients, considerable research suggests that successful attempts to improve adherence depend on certain key factors, including realistic assessment of patient knowledge and understanding of the regimen, clear and effective communication between health professionals and patients, and the nurturance of trust in the therapeutic relationship. Pharmacist interventions can help reduce the burden associated with the adverse effects of limited health literacy on medication-related issues that affect patient knowledge, self-care for chronic diseases, health status, and risk of hospitalization. This can lead to better appreciation of pharmacist interventions by patients, prescribers, third-party payers, and society at large.*

Measurement of adherence

No generally accepted gold standard exists for measuring adherence behavior.³² Several strategies have been used^{29,33–35}; they are categorized as direct or indirect.

Direct methods include observation of medication intake and biological assays of a drug, its metabolite(s), or a tracer substance in blood or urine.^{33,34} Observation verifies adherence, yet necessitates direct patient–clinician encounters and does not elucidate medication intake dynamics.³² Biological assays are intrusive,³⁴ expensive, burdensome to the health provider, and susceptible to distortion by the patient.^{33,34} Assays are most useful for medications whose serum concentrations are monitored, such as the antiepileptic agents phenytoin and valproic acid.

Indirect methods include patient questionnaires, self-report, pill counts, rates of prescription refills, collateral reports from family members or clinicians, assessment of the patient's clinical response, electronic medication monitors, measurement of physiologic marker, and patient diaries.^{31,33,36} Questionnaires (or questioning the patient), patient diaries, and assessment of clinical response are relatively easy methods but can be susceptible to misrepresentation. Self-report and collateral reports are uncomplicated, inexpensive, and feasible in clinical settings but are prone to recall and social desirability response bias. Collateral reporting depends on the family member or clinician's familiarity with the patient.^{37,38} Pill counts (i.e., pills dispensed, remaining, and prescribed), although easy to perform, are invalidated when patients hoard or discard drugs.^{37,38} Furthermore, patients may not accurately recall the date that they started taking the medication.

Electronic monitors provide precise and detailed information on patients' behavior in taking medications, but they do not provide information as to whether the patient actually ingested the correct drug or correct dose. Also, the cost of electronic monitoring limits the feasibility of the devices. They provide the most accurate and valuable data on adherence in difficult clinical situations. Prescription refill rates provide an accurate measure of overall adherence in a closed pharmacy system such as the Department of Veterans Affairs Health Care System but are problematic when patients use a number of nonnetworked pharmacies^{32,37,39}; they are not useful for medications that do not require subsequent refills. Also, although refill rates provide a proxy measure, patients' true medication-taking behavior may remain unknown. In summary, although using one method in a particular situation might be advantageous, a combination of methods tends to maximize accuracy.⁴⁰

Medication adherence rates

Medication adherence rates have been reported by some researchers as the percentage of the prescribed doses of medication actually taken by the patient during a specified period.³³ Other investigators have estimated medication adherence by determining the number of tablets or capsules missed (or taken at inappropriate time intervals) or the number of days without therapy and reported the average number of tablets or capsules missed, average number of days without medication, or average deviation from the prescribed consumption time.³⁴ Re-

search suggests that only about 50% of patients typically take their medications as prescribed,¹¹ only 50 to 60% of patients are adherent to prescribed medications over a 1-year period,⁹ and adherence rates are typically higher among patients with acute conditions³³ compared with long-term medication regimens, for which adherence ranges from 17 to 80%.³⁵

A 2006 survey commissioned by the National Community Pharmacists Association reported that nearly three of every four American patients do not always take their prescription medication as directed.⁴¹ Nonadherence occurs among patients of all ages, social classes, and ethnic groups and amidst patients participating in various forms of health care delivery.⁴² Medication nonadherence in the home setting often involves using more or less than the prescribed dosage (36%), completely omitting one or more prescribed medications (28%), taking an extra dose (12%), using an unauthorized medication (8%), or taking medication at the wrong time (7%).⁴³

Factors contributing to nonadherence

Adherence is a multidimensional phenomenon,⁴⁴ and as interest surrounding adherence behavior has developed, a number of theoretical models have been forwarded to account for the various factors that influence adherence behavior.^{45,46} Among these models are social behavioral theories including the Health Belief Model,⁴⁷ the Common Sense Model,⁴⁸ and the Self-Efficacy Theory.⁴⁹

The Medication Adherence Model provides an elaborate analysis of how three key constructs influence medication-taking behavior⁵⁰: (1) the patient's representation of his or her illness (e.g., perceived severity), (2) the patient's cognitive function (e.g., comprehension, long-term memory), and (3) external cues or strategies used by the patient to enhance medication-taking behavior (e.g., social support, reminder devices). The patient's cognitive function construct may be critical for proper medication use and in the pharmacist–patient interaction. This is because the patient's ability to adhere to the prescribed treatment regimen may be compromised if he or she cannot obtain and understand basic information about how to take the prescribed medication.^{51–53}

Health literacy

Healthy People 2010 defines health literacy as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”⁵⁴ Thus, health literacy relates to both the cognitive and functional skills used to make health-related decisions.⁵⁵ This definition also implies that literacy goes beyond the ability to read a sentence to the ability to comprehend the written word. Health literacy includes numeracy skills such as calculating blood glucose levels and measuring medications. Furthermore, it requires knowledge of health topics in addition to basic literacy skills.

Literacy, the foundation of health literacy,¹⁷ has been defined as “an individual's ability to read, write, and speak English and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and to

develop one's knowledge and potential.⁵⁶ Illiteracy means being unable to read or write. An individual who has limited or low literacy skills is not illiterate.⁵⁷

A person's health literacy skills may be worse than his or her general literacy skills. A report from the Institute of Medicine (IOM) states that, generally, individuals with limited literacy skills also have limited health literacy—an inability to “obtain, process, and understand basic health information and services needed to make appropriate health decisions.”¹⁷ Limited literacy skills are associated with lack of understanding of written or oral health communication.⁵⁸ According to the American Medical Association, poor health literacy skills are a stronger predictor of an individual's health status than age, income, employment status, education level, or racial/ethnic group.⁵⁹

Prevalence of low health literacy

Data from the U.S. Department of Education 2003 National Assessment of Adult Literacy (NAAL) study⁶⁰ indicate that a large segment of the population lacks sufficient general literacy to effectively undertake and execute medical recommendations. Nearly 90 million adult Americans (36% of the adult population) are limited in their ability to read and understand health information, including medication labels.¹⁷ Individuals with limited health literacy cannot circle the date of a medical appointment on a hospital appointment slip or identify how often a person should have a specified medical test, based on information in a clearly written pamphlet.⁵ Almost one-third of adults older than 65 years have very poor health literacy skills. Adults who receive Medicare or Medicaid and those with no insurance have lower-than-average health literacy.⁵ More than one-third of English-speaking patients and more than one-half of primarily Spanish-speaking patients at U.S. public hospitals have low health literacy.⁶¹

NAAL data indicate that only 12% of U.S. adults have proficient health literacy skills. Individuals with proficient health literacy skills can deal with complex and challenging health literacy tasks (e.g., calculating an employee's share of health insurance costs for a year using a table showing how the employee's monthly cost varies depending on income and family size, finding information required to define a medical term by searching through a complex document and evaluating information to determine which legal document is applicable to a specific health situation).

Of the other patients, 52, 22, and 14% have intermediate, basic, or below basic health literacy skills, respectively.⁶⁰ Those with intermediate skills can deal with most health literacy tasks that they encounter (e.g., using an over-the-counter drug label to identify substances that may cause an adverse drug interaction, using a childhood immunization chart to find the proper age range when certain vaccines may be given to children). Individuals with basic health literacy would have trouble providing two reasons why someone with certain symptoms might have a specified test, even when using information from a clearly written, accurate pamphlet. Those with below basic health literacy would not be able to recognize a medical appointment on a hospital appointment form or be able to determine how often a person might have a specified medical test from a clearly written pam-

phlet containing basic information. Patients with basic or below basic health literacy frequently cannot read written information given to them by health professionals.

Risk factors for low health literacy

Poor health literacy is a problem that affects individuals from all segments of society regardless of their age, gender, race/ethnicity, income, or social class.⁶² Individuals at highest risk are the economically disadvantaged, elderly, or chronically ill.⁶³ Certain ethnic or racial groups also have high rates of low health literacy, with 66% of Hispanics and 58% of blacks having basic or below basic literacy skills in the NAAL study.⁶⁰ However, the most common demographic profile of an individual with low health literacy is white race and born in the United States.⁶⁴ Groups with especially high prevalence of low literacy are listed in Table 1.

Effectively communicating health information

Most of the health education information that is provided to patients, both oral instructions and written information, is presented in a format that is too complex for the average person to understand.^{2,58,65-67} This communication mismatch is one of the causes of nonadherence.^{2,10,68,69} Approximately one-third of all patients and two-thirds of physicians know someone who has had health problems because they did not understand how to take a prescription medication correctly.⁷⁰ Inadequate understanding or misunderstanding of medication instructions and information includes not understanding how to properly administer the medication and not comprehending the importance of medication therapy.^{2,13,71} Patients may believe, for example, that medications such as antidepressants and corticosteroids are not working and stop taking them before the intended effects of the medications can be produced.²⁹

Effective communication every time medications are dispensed can make a critical difference.⁷²⁻⁷⁴ Although the effect of pharmacist-patient communication is unstudied within the context of health literacy, research on physician-patient communication shows that physicians commonly overestimate patients' literacy levels and rarely consider limited literacy skills in their assessment of whether patients understand what action is needed.⁶⁹ Individuals with low literacy skills are disadvantaged in their ability to obtain, process, and understand both written and verbal information.⁶⁵ This makes communication about taking medications a critical factor in the pharmacist-patient interaction. Improved communication between pharmacists and patients has the potential to enhance patients' understanding of the prescribed medication regimen and what to expect from medication therapy and hence avoid medication nonadherence related to these issues.

Oral communication

Patients with low health literacy skills rely heavily on oral communication and need help in remembering what they hear.⁷⁵⁻⁷⁷ They prefer to receive oral rather than written health information.⁷⁸ Unfortunately, in many cases, this is not what they get from their pharmacists. In a study of more than 300 pharmacies in eight states, most shoppers (89%) received written information,

25% of them never talked with a pharmacist, and 63% received oral information regarding new prescriptions. Further, the majority of shoppers received no oral advice or reinforcement about how long to take medications, how to manage adverse effects or precautions, or when the medications would begin to work. Although most shoppers in this study received written information, only 5% were provided with any review of the patient information leaflets.⁷⁹

Communication problems are not automatically resolved by patients' desire for oral communication and health providers' attempts to meet this need. A substantial gap exists between the words and language used among health professionals and those of their patients.^{76,80-82} Many people, including those who are highly literate, have trouble understanding commonly used health terms,⁸³ including medical words, concept words, category words, and value judgment words.^{83,84} These "words to watch" can be made understandable by explaining them with common words, using examples, or using visual aids.^{83,84} Appendix 1 (electronic version of this article, available online at www.japha.org) gives some examples of plain-language alternatives to these "words to watch."

Patients, particularly those with limited health literacy skills, are more interested in information that improves their sense of well-being and helps them deal with immediate health problems.⁵⁷ This information can sometimes be difficult for health professionals to provide, especially when dealing with patients who have limited literacy and/or health literacy skills. The literature on physician-patient communication indicates that although patients with limited literacy may want and need information clarified, they tend to ask fewer questions^{69,78} and may hide their limited understanding out of shame and embarrassment.^{69,85} Patients want information about the indication of medications, expected benefits, duration of therapy, and potential adverse effects, in addition to information identifying the drug's name, directions for use, and warnings.⁸⁶

Given that patients at all health literacy levels have problems understanding medical information,⁶² the relative paucity of vocabulary and restricted knowledge base among people with low health literacy skills put them at an even greater risk for difficulties in understanding and integrating oral communication. Thus, when pharmacists provide oral counseling, patients with low literacy and/or low health literacy skills may still not understand the information presented to them. For information to be understood and adherence to be promoted, pharmacists should speak clearly and slowly, use appropriate vocabulary, avoid medical jargon, explain the specific steps of the regimen, review the most important details, and encourage their patients to ask questions.^{43,57,65} Also, pharmacists need to consider and convey how the recommendation fits practically into their patients' lifestyles and how the information can benefit patients.⁵⁷ The Partnership for Clear Health Communication has excellent recommendations for patient involvement that centers on three questions that health care providers should encourage patients to ask about their health care visits:

- (1) What is my main problem?
- (2) What do I need to do?
- (3) Why is it important for me to do this?

A complete discussion of this topic and downloadable resources can be obtained at www.askme3.org.⁸³

Written communication

Written instructions on the use of medications are among the most important materials that patients receive.⁸⁷ The importance of written instructions in patient education is reflected by one of the goals of Healthy People 2010 (i.e., 95% of patients getting new prescriptions should also receive useful written medication instructions about the dispensed medicine).⁵⁴ The benefits of written medication information have been well documented.⁸⁸⁻⁹³ Health organizations and professionals use written patient information materials as part of patient education or health promotion efforts, in support of preventive, treatment, and adherence objectives.⁹⁴ When used as an adjunct to verbal counseling, written information can reinforce specific instructions or warnings. It can also provide a means for introducing supplemental information that may be difficult to convey during a brief counseling session.⁹⁵ Pharmacy-distributed patient education materials include details concerning adverse effects, medication interactions, purpose of the medication, what to do in the event of adverse effects, expected duration of therapy, and what to do if a dose is missed.⁸⁸

Despite the widespread availability and benefits of written materials, many such resources are of little value to patients with limited literacy and/or health literacy skills.^{2,18,96} Simply giving patients written information does not ensure that patients understand the information. Literacy studies show a gap of more than 5 years between most patients' reading capacities and the reading levels required to understand written educational materials.⁹⁷ Also, although the average adult American reads at an 8th grade level,² the average health education information material is written at the 12th grade level.⁶² In a study that examined the distribution and quality of patient medication leaflets provided in U.S. pharmacies, patients rated 36% of the leaflets as difficult to read.⁹⁸ Another study examining the readability of commonly used pharmacy patient education materials found that only 2% had readability scores at or below the 8th grade level; 69% scored in the 9th to 12th grade range, and 29% scored above the 12th grade level.⁸⁸

To provide optimal medication information to patients, written materials must be written at an appropriate reading skill or

Table 1. Groups and characteristics often associated with high prevalence of low literacy

Elderly
Female gender
Not completing high school
Immigrants
Incarceration
Income status classified as poor or near poor
Living in the south or northeast (rather than west and midwest)
Lower socioeconomic status
Member of minority group
Lower cognitive ability
Chronic disease

Source: References 55, 87, 100, 130, 137, 138, 146.

grade level for the intended audience.⁹⁵ A text's readability (i.e., the ease at which it can be read and understood), is one of the factors that affects its appeal.^{96,99} Findings from one study indicated that, compared with prescription warning labels with text written at the 3rd grade level or below, labels with text written at the 6th to 7th grade level are 4.3 times more likely to be misinterpreted and those with text at the 8th grade level are 12.9 times more likely to be misinterpreted.¹⁰⁰ The National Work Group on Literacy and Health recommends that health materials be written at a 5th grade readability level but recognizes that this level is still too difficult for about 25% of the population.¹⁰¹ Ideally, health education materials should be written at the 3rd to 4th grade level.¹⁰²

Medication knowledge

Patients' ability to participate in their care and decision making depends largely on their knowledge and literacy skills,¹⁰³ and several authors have reported that patients' knowledge of medications is positively associated with adherence.¹⁰⁴⁻¹⁰⁸

One study involving 2,659 patients with limited literacy skills examined patients' ability to process numbers (numeracy) and other concepts related to medication use. Overall, 42% of patients gave incorrect answers for "how to take a medication on an empty stomach," 33% for "how many pills of a prescription should be taken," 23% for "how many times a prescription can be refilled," and 13% could not understand directions to take medication four times a day.¹⁰⁹

A gap between what patients ought to know to use dispensed medications appropriately and what they actually know was also found in a study that evaluated the effects of low literacy, medication regimen complexity, and sociodemographic characteristics on medication management capacity among 152 mostly elderly participants (mean age 65.4 years). In the study, 38% of the patients were unable to identify all of their medications, despite being able to look at the bottle, label, or tablets.⁹ More than one-half (57%) of those with inadequate literacy skills were unable to identify all of their medications compared with 25% of those with marginal literacy and 7% of those with adequate (reading level of 9th grade or higher) literacy skills.

Cognitive capacity

Cognition is the portion of a person's comprehension, memory, and recall used to perform tasks that require some knowledge, skills, or ability.⁴⁶ The implication therefore is that patients must understand what they are supposed to do before they can follow medical recommendations.

A study designed to determine the prevalence of low functional health literacy among Medicare managed care enrollees found that 47.5% of adults with inadequate literacy skills incorrectly described the timing of medication doses after reading the label on a prescription vial compared with 24.4% of those with marginal and 11.5% of those with adequate literacy skills. Also, 54.3% of respondents with inadequate literacy skills could not describe how to take medication on an empty stomach compared with 33.7 and 15.6% of those with marginal and adequate literacy skills, respectively.¹¹⁰

In a recent multisite study that investigated the success with which patients understand instructions on medication labels, 46.3% misunderstood one or more of the prescription label instructions. The prevalence of incorrect answers among patients reading at the 9th grade level or above (adequate literacy), those reading at the 7th to 8th grade level (marginal literacy), and those reading at or below the 6th grade level (low literacy) was 37.7, 51.3, and 62.7%, respectively. More than one-third of patients with adequate literacy skills (38%) misunderstood at least one of the label instructions. Patients with low literacy were less able to understand the meaning of all five medication labels than those with adequate literacy. For example, for the instruction, "Take two tablets by mouth twice daily," most patients (71%) with low literacy could read the instruction correctly. However, only 35% accurately demonstrated the correct number of tablets to be taken daily. The majority of the misunderstood label instructions were related to dosing such as teaspoonful versus a tablespoonful or to frequency or duration of use. The frequency of mistakes was higher when the medication instructions included multiple varying numbers, such as, "Take one tablet by mouth twice daily for 7 days." Taking a greater number of prescription medications was also associated with misunderstanding label instructions.¹¹¹

In a portion of the above study,¹¹¹ patients were assessed based on whether they could accurately read and state the instructions for guaifenesin ("Take two tablets by mouth twice daily") and correctly demonstrate how many tablets were to be taken daily. Patients at all literacy levels were better able to read label instructions than to demonstrate the correct number of tablets to be taken. The investigators suggested that verifying whether patients or their surrogates can accurately describe and demonstrate how to take prescribed medications safely needs to occur during medication review. Most patients with literacy problems were unable to follow the prescription medication directions, "Take 1 tablet X times a day," with the X being a number.¹¹² With this instruction, patients took the prescribed medication at inappropriate times or intervals or in the wrong quantities. When the direction is written as "Take 1 tablet every X hours," patients are more likely to understand the directions and follow them correctly. Other recommendations for educating patients with low literacy skills include using simple language, having patients repeat back instructions to confirm understanding, and using assistance devices such as pillboxes, graphic medication schedules, pictographs, and other multimedia aids.¹¹³ Table 2 provides more information on enhancing understanding and recall of medication instructions.

Adherence is a multidimensional phenomenon⁴⁴ caused by varied and complex factors, including the patient's knowledge and confidence in their ability to follow recommended behaviors.¹¹⁴ Patients want practical, concise information focused on action and motivation.⁷⁸ Patients who are informed and effectively motivated are also more likely to adhere to their treatment recommendations.^{115,116} Studies have found that both patient satisfaction and patient adherence are enhanced by patients' involvement and participation in their care.^{117,118}

Table 2. Steps to enhance understanding among patients with low health literacy

Slow down and take time to assess patients' health literacy skills.
Use "living room" language instead of medical terminology.
Show or draw pictures to enhance understanding and subsequent recall.
Limit information given at each interaction and repeat instructions.
Use a "teach back" or "show me" approach to confirm understanding. This approach involves having clinicians take responsibility for adequate teaching by asking patients to demonstrate what they have been told (i.e., teach back to you how to take their medications) to ensure that education has been adequate.
Use of assistance devices such as pillboxes.
Avoid asking, "Do you understand?"
Be respectful, caring, and sensitive, thereby empowering patients to participate in their own health care.
Tailor information to the individual by giving examples and explaining relevance.
Ensure understanding through open-ended questioning and demonstration techniques.

Source: References 58, 66, 78, 133.

Implications for pharmacy practice

Substantial evidence indicates that inadequate health literacy adversely affects adherence behavior, patients' knowledge, self-care for chronic diseases, and health care costs.^{25,119,120} The IOM report *To Err Is Human*⁶⁸ noted that management of complex medication therapies, especially in elderly patients, is extremely difficult and requires special attention to the ability of the patient to understand and remember the amount and timing of a dose, as well as behavioral modifications required by the regimen. Some patients with limited literacy and/or health literacy skills may not be getting this special attention from their pharmacists. Study findings¹²¹ show that the quality and amount of counseling about medications in community pharmacies are inadequate and do not meet the intent of the Omnibus Budget Reconciliation Act of 1990, which made patient-centered practice mandatory for Medicaid beneficiaries through collection of patient information, prospective drug use review, and patient counseling.¹²²

According to a 2004 telephone survey that examined the receipt of medication information at pharmacies, only 31% of patients reported receiving instructions from their pharmacists about how to take a new medication and only 29% were told how much to take.¹²³ Although no single intervention strategy can improve the medication adherence of all patients, decades of research studies suggest that successful attempts to improve patient adherence depend on certain key factors, including realistic assessment of patients' knowledge and understanding of the regimen, clear and effective communication between health professionals and their patients, and the nurturance of trust in the therapeutic relationship.¹²⁴

Patient education

Patient education is "the process of influencing patient behavior and producing the changes in knowledge, attitudes and

skills necessary to maintain or improve health."¹²⁵ Lack of patient education can be an important predisposing factor in nonadherence to prescription medication instructions because understanding and recall of medication instructions depend on getting accurate information in the first place.¹²⁶ Lack of patient education is a concern for all patients but especially for patients with low health literacy skill.

A study of 483 asthma patients found an association between reading ability and asthma knowledge. Among patients reading below the 3rd grade level, 89% had poor metered-dose inhaler technique compared with 48% of patients reading at the high school level.²⁰ In another study of 227 human immunodeficiency virus-seropositive adults, patients with limited health literacy skills were less adherent to antiretroviral therapy, and this effect persisted after controlling for other variables.¹²⁷ In the study, patients with limited health literacy skills often cited confusion with prescribed regimen as a reason for nonadherence. Patients with low literacy skills were also reported in a study that examined patients' understanding and use of oral contraceptive pills to be less likely to understand how to correctly use birth control methods.¹²⁸

Challenges with low health literacy

Clinicians encounter patients with limited health literacy on a daily basis.⁸⁷ Patients with limited literacy and/or health literacy skills are more likely to have difficulties understanding and executing proper medication use.^{20,111,109,129} A report by the Agency for Healthcare Research and Quality on health literacy concluded, "Low reading skills and poor health are clearly related."¹³⁰ In addition, evidence indicates that communication barriers such as limited English proficiency and limited health literacy are associated with lower quality of care and place patients at risk for poor clinical outcomes.^{21,131}

All this information gives pharmacists more reasons to pay particular attention to their interactions with patients who have limited health literacy skills and other communication barriers. The philosophy of pharmaceutical care calls for pharmacists to identify, resolve, and prevent medication-related problems.¹³² Routine identification of patients with limited literacy and/or health literacy skills and development of interventions to prevent inappropriate use of prescribed medications may increase patient knowledge and self-care skills and, ultimately, adherence and outcome.

Pharmacists' role in unintentional medication nonadherence

Poor medication adherence is not simply a "patient" problem. The pharmacist is also involved. Studies of the reasons for patients not following medical advice have used models that place primary emphasis on patients and their motivations, predispositions, or level of "psychological readiness."³⁵ These models tend to neglect the possibility that nonadherence can be unintentional.^{133,134}

Some patients may be motivated to adhere to the prescribed regimen but fail to do so because of misunderstanding associated with factors such as low health literacy or language barriers.

ers. Misunderstanding of the regimen and language barriers are essential elements of unintentional nonadherence.¹³⁵

Given the extent of the limited literacy and health literacy problem in the United States and the association between limited health literacy and medication nonadherence, poor health, and treatment outcomes, pharmacists have a critical role to play. Communicating more effectively with patients about medications is necessary for helping them achieve desired therapeutic outcomes from medication therapy. Being aware of the patient's skills, including literacy and health literacy skills, is a necessary first step in this endeavor because different communication strategies may be needed for enhancing the pharmacist-patient interaction and subsequently improving adherence. However, awareness alone is not sufficient. Patients with limited literacy and/or health literacy skills have to be identified.

Identifying low literacy patients. A report from the American Pharmacists Association indicated that pharmacists are not paying sufficient attention to the literacy status of their patients.¹³⁶ The report highlighted the findings from a survey of community pharmacies⁷¹ showing that most pharmacists were unaware of the limited literacy skills of many of their patients. Also, many of the pharmacists thought that they did not have to worry about literacy issues because they did not have low-income patients. These findings are supported by other reports.^{65,87,137,138}

Generally, patients with limited literacy skills cannot be identified by their appearance or speech, and most describe themselves as able to read English "well" or "very well."¹³⁸ Identifying patients who may have limited health literacy skills can be difficult.⁶⁵ Asking patients questions such as, "How many years of school did you complete?" or "Can you read?" does not accurately assess their literacy level.^{58,87,97,139,140} A survey of Medicare managed care enrollees found that 27% of those who graduated from high school had inadequate or marginal health literacy, as did 17% of those with some college education.¹⁰⁷ Also, in a study of

preoperative veterans who were predominantly white and had at least a high school education, 12% had inadequate or marginal health literacy. Health literacy did not correlate with self-reported years of education.¹⁰⁸

In short, patients with limited health literacy do not fit a stereotype. Many well-groomed, articulate, intelligent-sounding individuals have limited health literacy.^{138,58,141} Most individuals with limited literacy are often embarrassed and go to great lengths to hide their inability to read or understand medical information.^{57,65,78} One study showed that 40% of patients with low literacy felt shame, 67% had not told their spouse, 53% had not told their children, and 19% never told anyone.¹⁴²

Red flags. Pharmacists may need other tools and clues or red flags in practice to help identify patients with limited literacy. A patient who fills out registration forms or other health questionnaires incompletely or incorrectly or takes medications the wrong way may do so because of limited health literacy skills.¹⁴³ Some clues to limited health literacy are listed in Table 3. However, an absence of clues does not necessarily indicate that a patient has adequate health literacy. Some experts have advised approaching all patients as if they have limited health literacy and to communicate with them accordingly.¹⁴⁴

Screening tests. Another approach pharmacists can take is to use screening tests in identifying patients with low health literacy. Instruments for measuring literacy in the health care setting have focused on the ability to read and, in some cases, use numbers.¹³⁰

The two frequently used instruments are the Rapid Estimate of Adult Literacy in Medicine (REALM) and the Test of Functional Health Literacy in Adults (TOFHLA).^{17,145,146} REALM is a 66-item word recognition and pronunciation test that measures the domain of vocabulary. The words are arranged in order of complexity by the number of syllables and pronunciation difficulty starting with simple one-syllable words such as "pill" and ending with

Table 3. Signs of and tips for identifying patient health literacy problems

Aloofness or withdrawal during physician/provider explanations
Asking staff for help
Be alert for possible vision and/or hearing problems
Frequent errors in medications or self-care instructions
Unable to name medications
Unable to explain a medication's purpose
Inability to keep appointments
Making excuses (e.g., "I forgot my glasses")
Observe if a surrogate reader accompanies patient
Postponing decision making (e.g., "May I take the instructions home?," "I'll read through this when I get home")
Take note if forms are incompletely filled out, possibly only with name provided
Take note of patients who do not know the name of medications they have been taking for a long time
Watch for a chronic pattern of nonadherence
Watch for patients who fail to look at printed material (or they fail to turn it right side up)
Written materials handed to a relative or other person accompanying the patient
Watching others (mimicking behavior)
Patients say they are taking their medication, but laboratory tests or physiological parameters do not change in expected fashion

Source: References 66, 76, 119, 129, 143, 159-161.

multisyllable words such as “antibiotics.” It can be administered and scored in less than 3 minutes by personnel with minimal training, making it easy to use in clinical settings.¹⁴⁷ Scores on REALM vary from 0 (no words pronounced correctly) to 66 (all words pronounced correctly). The scores can be grouped into three categories of literacy: inadequate (0–44, representing a reading level at or below the 6th grade, marginal (45–60, 7th to 8th grade level), and adequate (61–66, 9th grade or above).⁹ The test provides both an assessment of general reading skills and an indication of the individual’s health literacy skills. It is available only in English.

TOFHLA measures reading fluency and is available in both English and Spanish. The standard test includes a 17-item test of numerical ability and a 50-item test of reading comprehension and takes about 22 minutes to administer.¹⁴⁸ A short version of the test (S-TOFHLA) is also available; it takes about 7 minutes to administer. Both tests identify individuals who are likely to have poor background health knowledge and difficulty understanding both written and oral health messages.¹⁴⁹ Scores on TOFHLA categorize patients as having low, marginal, or adequate health literacy skills.¹⁵⁰

Recently, a new screening test, the Newest Vital Sign (NVS), was developed.¹⁴⁶ It consists of a nutrition label for ice cream with six questions about the information contained in the label. The patient’s response to each of the questions is scored as correct or incorrect. One point is assigned for each correct answer. Patients who score 4 to 6 are classified as having adequate health literacy skills. Those who score 2 to 3 are classified as “possibly” having low health literacy, and those with a score of 0 to 1 are classified as “likely” having low health literacy. NVS takes approximately 3 minutes to complete. It is fairly short, moderately accurate, and appears to identify individuals with limited reading capacities better than demographics alone.¹⁴⁵ NVS is available in both English and Spanish.

Although some researchers have used REALM, TOFHLA, S-TOFHLA, or NVS to identify individuals with limited literacy, others have relied on screening questions. Chew et al.¹⁵¹ found three screening questions to be predictive of limited health literacy skills in a sample of men receiving medical care at a Veterans Administration clinic: (1) “How often do you have problems learning about your medical condition because of difficulty understanding written information?” (always, often, sometimes, occasionally, or never), (2) “How often do you have someone help you read hospital materials?” (always, often, sometimes, occasionally, or never), and (3) “How confident are you filling out medical forms by yourself?” (extremely, quite a bit, somewhat, a little bit, or not at all). These researchers found the question about hospital materials to be most effective at identifying patients with limited health literacy. They concluded that limited literacy in health care settings can be detected with a single question and that the single question is more effective than demographic characteristics. These findings have been supported by other researchers.¹⁵²

Communicating to enhance medication adherence

Provider–patient communication is a contributing factor in patient satisfaction, adherence, and health outcomes.^{153,154} Studies have also shown that people understand and remember

what is important to them and have demonstrated significant differences between what patients want to know and what health professionals think they should know.^{155,156} A descriptive study of the information that patients with hypertension prefer to receive about medications to improve adherence reported that 90% of patients wanted to know about adverse drug reactions, 96% wanted to know about the benefits of the medication, and 82% wanted more information about their disease. Other frequent concerns were related to duration of therapy and lifestyle effects.¹⁵⁷

Effective communication with patients, especially those with low health literacy skills, has the potential of not only bridging the communication gap between practitioners and their patients but also improving patients’ understanding of the prescribed medication regimen and providing patients with information that they desire and want to know. Patients with limited literacy and/or health literacy skills may be empowered when pharmacists communicate using oral and/or written means that convey pertinent medication information and ensure that each patient understands the prescribed behavior. Difficulties may be addressed and potentially resolved before they lead to nonadherence with prescribed medications. Furthermore, collaboration with the patient may enhance shared decision making, which might lead to better adherence.¹⁵⁸

Oral communication

Most patients prefer medical advice that is simple and easy to understand.^{57,119,159–161} Pharmacists can simplify their advice to patients by providing essential instructions only and using non-medical language.^{59,83,143} Online Appendix 1 gives some examples of plain-language alternatives to medical terms.

Pharmacists can make their instructions interactive by having patients do, write, say, or show something to demonstrate their understanding.¹⁶ Also, because patients forget more than one-half of the information from oral explanations immediately after they hear it,¹⁶² strategies aimed at improving patients’ recall of medical instructions must be used to assist patients with their prescribed medication regimens. Recall can be aided by presenting instructions in a clear and simple manner, using concrete and specific advice, repeating and stressing the importance of the critical components of the advice, checking understanding, and providing feedback.^{58,78} Other suggestions to enhance adherence include color coding the prescription vials based on the time of day a dose needs to be taken²⁹ and using organizers and reminders such as blister packs, calendars, dosage counters, and special containers.^{85,163}

Pharmacists have an opportunity to access a patient’s cognitive structure during the counseling process to ensure that the prescribed instruction is comprehended and can be recalled when needed.⁴⁶ When pharmacists interact with patients at this level, they can successfully engage in patient education that empowers patients to better adhere to prescribed medication regimens, which might result in better therapeutic outcomes.

Use of written materials

Pharmacists can use a number of formulas to evaluate the readability of the most commonly used written patient medica-

tion information materials in their practice. Most of the formulas are applicable to narrative language (running text) but not to lists, charts, and tables.¹⁶⁴ Also, the majority of them establish readability based on two factors: (1) the number of difficult words (usually words with three or more syllables) in a sample and (2) a higher grade level. Pharmacists can test for readability by hand or using computer software. The Fry method is an easily used means of checking readability.¹⁶⁵ It is relatively simple and yields accurate results.^{95,164,166} Obtaining results for typical patient leaflets and materials when using the Fry method without electronic aids only takes about 15 to 20 minutes.

Several word-processing software programs, including Microsoft Word, can be used to test readability of passages. These computer tests provide a quick analysis of readability along with information such as the number of words per sentence and the number of sentences per paragraph. However, they may not be as accurate as manual calculations and should be used only as a very rough measure of readability¹⁵⁵ because the score from such programs is based on word length (the number of characters between spaces) and sentence length (the number of words between periods). Also, the readability score does not consider content.^{143,166} Instructions for calculating readability levels using the Fry method are provided in online Appendix 2.¹⁶⁷

The Gunning-Fog test is another simple readability test. Schrock¹⁶⁶ provides directions for these and other readability formulas along with information on Readability PLUS software.

Use of pictorial aids

Patients of all literacy levels can benefit from picture-based information, but patients with limited literacy skills are especially likely to benefit.^{2,77,168,169} Research findings have shown that pictorial aids enhance patient recall, comprehension, and adherence to medication regimens, particularly when combined with written or oral instructions.^{2,77,168} To reap the benefits of pictorial aids, however, pictorial aids designers need to take into account the educational level of the target group and the environment, both culturally and ecologically.^{57,138,168-170} Pictorial aids that are useful in one population might not be used successfully in another.^{168,170} Thus, pharmacists should make sure that patients interpret pictorial aids correctly when using them in their practice. Telling patients the correct meaning of an incorrect pictorial aid has been found to substantially increase its correct interpretation later.¹⁷¹ Training patients in the use of pictorial medication information to improve its use as a medication administration aid has been suggested.^{2,170} Recommendations on the use of pictorial aids in improving health communication are presented in Table 4.

Other resources for enhancing communication with patients

Pharmacists can use several available resources to enhance their communication with patients, especially those who are challenged by health literacy issues. They can, for example, register and take a free online course, “Unified health communication 101: Addressing health literacy, cultural competency, and limited English proficiency,” that was developed by the Health Resources and Services Administration.¹⁷² The course is designed to help health professionals improve their patient

communication skills, increase their awareness and knowledge of the three main factors that affect their communication with patients (health literacy, cultural competency, and low English proficiency), and implement patient-centered communication practices that demonstrate cultural competency and appropriately address patients with limited health literacy and low English proficiency.¹⁷² The Health Sciences Library at the University of North Carolina at Chapel Hill maintains a list of health literacy resources, many of which can be useful to pharmacists (online Appendix 3).¹⁷³ The list includes information on low literacy education materials that are designed by several national organizations and are available to the public. Other suggested strategies are presented in Tables 2 and 5.

Looking ahead: Pharmacist-patient interactions

Health care delivery continues to shift from inpatient to outpatient settings, and the practice of quality control over medication use is becoming more the responsibility of the patient and less the responsibility of the provider.¹⁰⁹ These trends indicate the importance of the pharmacist-patient interaction in ensuring that patients have the skill and knowledge needed to perform self-care medication-taking behaviors. Pharmacists have the essential technical knowledge for assisting patients with their medication information needs and medication-taking behavior. Despite this knowledge, rendering the assistance that patients need might be difficult because of certain operational aspects of pharmacy practice and the motivation and attitudes of pharmacists.

Results from a national survey indicated that pharmacists prefer devoting more of their time to consultation and drug use management activities in community settings.¹⁷⁴ The results also showed that pharmacists have not been afforded a full opportunity to engage in these activities to the desired extent.¹⁷⁴ Functional barriers such as time constraints, lack of resources, and lack of management support to counsel patients can affect pharmacists’ ability to engage in patient education. The involvement and collaboration of pharmacy employers is essential for developing solutions to improve clear communication between pharma-

Table 4. Recommendations for using pictures in health communication

Ask how you can use pictures to support key points
Minimize distracting details in pictures
Use simple language in conjunction with pictures
Closely link pictures to text and/or captions
Include people from the intended audience in designing pictures
Have health professionals plan the pictures, not artists
Evaluate pictures’ effects by comparing response to materials with and without pictures
Orienting instructions are important when patients are first introduced to pictorial aids
Make sure that patients interpret pictorial aids correctly

Source: References 2, 168-171, 173.

Table 5. Practice behaviors that can enhance oral communication with low health literacy patients

Limit teaching objectives
Use simple sentences and plain language
Limit points to two or three at a time
Give many examples
Demonstrate procedures such as counting pills
Repeat and summarize
Use drawings, diagrams, or models to illustrate what is being communicated
Encourage questions
Communicate with patient at eye level
Make learning participatory (enhances long-term memory of the information and checks patient's comprehension)
Organize your information and present the most important messages at the beginning and end
Be positive and encouraging
Encourage the desired behavior
Create a shame-free environment and offer assistance when needed
Use "teach back" or "show back" techniques to assess and ensure understanding

Source: References 66, 78, 138, 159.

cists and all patients but particularly between pharmacists and patients with limited literacy and/or health literacy. Although, in general, patients have problems understanding medical information, patients with limited literacy and/or health literacy are especially in need of help. These patients may rely more on verbal explanations than written medication information materials. To enhance medication adherence in this patient population, more intensive communication and educational strategies are needed, as well as a collaborative approach to care.³⁰ Pharmacists' interactions with these patients could be a critical factor in determining whether they understand the prescribed medication instructions and behaviors. General strategies might not be adequate for meeting their unique needs. Patients should be given the opportunity to assess the potential risks in a proposed treatment and its potential effect on the quality of their lives.¹⁰ Pharmacists

might need additional resources, such as training, time, automation, and technicians, to make this vital service available to patients.

With appropriate administrative support, pharmacists must work with all patients to find viable communication strategies to improve patient comprehension of prescribed medication instructions and, hopefully, adherence with medication regimens. A recently published study of a comprehensive pharmacy program composed of patient education and custom blister-packed medications was associated with substantial and sustained improvements in both adherence and therapeutic outcomes.¹⁷⁵ In today's health care environment, medications play a major role in increasing quality and years of healthy life. With the aging of the population and the likely increase in chronic diseases, medications will continue to be an integral part of the health care system. Pharmacist interventions can help reduce the burden associated with the adverse effects of limited health literacy on medication-related issues that affect patient knowledge, self-care for chronic diseases, health status, and risk of hospitalization. This can lead to better appreciation of pharmacist interventions by patients, prescribers, third-party payers, and society at large. Ultimately, this might result in reimbursement for more of the services that pharmacists provide to their patients and an enhancement of the public's view of pharmacy's professional image.

Conclusion

Although pharmacy-specific recommendations are still lacking for the most part, the need for health literacy education for pharmacists and students remains high. Such education should promote awareness of how to recognize patients with low literacy skills and provide strategies to enhance understanding and adherence in this population. Although the information provided in this article is not exhaustive or comprehensive, it can assist pharmacists in their efforts to communicate more effectively with all patients in a way that enhances their understanding of prescription medication instructions. By teaming with patients, physicians, and other professionals, pharmacists can overcome health literacy barriers and help ensure the delivery of appropriate patient education, potentially resulting in improved medication-taking behavior and adherence to prescribed medication therapy.

CPE Credit:

To obtain 2.0 contact hour of continuing pharmacy education credit (0.2 CEUs) for "Health literacy: A barrier to pharmacist-patient communication and medication adherence," go to www.pharmacist.com and take your test online for instant credit. CPE processing is free for APhA members and \$15 for nonmembers. A Statement of Credit will be awarded for a passing grade of 70% or better. You have two opportunities to successfully complete the posttest. Pharmacists who complete this exercise successfully before August 1, 2012, can receive credit.



The American Pharmacists Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. The ACPE Universal Activity Number assigned to the program by the accredited provider is 202-000-09-219-H04-P.

"Health literacy: A barrier to pharmacist-patient communication and medication adherence" is a home-study continuing education activity for pharmacists developed by the American Pharmacists Association.

Assessment Questions

Instructions: The assessment test for this activity must be taken online; please see “CPE processing” below for further instructions. There is only one correct answer to each question. This CPE will be available at www.pharmacist.com no later than August 31, 2009.

1. **What percent of patients typically take medications as prescribed according to the World Health Organization?**
 - a. 10%
 - b. 20%
 - c. 30%
 - d. 40%
 - e. 50%
2. **What percent of patients are adherent with taking prescribed medications during a 1-year period?**
 - a. 10–20%
 - b. 30–40%
 - c. 50–60%
 - d. 70–80%
3. **According to authors described in this article, what should always be considered whenever a patient’s condition is not responding to therapy?**
 - a. Adverse drug effects
 - b. Poor adherence
 - c. Suboptimal dose strength of the prescribed drug
 - d. Wrong medication therapy
4. **Medication nonadherence is thought to account for what percent of cases in which medications do not produce their therapeutic goals?**
 - a. <20%
 - b. 30–50%
 - c. 60–80%
 - d. >80%
5. **Which of the following is the strongest predictor of an individual’s health status according to the American Medical Association?**
 - a. Age
 - b. Employment status
 - c. Income
 - d. Poor health literacy skills
6. **Which of the following is the most frequent demographic profile of an individual with low health literacy in the United States?**
 - a. Black
 - b. Asian American
 - c. Hispanic
 - d. White, native-born American
7. **Who is not at risk for medication nonadherence?**
 - a. Elderly
 - b. Ethnic minorities
 - c. Those with low income and education levels
 - d. Those with high income and education
 - e. None of the above alternatives is correct.
8. **Approximately how many adult Americans have difficulty reading and understanding health information?**
 - a. 10 million
 - b. 50 million
 - c. 90 million
 - d. 140 million
 - e. <10 million
9. **Which of the following is correct?**
 - a. Health literacy refers only to the ability to read medical information.
 - b. A person’s health literacy may be worse than his/her general literacy.
 - c. Health literacy includes the ability to process numbers (numeracy) and navigate the health care system.
 - d. Alternatives b and c are correct.
10. **Health literacy assessment instruments include which of the following?**
 - a. Newest Vital Sign (NVS)
 - b. Rapid Estimate of Adult Literacy in Medicine (REALM)
 - c. Test of Functional Health Literacy in Adults (TOFHLA)
 - d. All of the above alternatives are correct.
11. **Which health literacy assessment strategy can be easily used by pharmacists?**
 - a. REALM
 - b. TOFHLA
 - c. NVS
 - d. Single-question health literacy assessments
12. **Which of the following is false?**
 - a. Almost one-third of adults older than 65 years have very poor health literacy skills.
 - b. Adults who receive Medicare or Medicaid have lower-than-average health literacy.

CPE Processing:

Get your documentation of credit now! Completing a posttest at www.pharmacist.com/education is as easy as 1-2-3.

1. Go to Online CE Quick List and click on the title of this activity.
2. Log in. APhA members enter your user name and password. Not an APhA member? Just click “Create one now” to open an account. No fee is required to register.
3. Successfully complete the CPE exam and evaluation form to gain immediate access to your documentation of credit.

Live step-by-step assistance is available Monday through Friday 8:30 am to 5:00 pm ET at APhA Member Services at 800-237-APhA (2742) or by e-mailing InfoCenter@pharmacist.com.

- c. Low literacy affects patients' health and their participation in medical care decision making and patient-centered care.
- d. Study findings indicate that the quality and amount of counseling regarding medications in community pharmacies are adequate and meet the intent of the Omnibus Budget Reconciliation Act of 1990.

13. Patients with limited health literacy skills can be identified by their

- a. Appearance.
- b. Educational status.
- c. Speech.
- d. None of the above alternatives is correct.

14. Patients with limited health literacy skills would be most likely to make mistakes in interpreting which of the following label instructions?

- a. Take two tablets by mouth twice daily for 7 days
- b. Take two tablets by mouth every 12 hours
- c. Take two tablets by mouth two times daily
- d. Take two tablets by mouth twice daily

15. Patients with limited health literacy skills would be least likely to make mistakes in interpreting which of the following label instructions?

- a. Take two tablets by mouth twice daily for 7 days
- b. Take two tablets by mouth every 12 hours
- c. Take two tablets by mouth two times daily
- d. Take two tablets by mouth twice daily

16. Which of the following formulas has been recommended for checking readability by hand?

- a. The Fry formula
- b. The Gunning-Fog formula
- c. Readability Plus
- d. Alternatives a and b are correct.

17. Which of the following statements on the use of visual aids is false?

- a. Picture-based information can benefit only patients with limited health literacy skills.
- b. Research findings indicate that visual aids enhance patient adherence to medication regimens.
- c. Pictorial aids that are used successfully in one culture can be used successfully in other cultures.
- d. Telling patients the correct meaning of an incorrect pictorial aid has been found to considerably increase its correct interpretation later.
- e. Alternatives a and c are false.

The following case applies to questions 18 through 20: J.T. is a 58-year-old white man who has been a patient of your pharmacy for more than 10 years. His medical history includes diabetes, hypertension, and asthma. His current medications include glyburide/metformin (5 mg/500 mg

twice daily, lisinopril/hydrochlorothiazide (20 mg/12.5 mg) once daily, albuterol hydrofluoroalkane 2 puffs every 4 to 6 hours as needed, fluticasone/salmeterol inhaler (250 mcg/50 mcg) twice daily.

J.T. was recently hospitalized with heart failure. He was discharged after 3 days and given a new prescription for digoxin 0.125 mg, alternating with 0.25 mg every other day. He comes to your pharmacy to fill his prescriptions. You ask him how he is feeling, and he says, "I am feeling much better, but my doctor keeps on prescribing me the wrong medications. I take all my medications but I keep having one health crisis after another." You ensure him that digoxin is a good heart medication but that he needs to take it as directed. You tell him that he should stop taking the medication and contact his doctor immediately if he experiences vision changes (e.g., yellow-green or blurred vision).

In order to not keep him waiting, you quickly fill his prescription and hand it to him. You are about to attend to the next patient when you realize that you did not put the medication information sheet into J.T.'s medication bag. You go after J.T. and hand the medication sheet to him (wrong side up). You wait a few minutes for J.T. to read the medication information and ask him if he understood the information. Without turning the sheet right side up, he says, "Yes, but I will read it more carefully later when I get home." At this point, he says, "I think I also need a refill for my inhaler." You ask the name of the inhaler that he wants refill and he says, "You know the one that I have been taking for a very long time. It is in your computer. I still have enough of the new inhaler at home." You look in his profile and see that all his medications are 3 months past their refill dates.

18. Which of the following statements would be true if J.T. has a health literacy problem?

- a. He could be well groomed.
- b. He could have a college degree.
- c. He could be an articulate, intelligent-sounding individual.
- d. He could go to great lengths to hide his inability to read or understand medical information.
- e. All of the above alternatives are correct.

19. Which of the following techniques can the pharmacist use to assess J.T.'s understanding of the prescribed medication instructions?

- a. Ask "Do you understand?"
- b. Ask open-ended questions
- c. Use the "teach back" technique
- d. Alternatives b and c are correct.

20. The National Work Group on Literacy and Health recommends that patient education materials for J.T. be written at which of the following grade readability levels?

- a. 8th
- b. 7th
- c. 6th
- d. 5th