RESEARCH ARTICLES

Vocabulary Knowledge of Pharmacy Students Whose First or Best Language Is Not English

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Submitted November 17, 2003; accepted March 15, 2004; published October 1, 2004.

Objective. To study the word knowledge of pharmacy students whose first or best language is not English and to identify problematic health and pharmacy-related vocabulary and the linguistic obstacles that hinder word knowledge.

Methods. Twenty-five preprofessional, first, third, and fourth professional year pharmacy students completed a survey of 105 word prompts typically found in pharmacy curricula multiple-choice examinations and completed a 10-sentence survey instrument with 31 words in context. The purpose of the 105-word survey was for the students to indicate and demonstrate their knowledge of the words in isolation. The purpose of the 10-sentence survey was for students to indicate and demonstrate their knowledge of 31 words in context.

Results. The respondents in this study demonstrated a lack of fundamental knowledge of certain basic and common pharmacy and health-related vocabulary words when encountered in isolation as well as in context, falsely believed that they knew the meaning of certain words, and confused similar words phonemically, graphemically, and morphologically.

Conclusions. The students demonstrated significant misunderstandings of essential and commonly used health and pharmacy-related vocabulary.

Keywords: language, vocabulary, English as a second language, non-native speakers

INTRODUCTION

The number of non-native speakers (NNSs) of English, also referred to as “English as a second language” (ESL) students, represents a significant student population in pharmacy schools. According to the American Association of Colleges of Pharmacy (AACP), in 2002, over 900 foreign students attended pharmacy schools in the United States, and more than 8,000 students, either United States citizens or permanent residents, of Asian descent or Native Hawaiian or other Pacific Islander descent were enrolled in pharmacy schools across the country. According to data from health professions associations, during the 1990–1991 academic year, over 2,000 Asian students were enrolled in pharmacy school, compared with over 7,400 enrolled in the 2000–2001 academic year. The data do not indicate whether the students spoke English as a first or second language, nor do the data indicate whether they were first- or second-generation citizens or immigrants. While English may not have been a barrier for the majority of those students, for others the English language presents huge obstacles in the areas of written and oral communication, reading, and vocabulary. At the Philadelphia College of Pharmacy at the University of the Sciences in Philadelphia (USP), Penn, during the 1999–2001 academic year, 200 PharmD students, including the 25 respondents in this study, were identified as ESL students through their diagnostic writing examination and placed in ESL reading/writing classes because of weak writing skills. A study in Australia by Holder et al, which looked at the relationship between academic literacy skills and progression rates among both native and non-native English-speaking pharmacy students, revealed that almost half of the students lacked the English skills necessary for tertiary study. Studies by Dobson and Sharma (1993), Farnell and Hayes (1996), and Thompson (1992) indicate that the academic performance of students from non-native English-speaking backgrounds is particularly affected as a result of the difficulties experienced with English.

Research regarding vocabulary acquisition and the skills of ESL students is extensive. Vocabulary is the biggest challenge for ESL and foreign-language students who are faced with an unfamiliar reading text. They may falsely believe they know the words or decide to
ignore the words they do not know. Despite learning basic vocabulary, ESL students will have an increasingly difficult time developing and expanding vocabulary to include “specialized, exact or evocative terms that are the mark of the fully proficient language user.” As Laufer’s research (1997) suggests, lexical problems experienced by second language (L2) readers of English, including the inability to comprehend unfamiliar words, miscomprehension of unknown but familiar-looking words, and the strategy of guessing unknown words (which does not always work), hinder vocabulary and reading comprehension.

This paper presents the findings of an exploratory study at the University of the Sciences in Philadelphia (USP) to determine the word knowledge of pharmacy students whose first or best language is not English. Faculty members who have students whose first or best language is not English in their courses often express that the students’ language barrier makes it difficult for them to teach and for the students to learn.

The objectives of this study were to identify students’ word knowledge and potentially problematic vocabulary, to explain the students’ responses, and to demonstrate how lack of word knowledge may impact the test-taking experience and performance, as well as oral and written communication skills.

METHODS
The 25 students in this study represent 8 language groups: Vietnamese (6), Korean (5), Gujarati (5), Arabic (2), Cantonese (1), Chinese (1), Mandarin (1), Spanish (1), French (1), Polish (1), and Bosnian/Serbo-Croatian (1). They were recruited in the University’s writing center, where they attended weekly grammar workshops and a discussion group to help them prepare to pass the University’s writing proficiency examination, which is a graduation requirement. The number of years the students had been in the United States ranged from 2.9 to 19 years. The average number of years in the United States was 7.0 years. The Vietnamese and Korean students’ average time in the United States was 11 years; the Indian students’ average time was 3.4 years; and the Chinese students’ average time was 9.3 years. Though the average time in the United States for the Chinese students is 9.3 years, one of the Chinese students was born in the United States and is 18 years old and the other Chinese student has been living in the United States for less than 1 year. The students in the other language groups (Arabic, Spanish, French, Polish, and Bosnian/Serbo-Croatian) collectively average 4.7 years in the United States. At the time these respondents applied to the College of Pharmacy, Pharmacy College Admissions Test (PCAT) verbal and reading scores were not yet required for admission.

Five students were preprofessional year students, 9 were first professional year students, 7 were second professional year students, and 4 were third professional year students. Nineteen students were high school graduates from North American high schools. Ten students had an Associate’s or Bachelor’s degree, 8 of them from an American community college or university. Five of those 8 students also had degrees from their native country. Of the 25 students, 23 had transferred to the USP pharmacy program from other colleges or universities, and 2 were freshmen. Only 3 of the students were international students: 1 from France, 1 from Korea, and 1 from Canada. Twenty-four students were immigrants with permanent residency status in the United States, and one student was born in the United States.

For part 1 of the data collection, a survey instrument listing 105-word prompts and 5 categories of word knowledge was distributed to the students. The 105 words were selected from a series of multiple-choice examinations and quizzes volunteered for the study by faculty members from the Pharmacy Practice and Administration department in the College of Pharmacy at USP. However, the words selected are not necessarily exclusive to pharmacy as they are found in other science and non-science courses.

For part 2 of the data collection, 31 words and/or word collocations were selected from the list of 105 prompts that students demonstrated difficulty with and that revealed poor knowledge, and 10 sentences were created using the 31 words and phrases (Appendix 2). The objective of the 10-sentence survey was to determine knowledge of words in context. The 10-sentence survey instrument was e-mailed to students and collected from the students via e-mail. Twenty-one of the 25 students completed the 10-sentence survey instrument.

RESULTS
Collectively, the 25 respondents provided acceptable definitions or synonyms for 52% of the words. The 5 preprofessional respondents provided an average of 37% acceptable definitions or synonyms; the 9 second professional year respondents provided an average of 53.8% acceptable definitions or synonyms; the 7 third professional year respondents provided an average of 76% acceptable definitions or synonyms, and the 4 fourth professional year respondents provided an average of 56.3% acceptable definitions or synonyms. The majority of words that appeared in isolation related to patient states, such as “perkier,”
“groggy,” and “lethargic,” and were either unknown or unfamiliar to the majority of the respondents as illustrated in Table 1. In addition, some respondents demonstrated weak knowledge of words they believed they knew such as “drowsy,” “crampy,” and “anxious.” Some of the respondents who believed they knew the meanings of these words responded with unacceptable or problematic definitions of or synonyms for the words.

Respondents also showed weak knowledge of words or collocations related to patient complaints, treatment, behavior, and bodily functions and movements. Some definitions or synonyms provided/given for other words believed to be known by 70% to 84% of the respondents also illustrated poor understanding of the words. Some of the respondents who believed they knew the meanings of these words provided unacceptable synonyms or definitions as illustrated in Table 2. In addition, although most students did produce acceptable definitions or synonyms indicating movement for the word mobilizing, knowledge of only this definition or synonym for the

### Table 1. Respondents’ Knowledge of Words in Isolation Related to Patient State (N=25)

<table>
<thead>
<tr>
<th>Word</th>
<th>Do Not Know Word</th>
<th>Have Never Seen Word</th>
<th>Word Is Familiar</th>
<th>I Know Word</th>
<th>Unacceptable or Problematic Definitions or Synonyms*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perkier</td>
<td>16 (60)</td>
<td>11 (44)</td>
<td>4 (16)</td>
<td>2 (8)</td>
<td>happy; one who wants perks</td>
</tr>
<tr>
<td>Lethargic</td>
<td>6 (24)</td>
<td>5 (20)</td>
<td>11 (44)</td>
<td>11 (44)</td>
<td>lethal cause; lethal(death); no feelings; bit too much; pain</td>
</tr>
<tr>
<td>Groggy</td>
<td>14 (56)</td>
<td>13 (52)</td>
<td>5 (20)</td>
<td>4 (16)</td>
<td>sick; not feeling good; dizzy-confused</td>
</tr>
<tr>
<td>Drowsy</td>
<td>1 (4)</td>
<td>2 (8)</td>
<td>10 (40)</td>
<td>21 (84)</td>
<td>want to know; unconscious; feeling dizzy; headache; feeling very dry; dizziness; dizzy; can't breathe because of shrinking H2O irritated; mexy; it hurts; breakdown; not happy</td>
</tr>
<tr>
<td>Crampy</td>
<td>1 (4)</td>
<td>3 (12)</td>
<td>11 (44)</td>
<td>20 (80)</td>
<td>curious; bother; psychosis</td>
</tr>
<tr>
<td>Anxious</td>
<td>1 (4)</td>
<td>1 (4)</td>
<td>11 (44)</td>
<td>23 (92)</td>
<td></td>
</tr>
</tbody>
</table>

*The definitions and synonyms are presented as spelled by the respondent

### Table 2. Respondents’ Knowledge of Words Related Patient Complaint, Treatment, Behavior and Bodily Functions (N=25)

<table>
<thead>
<tr>
<th>Word or Collocation</th>
<th>Do Not Know</th>
<th>Have Never Seen</th>
<th>Word Is Familiar</th>
<th>I Know</th>
<th>Unacceptable Definitions or Synonyms*</th>
</tr>
</thead>
<tbody>
<tr>
<td>mobilizing</td>
<td>1 (4)</td>
<td>1 (4)</td>
<td>7 (28)</td>
<td>23 (92)</td>
<td>inducing; stopping; to produce; to move the reaction (2)*; moving the drug or anything not deep; deglutition; not deep; inflammation constipation; GIT movement; normal movement in GI when digestion; stomach sound; intestine movement; to go to WC for longer time; food motility in GI</td>
</tr>
<tr>
<td>swallow</td>
<td>0 (0)</td>
<td>1 (4)</td>
<td>20 (80)</td>
<td>21 (84)</td>
<td>daily checks pc; random x-ray; to check up frequently; periodic check; to test for basic symptoms; repeat screening; checking; check up; to check regularly</td>
</tr>
<tr>
<td>bowel movement</td>
<td>2 (8)</td>
<td>3 (12)</td>
<td>11 (44)</td>
<td>20 (80)</td>
<td>very strong stomach problem; not severe; can't digest food well</td>
</tr>
<tr>
<td>mild constipation</td>
<td>1 (4)</td>
<td>4 (16)</td>
<td>10 (40)</td>
<td>18 (72)</td>
<td>someone who always complain; under the control; to give your view; make comment; say something you don't like; have a problem/symptoms; make unhappy comments</td>
</tr>
<tr>
<td>routine screening</td>
<td>3 (12)</td>
<td>1 (4)</td>
<td>11 (44)</td>
<td>18 (72)</td>
<td>make it increase; increasing; to increase; to elevate; lift off; uprising; to get higher strong pain; sharp pain; as in headache; pain associated with nerve damage</td>
</tr>
<tr>
<td>compliant</td>
<td>3 (12)</td>
<td>2 (8)</td>
<td>10 (40)</td>
<td>18 (72)</td>
<td>someone who always complain; under the control; to give your view; make comment; say something you don't like; have a problem/symptoms; make unhappy comments</td>
</tr>
<tr>
<td>alleviation</td>
<td>7 (28)</td>
<td>8 (32)</td>
<td>9 (36)</td>
<td>11 (44)</td>
<td>make it increase; increasing; to increase; to elevate; lift off; uprising; to get higher strong pain; sharp pain; as in headache; pain associated with nerve damage</td>
</tr>
<tr>
<td>throbbing pain</td>
<td>10 (40)</td>
<td>6 (24)</td>
<td>11 (44)</td>
<td>7 (28)</td>
<td>taste; mitisative</td>
</tr>
<tr>
<td>palliative</td>
<td>11 (44)</td>
<td>10 (40)</td>
<td>7 (28)</td>
<td>6 (24)</td>
<td>to exclude; progress; speed up</td>
</tr>
<tr>
<td>exuberant</td>
<td>10 (40)</td>
<td>9 (36)</td>
<td>7 (28)</td>
<td>5 (20)</td>
<td>taste; mitisative</td>
</tr>
</tbody>
</table>

*The definitions and synonyms are presented as spelled by the respondent

*Indicates the number of respondents who provided this same definition or synonym
word could be potentially problematic if the word were
used to indicate “preparing or gathering for a particular
purpose such an emergency or war,” and not physical
movement.

In Part II of the study, respondents were asked to read
10 sentences. Each sentence contained 2 to 4 words from
the original 105-word survey instrument. Respondents
were asked to supply a definition or synonym for the bold-
ed words in context. Although most respondents were able
to produce acceptable definitions or synonyms to illustrate
their understanding, others produced problematic and
unacceptable definitions or synonyms given the context of
the sentence. Table 3 compares respondents’ word knowl-
edge of words in isolation and in context. Two sentences
from the 10-sentence survey instrument are used to illus-
trate the respondents’ knowledge of words in context.

Table 4 illustrates respondents’ poor word knowledge of
other words in context.

An analysis of the students’ production of their word
knowledge in words in isolation and words in context
suggests that, generally, the respondents in this study (1)
lacked fundamental knowledge of certain basic and com-

### Table 3. Comparison of Respondents’ Word Knowledge in Isolation and in Context

<table>
<thead>
<tr>
<th>Words in Isolation (N=25)</th>
<th>Acceptable Definitions or Synonyms Provided, No. (%)</th>
<th>Unacceptable or Problematic Definitions or Synonyms Provided*</th>
</tr>
</thead>
<tbody>
<tr>
<td>despite</td>
<td>4 (16)</td>
<td>ignore the facts; although; instead of; besides; insult; regard</td>
</tr>
<tr>
<td>confided</td>
<td>0 (0)</td>
<td>to trap of seal; confese; has limit-certain sx</td>
</tr>
<tr>
<td>significant</td>
<td>16 (64)</td>
<td>proper amount; almost to the point; detectable</td>
</tr>
<tr>
<td>alleviation</td>
<td>4 (16)</td>
<td>make it increase; increasing; to increase; to elevate; lift off; uprising; to get higher</td>
</tr>
</tbody>
</table>

Words in Context (N=21)

Despite the strong narcotic, the patient confided to the pharmacist that he was not experiencing any significant alleviation.

despite                  | 13 (62)                                               | in contrast; ignore; not paying attention; beside; avoid     |
| confided                | 1 (5)                                                 | consult; restrict; explain; complain (2); review; inform; revealed; reported; told (6); eventually told; have told considerably |
| significant             | 14 (67)                                               | notable; clear; outstanding result; specific (2); obvious    |
| alleviation             | 9 (43)                                                | Getting high; changes; to go up; usually used for tests; palpation; side effect; stimulation |

**Example 1**

Words in Isolation (N=25)

drowsy                   | 10 (40)                                               | want to know; unconscious; feeling dizzy; headache; feeling very dry; dizziness; dizzy; can't breathe because of shrinking H2O |
| itching                 | 12 (48)                                               | pain; dead cells that are in body in which is irritating skin cell |
| persisted               | 2 (8)                                                 | to struggle; to against; insist; insisted; insisting; all the time developed; endurance; |

Words in Context (N=21)

The doctor told the patient that if the medication made her drowsy and the itching persisted, to discontinue the medication.

drowsy                   | 11 (52)                                               | feel of dehydration; can be concentrated;dozy; dizzy, slow, dizziness |
| itching                 | 17 (81)                                               | irritable; something cause to stretch                         |
| persisted               | 11 (52)                                               | stooded with; insist (3); insisting                           |

**Example 2**

Words in Isolation (N=25)

<table>
<thead>
<tr>
<th>Word</th>
<th>Provided No Definition, No. (%)</th>
<th>Unacceptable or Problematic Definition or Synonym Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>groggy</td>
<td>15 (71)</td>
<td>cranky, dizzy, grouchy, slappy</td>
</tr>
<tr>
<td>perkier</td>
<td>11 (52)</td>
<td>happier in a strange way, tired</td>
</tr>
<tr>
<td>lethargic</td>
<td>11 (52)</td>
<td>experiencing, can’t hold on to it, overwhelming, feel like vomiting, dying</td>
</tr>
<tr>
<td>throbbing</td>
<td>16 (76)</td>
<td>crisis, can't hold on to it, overwhelming, feel like vomiting, dying</td>
</tr>
<tr>
<td>exertion</td>
<td>13 (61)</td>
<td>force, struggle, acting on</td>
</tr>
<tr>
<td>invasive</td>
<td>11 (52)</td>
<td>very harsh, enlarged, offensive</td>
</tr>
</tbody>
</table>

*The definitions and synonyms are presented as spelled by the respondent.
†Indicates the number of respondents who provided this same definition or synonym

Table 4. Respondents’ Knowledge of Other Words in Context

In Part II of the study, respondents were asked to read
10 sentences. Each sentence contained 2 to 4 words from
the original 105-word survey instrument. Respondents
were asked to supply a definition or synonym for the bold-
ed words in context. Although most respondents were able
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An analysis of the students’ production of their word
knowledge in words in isolation and words in context
suggests that, generally, the respondents in this study (1)
lacked fundamental knowledge of certain basic and com-
DISCUSSION

Students with a false sense of word knowledge will struggle with their pharmacy and science courses, as well as with their non-science courses. Lecture courses, as well as small classroom courses present enormous challenges for students whose first or best language is not English. Poor listening and note-taking skills due to misinterpretation of unfamiliar sounds in new words, many heard for the first time, or viewing words on the board for the first time without instructor guidance or clarification, will not produce good notes or reasonable understanding of the lectures, even if students tape record the lectures. Poor reading skills due to lack of vocabulary and word knowledge result in misunderstanding or poor understanding of vocabulary meanings in course readings and examinations, including multiple-choice questions. Even if students have a remarkable knack for memorizing material, lack of word knowledge due to the language barrier puts them at a great disadvantage.

Facing unfamiliar words on a multiple-choice test will have a negative impact on the students’ test-taking experience and test performance. Multiple-choice tests often put both native English speakers (NESs) and non-native speakers (NNSs) through a linguistic maze. For students whose first or best language is not English, coming across unfamiliar words or expressions in a multiple-choice test causes great despair and anxiety during the test-taking experience, which may negatively impact the test results. The following 3 anecdotes illustrate what ESL students experience during the test-taking experience when faced with unfamiliar vocabulary. A first-year student whose first language is Mandarin and who had been living in the United States for 4 years came across the word glob in a biology essay question. Because she had never seen the word, had never heard the word spoken, and could not guess its meaning, she panicked. She spent a long time staring at the word trying to figure out what it could possibly mean in the context of the sentence, but this simply created more anxiety and she was unable to respond to the question. Another first-year student whose first language is Cantonese and who had been living in the United States since age 4 doubted her understanding of the word collocation “cell divided” which appeared in her biology test. She understood the term to mean that the cell was divided into two parts and made smaller, when in fact “cell divided” means the cell multiplied. She only knew one meaning and use of the word divide. To her the terms divide and multiply were opposites, not synonymous. Consequently, she answered the question incorrectly.

First-year pharmacy students were not the only students who experienced test-anxiety when confronted with unfamiliar words. A fifth-year pharmacy student whose first language is Vietnamese and who had been living in the United States 6 years did not know the meaning of the word collocation multiple gestation, which appeared as an answer option in her pharmacy and therapeutics examination, although she understood the meaning of multiple pregnancy. These 3 anecdotes illustrate various levels of word knowledge. In the first anecdote, the word glob was completely unfamiliar. In the second anecdote, the student had a good sense of the meaning of the words, but not the best meaning given the context, and in the third anecdote, the word collocation was only partially known.

Unfamiliarity with vocabulary and language in course readings, lecture outlines, and multiple-choice examinations (the most common test format at USP), presents a major challenge for students whose first or best language is not English. Thus, this exploratory study specifically looked at the vocabulary knowledge of 105 common pharmacy- and health-related words of 25 USP pharmacy students whose first or best language was not English.

The respondents’ demonstration of weak word knowledge was consistent with L2 research in language vocabulary acquisition and development, which shows that second-language learners of English have insufficient vocabulary, misinterpret deceptively transparent words, and have the inability to correctly guess the meaning of unknown words.5-8 Although in this study the respondents were told to not guess, but provide a definition or synonym based on their knowledge of the word, the definitions or synonyms provided suggested poor word knowledge as well as a false sense of word knowledge.

How might the unacceptable definitions or synonyms produced by the respondents be explained? As illustrated in Table 5, linguistic explanations regarding word knowledge can help pharmacy instructors understand how NNSs may interpret English vocabulary they read in textbooks and in course examinations. In this study, respondents who believed they knew the meaning of a word but produced an unacceptable response may have done so as a result of the word or collocation being
deceptively transparent and containing a deceptive morphological structure. In addition, words that are false cognates or “false friends” can produce partial knowledge. For example, respondents applied their knowledge of the word mobile and concluded that the word mobilize meant “to move.” Not one student provided its other common meaning, “to prepare.” Respondents also produced graphemic and phonemic mismatches when they accessed misspelled words from their memory and/or pronounced the words differently from the words on the word list and the sentences in context, as is evident from a respondent defining invasive as meaning “avoidance”; alleviation pronounced and spelled as elevation and believed to mean “increase”; compliant pronounced and spelled as complaint and believed to mean to “complain”; posture pronounced and spelled as poster and believed to mean “the notice with big board”; paternal to mean parenteral and believed to mean “IV-intravenous”.

Table 5. Linguistic Explanations of Unacceptable and Problematic Definitions/Synonyms

<table>
<thead>
<tr>
<th>Linguistic Explanation</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deceptively transparent word/collocation</td>
<td>Bowel movement to mean “intestine movement” Around-the-clock to mean “clockwise”</td>
</tr>
<tr>
<td>False friends of false cognates</td>
<td>Mobilizing to mean only “mobile,” “to move” Paramedic to mean “ambulatory care” (ambulatory to mean ambulance)</td>
</tr>
<tr>
<td>Graphemic and phonemic mismatches</td>
<td>Invasive pronounced and spelled as evasive and believed to mean “avoidance”; alleviation pronounced and spelled as elevation and believed to mean “increase”; compliant pronounced and spelled as complaint and believed to mean to “complain”; posture pronounced and spelled as poster and believed to mean “the notice with big board”; paternal to mean parenteral and believed to mean “IV-intravenous”</td>
</tr>
<tr>
<td>Morphologically similar words</td>
<td>Swallow to mean shallow as in “not deep”; persist to mean insist, resist</td>
</tr>
<tr>
<td>Partial knowledge (too general; too specific; reasonable, but wrong)</td>
<td>Paramedic to mean “related to medicine”; doctor; pre-treatment; routine screening to mean “repeat screening”; “periodic check”; confided to mean “to tell”</td>
</tr>
<tr>
<td>Inability to guess unknown words due to non-existent contextual clues</td>
<td>As in the sentence: “The patient told the doctor she started to feel much perkier after he changed the medicine, which had made her groggy and lethargic.”</td>
</tr>
</tbody>
</table>

deceptively transparent and containing a deceptive morphological structure. In addition, words that are false cognates or “false friends” can produce partial knowledge. For example, respondents applied their knowledge of the word mobile and concluded that the word mobilize meant “to move.” Not one student provided its other common meaning, “to prepare.” Respondents also produced graphemic and phonemic mismatches when they accessed misspelled words from their memory and/or pronounced the words differently from the words on the word list and the sentences in context, as is evident from a respondent defining invasive as meaning “avoidance,” apparently confusing invasive with evasive. These synforms, or words with similar phonemic and morphological lexical forms, can also confuse second-language learners. Mismatching 2 phonemically similar words leads to significant misinterpretations, such as mistaking swallow with shallow, and as a result, believing that swallow means “deep,” mistaking paternal with parenteral, thinking that paternal means “IV-intravenous” and “injections,” or morphologically confusing persist with insist and resist. A closer look at a respondent’s definition of the word drowsy as “can’t breathe because of shrinking H20” reasonably suggests that the respondent may have mismatched drowsy with drowning and sinking with shrinking; therefore, “Can’t breathe because of shrinking H20” may mean that drowning is the inability to breathe due to sinking (shrinking) in water (H20).

Second, some words, both in isolation and in context, were simply unfamiliar and not known by the majority of the respondents. Health- and pharmacy-related words with a high frequency of use for describing patient states such as “perky,” “groggy,” and “lethargic,” or patient body functions such as “bowel movement” and “constipation,” are taken for granted by native speakers of English but may not be part of the NNS’s vocabulary. Even in context these words would be difficult to guess because contextual clues do not exist.

Third, some definitions or synonyms that were provided indicated that the respondent was on the right track in that the definition or synonym represented partial knowledge or was reasonable but wrong because the definition or synonym provided was too general, too specific, or lacked the word’s meaning in that context. Consequently, partial knowledge can still pose problems for NNSs. For example, definitions or synonyms provided for paramedic such as “the people in the ambulance,” “related to medicine,” “pre-treatment,” “first aid,” “a medical person,” and “emergency medical care unit” suggest that the definitions or synonyms are reasonable, but wrong because they are either too general or too specific.
Fourth, in some instances, respondents who believed they knew the meaning of a word provided inexplicable definitions or synonyms. For example, inexplicable definitions or synonyms included “mexy” and “breakdown” for crampy, “imitated” for exacerbated, “help” and “prove” for modified, and “degulation” for swallow.

CONCLUSIONS

First, the findings of this exploratory study suggest many of the respondents have never seen or do not know the meaning of a significant number of common and frequently used health- and pharmacy-related vocabulary terms found in multiple-choice and other testing formats, in texts and lectures, and in pharmacy and healthcare settings. In addition, the findings reveal that a false sense of word knowledge exists with NNSs of English. In many instances respondents indicated they knew the meaning of a word, but they provided unacceptable definitions or synonyms that indicated poor word knowledge.

A comparison of the respondents’ word knowledge of the 31 words in context compared with their word knowledge of the same 31 words in isolation revealed a few patterns. First, in some cases, some students who had provided unacceptable definitions or synonyms, or no definition or synonym to a word in isolation demonstrated acceptable knowledge of the word when used in context. However, the opposite also occurred. Students also provided an acceptable definition or synonym for a word in isolation, but provided an unacceptable definition or synonym for the same word when used in context, or provided no definition or synonym. With some words, students were unable to provide a definition or synonym for the word whether in isolation or in context.

Although this study did not investigate the pronunciation and spelling skills of the respondents, the relationship between the written word and the spoken word cannot be ignored. Mispronouncing words can lead to misspelling words such as pronouncing and misspelling the word scratch as “crash” or “stretch,” and sort of as “sore of.” Phonemically, graphemically, and morphologically mismatching words during a multiple-choice examination, for example, can negatively influence a nonnative English-speaking students’ understanding of words in a question prompt as well as in the options. Falsely interpreting words can result in disastrous test results. Some respondents also demonstrated significant problems with grammar, word forms, and spelling in their definitions and synonyms. Indeed, some of the errors may have been due to the anxiety of completing a task involving the English language, or perhaps recognizing that the task was an exercise in word knowledge, the students may have been less concerned with grammar and spelling. Nonetheless, grammar and spelling errors that appeared in their short definitions and synonyms are not acceptable in academic and professional writing tasks.

This exploratory study, though small in scope in terms of the number of respondents, has strong implications for addressing the English language needs and developing the word knowledge of NNS pharmacy students, as lack of both ultimately impacts academic performance as well as professional performance in a pharmacy setting with patients. Pharmacy faculty members need to be aware of the limitations of their students’ English language knowledge and skills, and the linguistic reasons for the limited or false sense of word knowledge among NNSs. Consequently, new ways to assess English language skills, deliver lectures, guide students through the learning experience, and linguistically integrate vocabulary-building skills and oral skills into the pharmacy curriculum with the help of ESL colleagues and professionals on campus must be embraced.

Recognizing that language should not be a barrier to professional practice, USP continues to develop initiatives to address the language needs of its ESL students. Historically, students who demonstrate weak writing and grammar skills on the diagnostic writing examination were placed in reading/writing courses taught by ESL faculty. The most recent offering is an ESL listening/speaking class designed to help students improve their pronunciation, note-taking skills, knowledge of American idioms, and oral presentation skills. In 2000, the University’s writing center began offering discussion and grammar workshops, along with one-on-one tutoring and cooperative learning to prepare students for the writing proficiency examination, a graduation requirement. All faculty members on campus also receive opportunities to learn more about the role of language and culture in learning through workshops offered by the University’s Teaching and Learning Center. Collaboration between ESL and pharmacy practice faculty members has recently resulted in the creation of workshops to help fifth-year students prepare for their seminar presentation. As a result of this study, the author hopes to develop health- and pharmacy-related vocabulary courses for pharmacy students at USP.

Students whose first language is not English, as well as native English-speaking students, must continue to develop their vocabulary skills, an area of increased importance. A comprehensive vocabulary component needs to be included in any curriculum and allow for explicit and implicit learning opportunities so that learners can expand their vocabulary in the classroom and
outside the classroom. Inattention to vocabulary instruction will result in students’ inability to acceptably function in second-language contexts. Pharmacy students and future pharmacists will interact in a variety of contexts. They will need to be able to communicate in spoken and written English with their patients and family members, doctors, and other healthcare professionals. Only through the “clear and concise transfer of accurate information” to patients and healthcare professionals will future pharmacists be able to deliver competent and effective pharmaceutical care. Poor vocabulary skills will lead to poor oral skills and weak writing skills, as well as potentially dangerous miscommunication. By sharing the results of this exploratory study, the researcher hopes that pharmacy curricula will take notice of the importance of vocabulary development for pharmacy students whose first or best language is not English, as language should never be a barrier to quality pharmaceutical training for the learner or pharmaceutical care for the patient.

ACKNOWLEDGEMENTS

The author wishes to acknowledge Dr. Phyllis Blumberg and Dr. Rebecca Finley for their encouragement, support, help, and suggestions. The author acknowledges the University of the Sciences in Philadelphia for awarding the grant to conduct the research.

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