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Language proficiency and adverse events in US hospitals: a pilot study

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Abstract

Objective. To examine differences in the characteristics of adverse events between English speaking patients and patients with limited English proficiency in US hospitals.

Setting. Six Joint Commission accredited hospitals in the USA.

Method. Adverse event data on English speaking patients and patients with limited English proficiency were collected from six hospitals over 7 months in 2005 and classified using the National Quality Forum endorsed Patient Safety Event Taxonomy.

Results. About 49.1% of limited English proficient patient adverse events involved some physical harm whereas only 29.5% of adverse events for patients who speak English resulted in physical harm. Of those adverse events resulting in physical harm, 46.8% of the limited English proficient patient adverse events had a level of harm ranging from *moderate temporary harm* to *death*, compared with 24.4% of English speaking patient adverse events. The adverse events that occurred to limited English proficient patients were also more likely to be the result of communication errors (52.4%) than adverse events for English speaking patients (35.9%).

Conclusions. Language barriers appear to increase the risks to patient safety. It is important for patients with language barriers to have ready access to competent language services. Providers need to collect reliable language data at the patient point of entry and document the language services provided during the patient–provider encounter.

Keywords: patient safety, adverse events, language barriers, language proficiency, patient safety event taxonomy

Limited English proficiency is defined as the limited ability or inability to speak, read, write or understand the English language at a level that permits the person to interact effectively with healthcare providers or social service agencies [1]. In the USA, as in many countries around the world, healthcare must be provided to a multi-cultural and multi-lingual population. According to the 2000 Census, over 20 million people in the USA are limited English proficient (LEP), and between 1990 and 2000, the LEP population grew by one-third, from 6.1 to 8.1% [2]. Patients who are LEP are one of the fastest growing segments of the US population and are particularly vulnerable to disparities in healthcare quality [3].

Effective communication between patient and provider is critical to the delivery of safe, high-quality care. Any language barrier can impede patient–provider communication [3]. The inability to effectively communicate with a provider limits patient access, undermines trust in the quality of the medical care received and decreases the likelihood that patients will receive appropriate follow-up [4]. In addition, a failure to address language barriers can result, on the part of the patient, in misunderstandings, problems with informed consent, inadequate comprehension of diagnoses and treatment, dissatisfaction with care, preventable morbidity and mortality, disparities in prescriptions, test ordering and diagnostic evaluations [4]. On the provider side, language barriers can inhibit a clinician's ability to elicit patient symptoms, often resulting in an increased use of diagnostic resources or invasive procedures, inappropriate treatment and diagnostic errors [5].

Patient–provider communication is also a serious patient safety concern and a common root cause of adverse events in healthcare [6]. An *adverse event* is any 'unintended harm to the patient by an act of commission or omission rather than by the underlying disease or condition of the patient' [7]. Although the Institute of Medicine report focused attention on patient safety, improvement strategies have yet to address errors due to language barriers [8]. As Johnstone and Kanitsaki point out, '. . .there is a paucity of literature

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specifically addressing the critical relationship that exists between culture, language, and patient safety, and the particular risks that patients from minority racial, ethno-cultural, and language backgrounds face when being cared for by healthcare professionals who do not know about, share, or understand either their culture or language' [9]. Although it would seem reasonable to hypothesize that limited English proficiency is associated with higher rates of adverse events, few studies have directly examined the impact of language barriers on patient safety [8, 10, 11]. As a consequence, the contribution of language barriers between patients and providers to the occurrence of adverse events is not well understood.

One reason for the lack of research on this topic may be that it is difficult to identify adverse events for any patient population given that such events are universally underreported [12–14]. In addition, the lack of race, ethnicity and primary language documentation constrains patient safety research on the LEP population [15]. Access to information on interpreter availability, the language fluency of patients and providers, and data on when and how interpreters are used is also limited [3].

The absence of trained interpreters is the norm in most clinical settings in the USA. One study concluded that nearly half of the LEP patients did not receive interpreter services [8]. Moreover, the same study found that interpreter errors often lead to potentially serious clinical consequences, indicating that the quality of interpreters is nearly as important as having access to them. However, fewer than 25% of hospitals in the USA provide training for medical interpreters. Also, most hospital staff are not trained to work with interpreters and have little or no education on linguistic and cultural issues in clinical care [8]. Bilingual nurses who have not been trained in medical interpretation are frequently tasked to translate for LEP patients. A study that examined the accuracy of the interpretation provided by these hospital nurses found that approximately half of all encounters resulted in serious miscommunication affecting the physician's understanding of patient symptoms or the credibility of the patient's concerns [16]. Some hospitals opt to use volunteer interpreters, but only 14% of these hospitals provide training for the volunteers and only about half of these hospitals training programs are mandatory [8].

What is the impact, then, of language barriers on patient safety? This exploratory study examined the incidence and characteristics of adverse events for LEP and English speaking inpatients in a small sample of US hospitals.

Methods

To participate in the study, hospitals were required to: (i) serve patients who are limited English proficient; (ii) have a process to identify LEP patients; (iii) have an existing incident (adverse event) reporting system; (iv) be willing to dedicate resources to undertake prospective incident report data collection for the study period; and (v) share de-identified incident reports. Twelve randomly identified Joint Commission accredited hospitals expressed an interest in the study; six of which met the inclusion criteria and were selected to participate. To detect differences between groups with 95% confidence and 80% power, a power analysis determined that it would be necessary to collect data on 251 adverse events for each group (LEP patients and English speaking patients) across all hospitals.

Adverse events described in the incident reports were categorized using concepts from the Joint Commission's Patient Safety Event Taxonomy (PSET) [17]. The PSET is a common terminology and classification schema for organizing patient safety data. This classification system is designed to standardize adverse event information gathered through disparate incident reporting systems and has been endorsed by the National Quality Forum (NQF) as a national standard for patient safety taxonomies [18]. The use of PSET to categorize adverse events is akin to a rudimentary root cause analysis that enables the identification of potential causative and contributive factors.

A database was developed in Microsoft® Access 2003 using the PSET classification categories as data fields so that each incident report could be classified and recorded according to the PSET terminology. Reports were entered into the database in a standardized format allowing incidents gathered through differing reporting systems to be compared across hospitals. The data were then analyzed to determine the volume and characteristics of adverse events reported for patients at each hospital as described by the PSET categories.

Data were collected between 1 February 2005 and 31 August 2005. Hospitals were provided with a simple protocol for random selection and submission of 20 de-identified incident reports for English speaking patients and 20 de-identified incident reports for LEP patients. Hospitals that had fewer than 20 incident reports for adverse events pertaining to either group of patients were asked to submit 100% of the incident reports for that patient group. All of the incident reports were supplied in the hospitals' existing incident reporting format that varied in the level of detail furnished about the event.

Upon receipt, adverse events were categorized and coded using the PSET by a trained clinical nurse reviewer with expertise in adverse event review. To ensure coding accuracy, a physician reviewer re-coded a small sample of the incident reports to verify the work of the nurse reviewer. Their coding matched 100%. In addition, the narrative section of each incident report was reviewed for information about adverse events not captured through the coded data fields of the incident reporting system. Adverse events that were explicitly related to language barriers were flagged during this process.

Data analysis

PC-SAS version 8.2 (Cary, NC, USA) was used for all analyses. Frequencies, means and other descriptive statistics were calculated for the PSET categories. Since the number of LEP events varied across hospitals, Mantel–Haenszel odds ratios, stratified on hospital, were used to test the association between the PSET categories and the binary variable *language status* (LEP or English speaking). Statistical significance was defined as $P < 0.05$ with a two-tailed test.

Results

A total of 1083 adverse event incident reports from six hospitals were collected and reviewed over a 7-month period in 2005. Of the 1083 incident reports, 832 were English speaking patients incident reports and 251 were LEP patients incident reports (Table 1). The characteristics of adverse events were examined and compared using three concepts derived from the PSET: impact on the patient (impact), process failures (type) and contributive factors (cause) (Table 2).

Impact was defined as the outcome or effect of healthcare error or systems failure, commonly referred to as harm to the recipient of care [18]. *Medical physical harm* was defined as any impact on the physiological or functional health of the patient as a result of the adverse event [18]. Overall, 29.5% of reported adverse events in English speaking patients and 49.1% of reported adverse events in LEP patients caused some physical harm to the patient (Table 3). In addition, a greater proportion of LEP patient adverse events resulted in a higher level of harm, specifically *moderate temporary* or *severe temporary harm*. The difference between English speaking patients and LEP patients on the overall distribution of physical harm was statistically significant (Table 3).

Type was defined as the perceptible, outward or visible process that was in error or failed [18]. LEP patients experienced a statistically significantly greater proportion of adverse events that were attributable to *communication* failure (52.4%) than did English speaking patients (35.9%) (Table 4). Among the processes related to *communication*, LEP patients experienced a statistically significantly greater proportion of events attributable to *questionable advice/interpretation* than English speaking patients (11.2 vs. 3.5%). Adverse events attributable to the *questionable assessment of patient needs* were also statistically significantly greater for LEP patients than English speaking patients (14.7 vs. 6.4%).

Cause was defined as the factors and agents that bring about a healthcare error or systems failure (i.e. system or human error factors) [18]. Overall, *system* factors were found to play a statistically significantly greater role in the occurrence of adverse events for LEP patients than for English speaking patients (Table 5). Specifically, adverse events were more often attributable to *organization factors* for LEP patients than for English speakers (65.7 vs. 54.1%). While the proportions of adverse events related to *human error* factors were similar, adverse events associated with *practitioner* factors occurred more often to LEP patients than to English speaking patients.

Of the 1083 incident reports analyzed for this study, 592 contained reviewable narrative text, 457 of which were English speaking patient incident reports and 135 of which were LEP patient incident reports. A qualitative review of the narrative text showed that 29.7% of the events in the study pertained to medication errors, 21.3% pertained to patient falls, 17.4% pertained to injury during treatment, 10% pertained to skin breakdown and 8.6% pertained to equipment/instrument issues. The remainder of the 14 categories contained less than 5% of the total adverse events for any one category. We did not observe any differences in the distribution of adverse event groupings between LEP and English speaking patients.

Discussion

The study's most notable finding was that some degree of detectable physical harm occurred in 49.1% of reported LEP patient adverse events, whereas only 29.5% of reported adverse events for patients who speak English resulted in detectable physical harm. Also, in 46.8% of those cases where LEP patient adverse events resulted in detectable physical harm, patients suffered *moderate temporary harm* or worse compared with 24.4% of the adverse events for English speaking patients. Few adverse events in either group were categorized as causing *severe temporary physical harm*, *severe permanent physical harm* or *death*, but the rate for LEP patient adverse events (3.6%) was still more than two and one half times greater than for English speaking patient adverse events (1.4%).

Slightly more than half (52.4%) of the adverse events experienced by LEP patients were attributable to some failure in communication, compared with 35.9% for English speaking patients. That more LEP adverse events would be characterized by communication failures was certainly expected. However, LEP patients also experienced more events attributable to *questionable advice/interpretation*, *questionable disclosure*, and *questionable assessment of patient needs*.

Table 1 Number of adverse events reported by hospitals

Hospital	English speaking adverse events reported	Limited English proficient adverse events reported	Total adverse events reported
1	176	52	228
2	134	8	142
3	128	1	19
4	123	28	149
5	110	5	115
6	161	157	318
Total	832	251	1083

Table 2 Patient Safety Event Taxonomy (PSET) term definitions

PSET Term	Definition
Physical harm (Impact)	Any impact on the physiological or mechanical functional health of the patient as a result of the healthcare error or systems failure.
No harm	The absence of harm.
No detectable harm	Not able to discover or ascertain the existence, presence or fact of harm, but harm may exist.
Minimal temporary harm	Detectable harm, lasting for a limited time only, resulting in no permanent injury, and minimal in severity.
Moderate temporary harm	Detectable harm, lasting for a limited time only, resulting in no permanent injury, and is greater than minimal harm but less than severe harm.
Severe temporary harm	Detectable harm, lasting for a limited time only, resulting in no permanent injury and causing great discomfort, damage, or distress.
Severe permanent harm	Detectable harm, not expecting change in clinical status, and causing great discomfort, damage, or distress.
Death	The termination of life.
Communication (Type)	An error or failure in the exchange of thoughts, messages or information, as by speech, signals, writing or behavior.
Inaccurate/incomplete information	The provider did not receive or transmit the necessary information to adequately provide care to the patient.
Questionable advice/interpretation	The provider's care or direction of care to other clinical staff deviated from the normal, accepted delivery of care or was misinterpreted by clinical staff delivering the care.
Questionable consent process	The provider did not adequately perform the duty of disclosing what a reasonably prudent provider in the medical community, in the exercise of reasonable care, would disclose to his or her patients about risks of injury that might be incurred from a proposed course of treatment.
Questionable disclosure process	The provider did not adequately share pertinent information about the care delivered or the outcome of the care to the patient/family; or the patient did not adequately share pertinent information with the provider that would influence the course of treatment provided.
Questionable documentation	The inadequate, incomplete or inaccurate process of recording information in the patient's medical/health records or other source documents.
Questionable assessment of patient needs	The inadequate determination of a patient's care or communication needs.
Patient management (Type)	An error or failure in the system of care, including improper delegation, consultation, use of resources, tracking and/or follow-up.
Questionable delegation	The hand-off of care, care tasks, or directions of care of a patient to the inappropriate clinical staff.
Questionable tracking and follow-up	The inaccurate, incomplete, or inadequate reinforcement or evaluation of a previous clinical action.
Questionable use of resources	The inaccurate, inadequate or incomplete use of services, staff, time, equipment, materials, devices, drugs, etc. that can be used to support the delivery of care.
Clinical performance (Type)	An error or failure in the delivery of care to the patient before the intervention, during the intervention, or after the intervention.
Correct diagnosis questionable intervention	The diagnosis was correct, but the delivery of care or prescribed treatment/clinical effort to instigate recovery was inaccurate, incomplete or inadequate for that diagnosis.

(*Continued*)

Table 2 *Continued*

PSET Term	Definition
System factors (Cause)	Failures of design (process design, task design, and equipment design) and failures of organization and environment (objective evidence of psychological precursors such as conditions of the workplace, schedules, etc.; inadequate team building; and training failures).
Organizational factors	Latent organizational failure that involves five areas: 1) management, 2) organizational culture, 3) protocols/processes, 4) transfer of knowledge, and 5) external factors.
External	Organizational failures that are beyond the control and responsibility of the individuals in the organization.
Organizational management	Failures related to maintenance of organizational resources (e.g., selection, training, staffing) and monetary safety budgets.
Organizational culture	Failures resulting from the collective practices and approaches to risk and patient safety (e.g., Formal accountability, communication channels, culture of safety).
Protocols/processes	Failures related to the quality and availability of the protocols within the department (e.g., too complicated, inaccurate, unrealistic, absent or poorly presented).
Transfer of knowledge	Failures resulting from inadequate measures taken to ensure that situational or domain specific knowledge or information is transferred to all new or inexperienced staff.
Technical factors	Failures that involve factors unrelated to knowledge and skill of care givers.
Facilities	Failures due to poor design in equipment, software, labels, forms or material defects.
Environment	Technical failures that are beyond the control and responsibility of the organization.
Human Error (Cause)	Failure to perform a task satisfactorily against customary standards, and the failure cannot be attributed to causes beyond the patient or provider.
Practitioner	Failure to perform a task satisfactorily against customary standards, and the failure cannot be attributed to causes beyond the providers.
Skill based	An unintended error or execution of a correctly intended action.
Rule based	[A mistake that] relates to problems for which the person possesses some prepackaged solution, acquired as a result of training, experience or the availability of appropriate procedures.
Knowledge based	[A mistake that] occurs in a novel situation where the solution to a problem has to be worked out on the spot without the help of preprogrammed solutions. This entails the use of slow, resource-limited but computationally powerful conscious reasoning carried out in relation to what is often an inaccurate and incomplete "mental model" of the problem and its possible causes.
Unclassified	Failures that are provider human error that cannot be classified into any other category.
External	Human failures that are beyond the control and the responsibility of the organization.
Patient factors	Failure related to patient characteristics or conditions that influence treatment and are beyond the control of staff.

Because many clinicians rely on their own interpretation skills, or tend to avoid communication with LEP patients [19, 20], they may not always share pertinent care information, or discuss the outcomes of the care, with the patient. Providers may also face difficulties in ascertaining patient needs for such things as pain medication or the presence of allergies. *Questionable advice/interpretation* pertains to inter-provider communication related to the direction of care or the implementation of instructions. Since this relates to communication between providers, it might not have been expected to vary across LEP and English speaking patients.

Table 3 Adverse event Impact characteristics for English speaking and LEP patients

Adverse event characteristic	English speaking *N* (%)	Limited English proficient *N* (%)	*P*-value
Physical harm			<0.001*
No harm	366 (46.1)	89 (40.1)	
No detectable harm	194 (24.4)	24 (10.8)	
Minimal temporary harm	177 (22.3)	58 (26.1)	
Moderate temporary harm	46 (5.8)	43 (19.4)	
Severe temporary harm	7 (0.9)	7 (3.2)	
Severe permanent harm	1 (0.1)	0 (0.0)	
Death	3 (0.4)	1 (0.5)	

*Overall statistical significance between ES and LEP on the distribution of physical harm. The concepts represented in this table are derived from the primary classification category of Impact within the PSET [17, 18]. Thirty-eight English speaking cases and 29 LEP cases are missing from the table because those incident reports did not contained enough information to be categorized on this concept.

Although both *organizational* and *practitioner* factors were found to play a more active role in adverse events for LEP patients than English speaking patients, no significant differences were found in any of the sub-categories. For example, though the number of LEP adverse events were proportionally greater for organizational factors such as *organizational culture*, *protocols/processes* and *transfer of knowledge*, as well as for *skill based* and *rule based* practitioner error, none of those differences reached statistical significance.

In summary, when compared with English speaking patients, adverse events experienced by LEP patients more often result in some detectable harm to the patient and the severity of that harm tends to be greater. The LEP patient adverse events are also more frequently a consequence of some failure in communication. This implies that although hospitals may be providing language services to LEP patients, those services could be inadequate for mitigating the patient safety risks posed by language barriers.

Limitations

There are several limitations to this study. The small number of participating hospitals and limited adverse event sample sizes restricted our ability to generalize from the findings or draw definitive conclusions. Beyond the universal underreporting of adverse events, it is almost certain that LEP adverse events went unrecognized due to the varying and inconsistent practices for identifying and documenting LEP status across the six hospitals. In addition, our ability to identify adverse events directly attributable to language barriers was limited because little information was available on the provision of interpreter services due, in part, to the universal absence in incident reports of standardized fields to capture the presence of an interpreter. At the same time, the absence of data relating to race, ethnicity, primary language and literacy prevented the examination of co-variates, thus limiting our understanding of potential confounding factors.

Table 4 Adverse event Type characteristics for English speaking and LEP patients

Adverse event acharacteristic	English speaking *N* (%)	Limited English proficient *N* (%)	*P*-value
Communication	299 (35.9)	130 (52.4)	<0.001
Inaccurate/incomplete information	132 (15.9)	39 (15.5)	0.44
Questionable advice/interpretation	29 (3.5)	28 (11.2)	0.002
Questionable consent process	10 (1.2)	7 (2.8)	0.33
Questionable disclosure process	7 (0.8)	8 (3.2)	0.042
Questionable documentation	171 (20.6)	59 (23.5)	0.77
Questionable assessment of patient needs	53 (6.4)	37 (14.7)	<0.001
Patient management	467 (56.1)	133 (53.0)	0.12
Questionable delegation	14 (1.7)	10 (4.0)	0.69
Questionable tracking and follow-up	182 (21.9)	61 (24.3)	0.30
Questionable use of resources	257 (30.9)	60 (23.9)	0.18
Clinical performance	154 (18.5)	36 (14.3)	0.47
Correct diagnosis questionable intervention	152 (18.3)	32 (12.8)	0.77

The concepts represented in this table are derived from the primary classification category of Type within the PSET [17, 18]. The categories are not mutually exclusive and cases can fall into multiple categories. Not all subcategories are reported.

Table 5 Adverse event Cause characteristics for English speaking and LEP patients

Adverse event characteristic	English speaking *N* (%)	Limited English proficient *N* (%)	*P*-value
System factors	493 (59.3)	172 (68.5)	0.03
Organizational factors	450 (54.1)	165 (65.7)	0.01
External	14 (1.7)	3 (1.2)	0.44
Organizational management	89 (10.7)	5 (2.0)	0.23
Organizational culture	21 (2.5)	12 (4.8)	0.65
Protocols/processes	331 (39.8)	117 (46.6)	0.45
Transfer of knowledge	24 (2.8)	16 (6.4)	0.27
Technical factors	61 (7.3)	12 (4.8)	0.13
Facilities	34 (4.1)	7 (2.8)	0.29
Environment	29 (3.5)	5 (2.0)	0.21
Human error	323 (38.8)	112 (44.6)	0.24
Practitioner	143 (17.2)	55 (21.9)	0.01
Skill based	14 (1.7)	14 (5.6)	0.09
Rule based	54 (6.5)	19 (7.6)	0.07
Knowledge based	4 (0.5)	1 (0.4)	0.68
Unclassified	62 (7.5)	13 (5.2)	0.67
External	0 (0.0)	1 (0.4)	0.07
Patient factors	184 (22.1)	59 (23.5)	0.40

The concepts represented in this table are derived from the primary classification category of Cause within the PSET [17, 18]. The categories are not mutually exclusive and cases can fall into multiple categories. Not all subcategories are reported.

While we attempted to reduce investigator and observer bias by providing standardized data collection instructions and training, data were identified differently at each organization due to differences in patient record formats and hospital reporting systems. Because hospitals' reporting systems supported different levels of granularity, the content of the incident reports and narratives varied across hospitals. Some incident reports did not provide sufficient information to populate all PSET categories and, as a consequence, there were gaps in the data. Furthermore, we were unable to obtain additional information from the hospital or to verify the incident from secondary sources such as nursing notes and patient charts.

The overall incidence of adverse events for LEP and English speaking patients could not be established because hospitals found it too burdensome to stratify patient admissions and incident reports by patient language. Even advanced incident reporting systems capture only a minimal amount of patient demographic information. None of the reporting systems included a data field indicating primary language or LEP status. This made it difficult to identify LEP adverse events. Furthermore, hospitals with electronic medical records and patient safety databases were a minority and where those systems did exist, they were not interoperable.

Conclusions

Results from this study highlight the risks to patient safety that can be attributed to language barriers in hospitals and reinforce that it is important for LEP patients to receive competent language services. Equally important is the need for hospitals to measure the incidence and characteristics of adverse events so that they can understand the mechanisms by which language barriers impact LEP patient safety.

Unfortunately, efforts to improve the care of LEP patients are often hindered because providers fail to collect reliable patient language data. A critical first step towards the examination and mitigation of patient safety risk for LEP patients is to collect data on the patient's primary language. Hospitals should adopt and implement a process or mechanism to identify and document a patient's English proficiency status. This process must be consistently implemented at all hospital entry points such as the emergency room, ambulatory care clinic or admissions. To that end, the Joint Commission implemented a new accreditation standard in January 2006 requiring the patient's language and communication needs to be entered in the patient record [21].

It is equally important that organizations consistently document the language services provided during a patient–provider encounter. The hospitals in this study rarely documented the language skills of providers, whether an interpreter was present during patient encounters or the type of interpreter service they provide. Furthermore, when this information was documented, it generally was not recorded with any consistency. Having uniform access to these types of data allow hospitals to examine their processes, identify areas for improvement and initiate efforts to address any disparities in outcomes for LEP patients.

Hospital incident reporting systems should also capture data on the patient's race and ethnicity. This would enable quality improvement and safety specialists to develop and implement preventive strategies targeted for specific LEP populations that can subsequently be evaluated for effectiveness.

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