

# Emergency department discharge instructions comprehension and compliance study

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## ABSTRACT

**Objectives:** To assess patient comprehension of emergency department discharge instructions and to describe other predictors of patient compliance with discharge instructions.

**Methods:** Patients departing from the emergency department of an inner-city teaching hospital were invited to undergo a structured interview and reading test, and to participate in a follow-up telephone interview 2 weeks later. Two physicians, blinded to the other's data, scored patient comprehension of discharge information and compliance with discharge instructions. Inter-rater reliability was assessed using a kappa-weighted statistic, and correlations were assessed using Spearman's rank correlation coefficient and Fisher's exact test.

**Results:** Of 106 patients approached, 88 (83%) were enrolled. The inter-rater reliability of physician rating scores was high (kappa = 0.66). Approximately 60% of subjects demonstrated reading ability at or below a Grade 7 level. Comprehension was positively associated with reading ability ( $r = 0.29, p = 0.01$ ) and English as first language ( $r = 0.27, p = 0.01$ ). Reading ability was positively associated with years of education ( $r = 0.43, p < 0.0001$ ) and first language ( $r = 0.24, p = 0.03$ ), and inversely associated with age ( $r = -0.21, p = 0.05$ ). Non-English first language and need for translator were associated with poorer comprehension of discharge instructions but not related to compliance. Compliance with discharge instructions was correlated with comprehension ( $r = 0.31, p = 0.01$ ) but not associated with age, language, education, years in anglophone country, reading ability, format of discharge instructions, follow-up modality or association with a family physician.

**Conclusions:** Emergency department patients demonstrated poor reading skills. Comprehension was the only factor significantly related to compliance; therefore, future interventions to improve compliance with emergency department instructions will be most effective if they focus on improving comprehension.

**Key words:** comprehension; compliance; discharge; reading

## RÉSUMÉ

**Objectifs :** Évaluer la compréhension des patients des recommandations lors de leur congé du département d'urgence et décrire d'autres prédicteurs de respect de ces recommandations.

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**Méthodes :** Les patients quittant le département d'urgence d'un hôpital universitaire du centre-ville furent invités à se soumettre à une entrevue structurée et à un test de lecture et à participer à une entrevue téléphonique de suivi deux semaines plus tard. Deux médecins travaillant en aveugle notèrent le niveau de compréhension des patients face aux recommandations lors de leur congé et leur respect de celles-ci. Le coefficient d'objectivité fut évalué à l'aide d'une statistique kappa pondérée et les corrélations furent évaluées à l'aide du coefficient du rang de Spearman et de la méthode exacte de Fisher.

**Résultats :** Parmi 106 patients pressentis, 88 (83 %) furent inclus dans l'étude. Le coefficient d'objectivité des cotes d'évaluation par les médecins était élevé (kappa = 0,66). Environ 60 % des sujets démontrèrent une aptitude à la lecture d'un niveau de Secondaire I ou inférieur. Le niveau de compréhension était associé positivement à l'aptitude à la lecture ( $r = 0,29$ ,  $p = 0,01$ ) et à l'anglais comme langue maternelle ( $r = 0,27$ ,  $p = 0,01$ ). L'aptitude à la lecture était associée positivement au nombre d'années de scolarité ( $r = 0,43$ ,  $p < 0,0001$ ) et à la langue maternelle ( $r = 0,24$ ,  $p = 0,03$ ), et inversement associée à l'âge ( $r = 0,21$ ,  $p = 0,05$ ). La langue maternelle autre que l'anglais et le besoin d'un traducteur étaient associés à une moins bonne compréhension des recommandations lors du congé, mais non reliés au respect. Le respect des recommandations lors du congé était en corrélation avec la compréhension ( $r = 0,31$ ,  $p = 0,01$ ) mais non associé à l'âge, la langue, le niveau de scolarité, le nombre d'années vécues dans un pays anglophone, l'aptitude à la lecture, la forme des recommandations lors du congé, les modalités de suivi ou l'association avec un médecin de famille.

**Conclusions :** Les patients au département ont démontré de piètres habiletés de lecture. La compréhension était le seul facteur relié de façon significative au respect et, par conséquent, les interventions futures pour améliorer le respect des recommandations lors du congé d'un département d'urgence seront plus efficaces si elles se concentrent sur l'amélioration de la compréhension.

## Introduction

The medical management of the emergency patient does not end with discharge from the emergency department (ED). Discharge instructions include advice regarding ongoing management of the clinical condition, appropriate use of medications and required follow-up. The importance of patient compliance with ED discharge instructions is growing, in part because the management of acute conditions with possible morbidity and mortality is increasingly being shifted to the outpatient setting. Poor compliance with follow-up appointments contributes to ineffective care, and noncompliance rates ranging from 20%–67% are reported.<sup>1–4</sup>

Factors associated with noncompliance include lack of a primary care physician, lack of insurance, and whether a follow-up appointment was arranged prior to leaving the ED.<sup>2</sup> Patients with low literacy scores are less likely to comprehend discharge instructions,<sup>5</sup> and poor comprehension is associated with lower compliance rates.<sup>2</sup> Measures of reading ability include decoding, reading rate and comprehension. *Decoding* refers primarily to the ability to identify words (rather than the ability to identify higher units of meaning), and decoding skills are necessary to interpret the spoken or graphic symbols of a familiar language.

Our main objective was to assess patient comprehension of discharge instructions and subsequent compliance with

these instructions. Our secondary objective was to identify associations between social and demographic factors and comprehension and compliance.

## Methods

### Setting and patients

This study was conducted at the Toronto Western Hospital Emergency Department, a quaternary care inner city teaching hospital with approximately 40 000 annual visits. The ED is situated in an ethnically diverse community with immigrants from China, Portugal and Latin America. The study population consisted of a convenience sample of patients who attended the ED and were not admitted to hospital. Data were collected during twelve 6-hour periods between February and April of 2003. Data collection periods included day, evening and overnight shifts from both weekdays and weekends. This study was approved by the hospital Research Ethics Board.

### Data collection

During each 6-hour data collection shift, all patients discharged from the ED were approached at the exit to the ED and invited to participate, unless the researcher was already engaged in interviewing a patient. ED physicians on duty were not informed of the presence or the duties of the researcher during data collection. Patients were excluded if

they were unwilling to participate, unable to provide informed consent, unable to sufficiently understand English (with no translator present to facilitate consent and interview), or were in police custody.

All interviews were conducted by 1 of 2 interviewers (authors Clarke and Monzon) — both 2nd-year medical students with English as a first language. Interviewers used a standardized instrument comprised of 4 components: a demographic data set; a test of reading decoding ability; a comprehension interview; and a follow-up compliance interview. Demographic data included age, gender, relationship status, education level, first language, years in an English-speaking country, presence of a drug plan, triage score, whether patient was accompanied, and association with a family physician.

### ***Reading skill and comprehension***

Reading decoding ability was measured using the Wide Range Achievement Test for literacy (WRAT-3) ([www.rasch.org/rmt/rmt84q.htm](http://www.rasch.org/rmt/rmt84q.htm)). The WRAT-3 is a validated, widely-used, easily administered test of reading decoding.<sup>6</sup> Each patient is given a series of progressively more difficult words to pronounce. Performance on the test ultimately correlates reading decoding ability with expected reading ability grade ranges in North America. The WRAT-3 typically takes less than 5 minutes to complete.

The comprehension interview was administered after the patient had exited the ED, but not the hospital. Each patient was asked the following questions: a) What did the doctor say was wrong with you? b) What did the doctor tell you to do? c) Did the doctor tell you to take any medications? and How did he or she tell you to use each of them? d) Were you told to return to the emergency department or to see another doctor or clinic? Patients were asked if they had received any written information from the emergency physician, and were encouraged to use these materials as reference when answering the questions. The interviewer transcribed the responses verbatim.

### ***Compliance follow-up***

Consenting patients participated in a standardized telephone interview conducted by 1 of the 2 interviewers approximately 2 weeks after discharge, to assess compliance with discharge instructions, prescribed medications and clinical follow-up. Reasons for noncompliance were solicited.

### ***Data analysis***

Two physicians independently compared patients' compre-

hension responses and compliance outcomes with the ED physicians' documented discharge instructions, and rated each patient's comprehension and compliance. Comprehension was rated using a 4-point scale: 0 = No evidence understanding of diagnosis, medications or follow-up instructions; 1 = Vague understanding; 2 = Moderate understanding; and 3 = Good understanding. Compliance was scored using a 4-point scale: 0 = No recall; 1 = Recall, but no compliance; 2 = Recall with some compliance; 3 = Recall with good compliance.

Physicians doing the rating were blinded to patient demographics and to the other physician rater's data interpretations. In cases where the 2 independent raters disagreed on a given patient's comprehension or compliance scores, a third independent physician, also blinded to the others' assessments, provided a tie-breaking rating. Inter-rater agreement was assessed using a weighted kappa statistic, and the relationship between patient comprehension and other independent variables was explored using Spearman's rank correlation coefficient and confirmed through Fisher's exact test. Statistical analyses were performed using SPSS and SAS.

## **Results**

### ***Enrolment***

We invited 106 patients to participate in the study and 88 (83%) were enrolled. Fifteen (14%) refused to participate, citing personal reasons that included time constraints, people waiting for them, and dissatisfaction with time or service in the ED. Two patients (1.9%) were incompetent, thus ineligible for enrolment, and one (0.9%) was excluded because he was in police custody. Fourteen of 88 patients who completed the discharge interview could not be reached for telephone follow-up, leaving 74 patients who completed the telephone compliance assessment. This represented 89% of patients who underwent comprehension interviews and 70% of all those solicited to participate in the study.

### ***Demographics***

Mean age in the study cohort was 41.1 years (range 12–90 yr). Three patients were <15 years of age, and these interviews were conducted with the accompanying parent or guardian. Overall, 51% of patients were male, 31 (29%) had no drug plan, and 13 (12%) had no primary care physician. Only 45 (51%) identified English as their first language, while 17%, 9% and 8% identified Portuguese, Chinese and Spanish respectively. Most (79%) had spent over 10 years in an English-speaking country.

**Discharge and follow-up**

On discharge, 18 patients (24.3 %) received verbal instructions, 54 (73%) received handwritten instructions and 2 (2.7%) received a pre-printed, English-language instruction sheet (e.g., head injury or wound care protocol). Thirty-four (45.9%) had no follow-up advised, 24 (32.4%) were advised to see their family physician, 11 (14.9%) were referred to a hospital consultant, 4 (5.4%) were advised to see their own specialist, and 1 (1.4%) was advised to return to the ED.

**Education and reading**

While 66% of patients reported completing at least Grade 12, 30 (34%) reported that their highest grade completed was at or below Grade 11, and 15 (17%) reported their highest completed education was less than Grade 8 (Fig. 1). Individual performance on the WRAT-3 test typically demonstrated reading ability that was below the reported educational level, and 52 subjects (60%) demonstrated a reading ability below Grade 7 level (Table 1).

**Inter-rater reliability for patient comprehension and compliance**

Inter-rater agreement, based on a weighted kappa statistic, was high for patient comprehension level ( $\kappa = 0.66$ ; 95% confidence interval [CI], 0.47–0.84) and for degree of patient compliance with discharge instructions ( $\kappa = 0.49$ ; 95% CI, 0.26–0.71). A secondary analysis was performed looking at compliance among those patients who exhibited fair comprehension (i.e., comprehension ratings of 2 or 3). This analysis showed a similar level of agreement for pa-

tient compliance (weighted kappa = 0.44; 95% CI, 0.15–0.75).

**Comprehension**

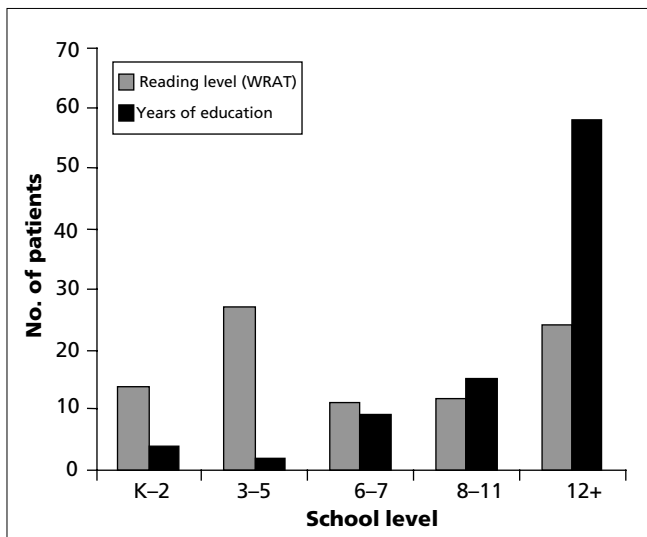
The mean comprehension score on a 0–3 scale was 2.7. We found a significant relationship but only moderate correlation between comprehension and English as first language ( $r = 0.27, p = 0.01$ ) and between comprehension and reading ability as assessed using the WRAT-3 score ( $r = 0.29, p = 0.01$ ). There was a weak correlation between comprehension score and years in an English-speaking country ( $r = 0.20, p = 0.06$ ). There was no correlation between comprehension and years of education or age (Table 2).

**Compliance**

The mean compliance score on a 0–3 scale was 2.9, and compliance with discharge instructions was correlated with comprehension ( $r = 0.31, p = 0.01$ ). The relationship between patient compliance and other independent variables was explored through a series of Spearman’s correlations. We found no significant relationship between compliance and age, first language, WRAT-3 score, years of education or years in an English-speaking country. Furthermore, no significant relationship was found between compliance score and having a drug plan, health care payer status, having a family doctor, format of discharge instructions (verbal only v. handwritten v. pre-printed information), how the follow-up appointment was arranged (by ED, patient initiated or clinic initiated), or the type of follow-up advised (ED, family doctor, own specialist or hospital physician).

**Discussion**

Subjects in our study generally had good comprehension



**Fig. 1. Years of schooling and reading comprehension levels. WRAT = Wide Range Achievement Test for literacy (WRAT-3)**

**Table 1. First language of study participants and no. of years of residence in an English-speaking country**

Variable	No. (and %) of patients
<b>First language</b>	
English	45 (51)
Portuguese	15 (17)
Chinese	8 (9)
Spanish	7 (8)
Other	13 (14)
<b>Years in English-speaking country</b>	
0-5	9 (10)
6-10	5 (6)
11-20	14 (16)
>20	60 (68)

and compliance. Higher comprehension scores were associated with English as first language and with higher reading decoding ability, as measured by the WRAT-3. Compliance was associated with comprehension scores, but we found no correlations between compliance and any other factors studied.

Approximately 60% of subjects demonstrated reading ability at or below a Grade 7 level. Previous studies have also reported that reading level is typically 3 to 4 grades below educational level, and that highest completed grade is an invalid measure of expected reading level.<sup>6–10</sup> Our finding that 47% of patients read at or below the Grade 5 level is consistent with a US study based in 2 inner-city EDs that reported the mean reading ability of patients to be at the 6th grade level.<sup>5</sup>

We did not find a significant difference in compliance among patients given written or pre-printed instructions versus those given verbal instructions alone. Patient educational materials and physicians' instructions are frequently ineffective with many patients in public hospitals.<sup>6,9</sup> US surveys have produced estimates of adult illiteracy ranging from 13%–55%, with the lower figure representing the percentage of Americans who are severely illiterate — reading at or a below a Grade 4 level. At this level, patients cannot read clinic signs or labels on medicine or food containers.<sup>9</sup> Patient discharge instructions are typically written

at a level exceeding the patient's reading ability,<sup>6</sup> and such mismatches impede patient comprehension.<sup>11</sup> Populations with large minority populations and high rates of poverty and immigration have been shown to have the highest percentage of patients with poor literacy.<sup>12</sup>

We found significant relationships between comprehension and English as first language ( $r = 0.27, p = 0.01$ ) and between comprehension and reading ability ( $r = 0.29, p = 0.01$ ). In US hospitals, non-English first language has been demonstrated to be associated with poorer comprehension.<sup>1</sup> Spandorfer and colleagues found that only WRAT-3 had an independent association with comprehension, while education level, age, gender, race, residence and first language did not.<sup>5</sup>

We suggest the possibility of a rational “selection bias” on the part of physicians in arranging patient follow-up: emergency physicians may anticipate which patients will have difficulty with comprehension and follow-up and therefore selectively utilize tailored verbal instructions and arranged appointments prior to discharge to facilitate comprehension and compliance. In a test of comprehension of ED patients, Spandorfer and colleagues noted that patients demonstrated high overall comprehension rates despite a 5-grade discrepancy between reading level of the study population and the pre-printed instructions. The authors postulated that verbal instructions given by the discharging

**Table 2. Comprehension and compliance correlations for study participants**

Variable	Correlation coefficient* (and <i>p</i> value)						
	Comprehension	Age	English first language	WRAT-3 grade level	Years of education	Years residing in English-speaking country	Compliance
Comprehension	1.00 (n/a)	−0.06 (0.55)	−0.27 (0.01)	0.29 (0.01)	0.11 (0.32)	0.20 (0.06)	0.31 (0.01)
Age	−0.06 (0.55)	1.00 (n/a)	0.06 (0.55)	−0.21 (0.05)	−0.05 (0.65)	0.60 ( $<0.0001$ )	−0.11 (0.34)
English first language	−0.27 (0.01)	0.06 (0.55)	1.00 (n/a)	−0.24 (0.03)	−0.13 (0.22)	−0.54 ( $<0.0001$ )	−0.13 (0.27)
WRAT-3 grade level	0.29 (0.01)	−0.21 (0.05)	−0.24 (0.03)	1.00 (n/a)	0.43 ( $<0.0001$ )	0.09 (0.40)	0.17 (0.14)
Years of education	0.11 (0.32)	−0.05 (0.65)	−0.13 (0.22)	0.43 ( $<0.0001$ )	1.00 (n/a)	0.03 (0.78)	0.02 (0.83)
Years residing in English-speaking country	0.20 (0.06)	0.60 ( $<0.0001$ )	−0.54 ( $<0.0001$ )	0.09 (0.40)	0.03 (0.78)	1.00 (n/a)	0.05 (0.64)
Compliance	0.31 (0.01)	−0.11 (0.34)	−0.13 (0.27)	0.17 (0.14)	0.02 (0.83)	0.05 (0.64)	1.00 (n/a)

Number pairs in each cell include the \*correlation coefficient (*r*) associated with the corresponding pair of items, followed by the *p* value. Correlation coefficients range from −1.0 (perfect negative association) to 0 (no association) to +1.0 (perfect positive association). Age and Years residing in English-speaking country were recorded as sequential years. Years of Education were scored as sequential years from 1 through 14. WRAT-3 [Wide Range Achievement Test for literacy] score was recorded as the correlating school grade, from kindergarten through grade 13.



physicians may have accounted for this discrepancy.<sup>5</sup> Improved compliance has also been associated with including family members in the patient education process.<sup>13</sup> Physicians may anticipate poor comprehension or compliance and direct discharge instructions to a family member or guardian when present.

Several studies have demonstrated improved compliance when the follow-up appointment is arranged prior to the patient's departure from the ED,<sup>2,14–17</sup> and when computerized discharge instructions are used.<sup>18,19</sup> We found no significant relationship between compliance score and how the follow-up appointment was arranged (by ED, patient initiated or clinic initiated), nor with type of instructions (verbal only, handwritten English, printed). However, our instrument measured global compliance, including follow-up with personal care, medication, and appointments — not patient compliance with appointments alone. As well, sample sizes may have been too small to detect an effect.

### Limitations

There are several potential limitations to this study. There was potential for physicians to deviate from their usual patterns of providing discharge information if they were aware of the study. However, ED staff were typically unaware of the nature of the study, and not informed when data collection was occurring. Incomplete physician charting and inaccurate charting (completion of charts at end of shift, routine charting of non-communicated information for medicolegal reasons) may have impacted on the reliability of comprehension ratings. Several physicians were fluent in languages other than English (including French, Italian, Hebrew, Korean and Polish). However, none speak Portuguese, Cantonese or Spanish, and the second language skills of the emergency physicians in this study seldom facilitate communication with patients. There was also potential for bias due to time of shifts and days that were chosen for interviewing. Data were collected in a distribution of shifts that represented a full spectrum of ED shifts, but were not evenly distributed. While word recognition and reading decoding ability as measured by WRAT-3 is an important measure of literacy, it is not necessarily a direct measure of reading comprehension.<sup>5</sup> Our measures of comprehension and compliance are inexact; raters did not exhibit perfect agreement, and this may have affected the strength of the effects we observed. The methodology does not assess the impact of accompanying guardians or family members on compliance. Patient forgetfulness at the compliance interview had the potential to falsely skew compliance scores downward, and exaggerated reports of compliance could skew compliance scores

upward if respondents felt a need to “please” the interviewer. While participation and telephone follow-up rates were satisfactory, there is potential that the study selected for patients with better comprehension and compliance. Last, this study was done in the Canadian single-payer health care setting, where patients typically do not pay for ED or follow-up visits. Our findings may not be generalizable to other countries.

### Conclusions

Patients demonstrated relatively good comprehension and compliance in our study, despite the prevalence of low reading scores and potential language barriers. Initiatives to improve compliance with ED instructions should be targeted at improving comprehension.

**Competing interests:** None declared.

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