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'This is the peer reviewed version of the following article: Hyun, K. K., Redfern, J., Woodward, M., Briffa, T., Chew, D. P., Ellis, C., ... & Howell, T. (2017). Is There Inequity in Hospital Care Among Patients With Acute Coronary Syndrome Who Are Proficient and Not Proficient in English Language?: Analysis of the SNAPSHOT ACS Study. Journal of Cardiovascular Nursing, 32(3), 288-295.

which has been published in final form at

DOI:
http://dx.doi.org/10.1097/JCN.0000000000000342

Journal of Cardiovascular Nursing
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Is there inequity amongst patients with acute coronary syndrome who are proficient and not proficient in English language in terms of their in-hospital care: Analysis of the SNAPSHOT ACS Study

Abstract

Background: The provision of equitable acute coronary syndrome (ACS) care in Australia and New Zealand (NZ) requires an understanding of the sources of variation in the provision of this care.

Objective: To compare the variation in care and outcomes between acute coronary syndrome (ACS) patients with limited English proficiency (LEP) and English proficiency (EP) admitted to Australian and New Zealand (NZ) hospitals.

Methods: Data were collected from 4387 suspected/confirmed ACS patients from 286 hospitals between 14-27 May 2012 who were followed for 18 months. We compared hospital care and outcomes according to the proficiency of English using logistic regressions.

Results: The 294 LEP patients were older (70.9 years vs. 66.3, $p<0.001$), had higher prevalence of hypertension (71.1% vs. 62.8%, $p=0.004$), diabetes (40.5% vs. 24.3%, $p<0.001$) and renal impairment (16.3% vs. 11.1%, $p=0.007$) compared to the 4093 EP patients. Once in hospital, there was no difference in receipt of percutaneous coronary intervention (57.0% vs. 55.4%, $p=0.78$) or coronary artery bypass graft surgery (10.5% vs. 11.5%, $p=0.98$). Following adjustment for the past medical history, there were no significant differences ($p>0.05$) between the two groups in the risk of major adverse cardiovascular events and/or all-cause death, during the index admission and from index admission to 18 months.

Conclusions: These results suggest that LEP patients admitted to Australian or NZ hospitals with suspected ACS may not suffer inequity in in-hospital care and outcomes.

Key words: Acute coronary syndrome; Language barriers; In-hospital mortality

INTRODUCTION

An acute coronary syndrome (ACS) include ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI) and unstable angina (UA) and represent a high-risk and potentially life-threatening presentation to the Emergency Department and beyond. Hospitalization with ACS accounts for significant morbidity and mortality in Australia and New Zealand. In Australia, ACS resulted in 11380 deaths in 2007, and 95,000 hospitalizations in 2008 [1]. Between 1993-94 and 2007-08, the number of ACS hospitalizations has increased by 79.5% for acute MI and 33.1% for UA. National data on the total number of ACS deaths were not available from New Zealand, but 5339 deaths in 2012 were due to ischemic heart disease and approximately 21,500 patients were hospitalized due to ACS in 2007 [2, 3]. With the population aging and the ACS hospitalization increasing in both jurisdictions, ACS represents growing social and economic burden.

The World Health Organization has reported health inequities in ethnicity, socioeconomic status, gender, education and employment status [4]. For patients whose ethnicity is different from their treating doctors, effective communication in healthcare between clinician and patient is required to ensure the former are aligned with the latter's preferences. This has been shown to be important for diagnosis, quality of care, early and late outcome, adherence to recommendations and patient satisfaction [5, 6]. Language barriers during a hospital admission have the potential to disrupt the bi-directional flow of information, and this is particularly relevant in societies, where some patients' language spoken at home differs to the primary language spoken within the society. Previous studies from Canada and the US have suggested that that limited English proficient (LEP) and English proficient (EP) patients have disparities in comorbidities, in-hospital mortality, length of stay (LOS), cardiac rehabilitation attendance and readmission rates [7, 8].

Australia and New Zealand are multicultural countries, where there are a growing number of LEP people. In Australia, the number of LEP people has increased by 93,959 (17%) from 2006 to 2011 [9], and in New Zealand, by 5595 (6%) from 2006 to 2013 [10]. Australia and New Zealand recognize the growth of cultural and linguistic diversity, and the implication this has in healthcare. Although policies and models have been put in place to provide equitable healthcare for LEP and EP patient [11, 12], the evidence for its implementation is lacking. The aim of this paper is to explore whether proficiency in English has impacted upon receipt of guideline-advocated in-hospital care and outcomes in Australia and New Zealand (NZ).

METHODS

Data and patient cohort

Data for this study were collected as part of the SNAPSHOT ACS audit. Full details of the SNAPSHOT ACS study and the main primary results for each country have been previously published [13, 14]. In brief, SNAPSHOT ACS was a prospective, observational study, which captured data across Australia and NZ. All Australian and NZ hospitals receiving patients with suspected ACS (including public and private, metropolitan and rural) were identified via public records and health networks and invited to participate in the study. Patients at participating hospitals were eligible if they were admitted overnight with a suspected or confirmed ACS event between May 14th and 27th, 2012. Patients were enrolled and followed for the duration of the acute care episode, including all contiguous transfers between hospitals (counted as a single episode of care). Patients surviving to hospital discharge were followed-up at 18 months. Ethics approval was obtained from all participating sites with a slightly different consent process in Australia and NZ due to relevant local ethical procedures. In Australia, approval was provided for opt-out consent was acquired from all participants. In NZ, a process of national ethical review was undertaken and a consent waiver was approved for NZ participants.

Data and outcomes

All data were entered into a customized database permitting secure, web-based entry for each patient. Data collected included demographics, details of clinical presentation and transfers between hospitals. Presenting characteristics included clinical variables enabling the calculation of the Global Registry of Acute Coronary Events (GRACE) risk score [15]. This score is proven to have high capacity to predict mortality. In-hospital care was observed including utilization of guideline-recommended therapies including inpatient invasive management/revascularization, dietary/physical activity advice, screen for depression and discharge prescription of aspirin, other oral antiplatelet therapies (OAP), statin, beta-blocker (BB), angiotensin converting enzyme inhibitor (ACE-I) and angiotensin receptor blocker (ARB), referral for cardiac rehabilitation, and smoking cessation advice were reported. Within the case report form for the study, patients' primary language spoken at home was recorded from the medical records. We were then able to classify participants into the two groups of LEP or EP where those who were identified as having English as their primary language spoken at home were classified as EP and those who spoke a non-English language as their primary language at home were classified as LEP. Although the primary language spoken at home does not provide an accurate level of proficiency in English, it has been considered as an indicator of proficiency and found to be a possible barrier to accessing healthcare [16, 17].

For the Australian cohort, mortality data at 18 months after index admission were collected via data linkage using the National Death Index (NDI). In addition, a survey and/or telephone interview at approximately 18 months after their index admission provided health service utilization and risk factor profile within the 18 month period. For LEP patients, a family member was asked to interpret or translate to obtain the data. For the New Zealand cohort, patients were not contacted for the 18 month follow-up, but death and hospital morbidity data were obtained by data linkage from the Ministry of Health Register in New Zealand. The outcomes explored were major adverse cardiovascular events (MACE), all-cause death and MACE/all-cause death during hospitalization, and from admission to 18 month follow-up, independently. In-hospital MACE included new or recurrent MI, worsening congestive heart failure (HF) and stroke, all-cause death and MACE/all-cause death. Detailed definitions of the events that comprised MACE were specified previously [13].

Statistical analysis

Patient demographics, medical history, in-hospital care, acute and late outcomes were stratified so as the compare LEP and EP. The chi-squared statistic was used to compare categorical variables, the independent t-test for means of continuous variables that were approximately symmetric, and the Wilcoxon rank-sum test for continuous variables that were skewed. A multiple-adjusted regression model was used for LOS, and multiple-adjusted logistic regression models were used for each of the outcomes to estimate the odds ratios (ORs) and corresponding 95% confidence intervals (CIs). For LOS, adjustments were made for gender, GRACE risk score, prior cardiac diagnosis and procedure (diabetes, MI, percutaneous coronary intervention (PCI), coronary artery bypass graft (CABG), atrial fibrillation (AF), and stroke), presenting diagnosis (STEMI, NSTEMI, UA and other non-confirmed cases of ACS), four or more in-hospital evidence based medications (aspirin, OAP, BB, ACE-I or ARB, and statin or other lipid lowering drugs (OLLD)), PCI and CABG. For in-hospital outcomes, the same covariates were applied except evidence based medications and any coronary revascularization procedure were excluded. For outcomes to 18 months, additional variables in the models were: four or more evidence based medications given during admission, PCI, CABG and referral to rehabilitation.

As sensitivity analyses, the LEP patients were propensity matched to EP patients 1:2 and 1:5 using the Greedy 8→1 Digit Match to compare each in-hospital and total outcomes. To compute propensity scores for in-hospital and total outcomes, the covariates included in the regression model were as identified for the in-hospital outcome variable in the preceding paragraph. Data were analyzed using Statistical Analysis System (SAS) 9.3 for Windows (SAS Institute Inc. Cary, North Carolina, United States of America).

RESULTS

Across Australia and New Zealand, 4387 patients were enrolled in 286 hospitals within the 2-week enrolment period. Excluding 321 in-hospital and post-hospital deaths collected from Australian hospitals and NDI linkage, 3060 Australian survivors were approached for follow-up. Of those, 1918 (62.7%) responded with data at 18 months after their index admission. Hospital readmission and mortality at 18 months were obtained through data linkage for all 1006 New Zealand patients.

At baseline, 41 hospitals (14.3%) had 10% or more of LEP patients enrolled in their sites. Of the 4387, 294 (6.7%) were LEP patients; who were older (70.9 years vs. 66.3 years, p<0.001) and had a higher GRACE risk score (113 vs. 98, p<0.001) than EP patients, but had similar discharge diagnoses (Table 1). Patients with LEP were more likely to have hypertension (71.1% vs. 62.8%, p=0.004), hyperlipidaemia (61.6% vs. 53.8%, p=0.001), diabetes (40.5% vs. 24.3%, p<0.001) and renal failure (16.3% vs. 11.1%, p=0.007), and a lower rate of family history of CHD (17.0% vs. 33.7%, p<0.001) than EP patients. The median symptom onset to presentation times for STEMI patients was longer for LEP patients (3.2 hours vs. 2.1 hours), but this difference was not significant (p=0.11). Of 294 LEP patients, 48 patients (16.3%) have deceased and 93 (31.6%) were followed up at 18 months after initial admission.

In-hospital care

In-hospital treatment was comparable between LEP and EP patients (Table 1). Time to reperfusion for STEMI patients was longer, although not significantly so (128 minutes vs. 87 minutes, p=0.74). There was no effect of EP on receipt of coronary angiography (52.8% vs. 57.1%, p=0.29), PCI (57.0% vs. 55.4%, p=0.78) and CABG (10.5% vs. 10.5%, p=0.98), and the findings persist after adjusting for the GRACE risk score. Similarly, the rate of receiving four or more of five evidence based medications were similar in hospital (75.7% vs. 74.2%, p=0.70) and at discharge (64.5% vs. 64.9%, p=0.92), even after adjusted for the GRACE risk score. Furthermore, referral to cardiac rehabilitation, and receipt of smoking cessation, dietary or physical activity advice were similar. However, LEP patients were less likely to be screened for depression than EP patients (3.6% vs. 7.8%, p=0.01). Even though the unadjusted median LOS was longer for LEP patients compared to EP patients (3.1 days vs. 2.5 days, p=0.001), once adjusted, language barrier was no longer a predictor of longer LOS (p=0.30).

Cardiovascular Events

Before adjustment, LEP patients had a higher rate of in-hospital MACE (24.2% vs. 14.9%, p<0.001), all-cause death (4.4% vs. 1.7%, p=0.001), and MACE/all-cause death (25.2% vs. 15.4%, p<0.001) compared to EP patients. Following adjustment, these differences were no longer apparent (Figure 1). For the total cardiovascular events, from index admission to the 18 months follow-up, before adjustment, there was no difference in the rate of MACE (22.5% vs. 20.7%, p=0.59), however, LEP patients had higher all-cause death (16.3% vs. 10.1%, p=0.001) and total MACE/all-cause death (35.7% vs. 26.4%, p=0.001) compared to EP patients. These differences in outcomes did not persist following adjustment for the higher baseline risk of the LEP population (Figure 1).

Sensitivity analyses

The results were confirmed by sensitivity analyses using propensity score matching. After 1:2 propensity score matching, 293 LEP patients were compared to 586 EP patients. We found that there was no significant difference between LEP and EP patients for in-hospital MACE (24.2% vs. 20.3%, p=0.18), all-cause death (4.4% vs. 2.2%, p=0.07), and MACE/death (25.3% vs. 21.2%, p=0.17). Furthermore, for combined events from admission to 18 month follow-up, after the propensity score matching, the rate of events were comparable for MACE (31.1% vs. 29.0%, p=0.53), all-cause death (16.% vs. 14.2%, p=0.38), and MACE/death (35.8% vs. 34.3%, p=0.65). Similarly, 1:5 propensity score matched analysis, where 293 LEP patients were matched to 1465 EP counterparts, showed that the event rates in hospital (MACE: 24.2% vs. 22.1%, p=0.41; all-cause death: 4.4% vs. 3.3%, p=0.32; and MACE/death: 25.3% vs. 23.0, p=0.41) and from admission to 18 month follow-up (MACE: 31.1% vs. 30.0%, p=0.73; all-cause death: 16.4% vs. 15.1%, p=0.57; and MACE/death: 35.8% vs. 35.7%, p=0.96) were comparable.

DISCUSSION

In this analysis we have investigated the association of English as a non-primary language amongst ACS patients with in-hospital care and outcomes using contemporary, comprehensive Australian and New Zealand data. Our results suggest that LEP patients who presented to a hospital were significantly older, and more likely to have a history of hypertension, hyperlipidaemia, diabetes mellitus, familial CHD and chronic renal failure, and had a higher GRACE risk score at presentation. LEP patients tended to present later to hospital and reperfusion for patients with STEMI was delayed, although these differences were not statistically significant. The language barrier was not associated with inequities in-hospital care, including receipt of evidence-based medications, provision of PCI, CABG, lifestyle advice and rehabilitation referral. Although LEP patients had a longer LOS, and had higher rates of MACE and death during admission and from admission to follow-up compared to EP patients, these differences did not persist following adjustment for the baseline characteristics and in-hospital therapies and procedures received by the LEP patients.

Our findings are an encouraging affirmation of the current Australasian hospital systems, which endeavors to provide consistent in-hospital quality of care to all patients. In Australia and New Zealand, there are structured and standardized evidence-based clinical guidelines and systems of care for the management of ACS regardless of the patients' culture and native language [18]. There are not only guidelines for managing ACS but numerous guidelines and programs to provide access and equity for culturally and linguistically diverse people. These include the Multicultural language services guidelines [19] and cultural competency in health guideline [11] for Australia, and the Health Practitioners Competence Assurance Act 2003 [12] and Operational Policy Framework [20] for New Zealand. Currently, hospitals from both countries provide 24 hour translation and interpretation services for over 120 different languages and dialects [21, 22], and the staff are trained to develop cross-cultural competence [23, 24] to meet these guidelines.

In contrast to our results, previous studies have identified significant differences in receipt of in-hospital care. A contemporary study from the United States, found that LEP patients with diverse medical and surgical conditions were prescribed fewer medications at discharge compared to EP patients [25], Relative to other comparable high-income countries, inequity is an acknowledged limitation of the United States healthcare system [26]. In comparison to the white American population, other ethnic groups are more likely to be uninsured [24], which may effect the care received by LEP patients.

An earlier single jurisdiction Australian study has also found differing results to ours, which was that LEP patients diagnosed with acute MI were more likely to receive PCI than EP counterparts, although the difference was not evident for UA patients [25]. Despite the contrasting results of in-hospital care, the finding that language barrier was not associated with the LOS is consistent with international literature [7, 8, 28, 29].

We found no difference in mortality during admission or from admission to 18-month follow-up based on English language proficiency. Other studies have drawn similar conclusions for patients with ischemic heart disease [28] acute MI [29], and general medical patients [8]. A Canadian study has looked at mortality for patients with acute MI and UA/chest pain separately [7]. Interestingly, this latter study found that LEP patients with acute MI had significantly lower in-hospital mortality after adjustment for risk, whereas LEP patients with UA and chest pain had no difference in in-hospital mortality compared to EP patients.

Our study had several limitations. First, this was an observational design that may have introduced reporting bias. As the data were transcribed from medical records, the accuracy of the information recorded may be less reliable. This includes classification of patients as LEP and EP which would require a thorough assessment of literacy. Despite this, a strength of this study is the non-trial design with opt-out (Australia) or consent waiver (NZ) which is likely to have increased the diversity of the sample compared to clinical trials cohorts where written consent is required. Second, the data were collected over a 2-week period, and may not be representative of admissions over a longer period. Third, due to lack of LEP patients the effect of the use of interpretation services or help from a kin could not be analyzed separately. Fourth, the influence of patient preference on in-hospital care could not be tested as data on patient preference was not collected. Finally, LEP comprise a heterogeneous population from diverse geographic, cultural and ethnic backgrounds. It is possible that individual population subgroups may experience disparities in care; larger cohort studies will be required to further investigate this.

Conclusion

In summary, LEP patients with ACS present older, with more comorbidities than EP patients. Language barrier is not associated with inequities in the receipt of coronary angiography, evidence based medicines, and other secondary prevention strategies. LEP patients have higher rate of MACE and all-cause death. After accounting for patient demographics and comorbidities, there is no difference in mortality or MACE between English and non-English speaking patients. These results suggest that people admitted to an Australian or New Zealand hospital with ACS and who have LEP do not experience any major inequity in care, acute and late outcomes.

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