

Hispanic Hospitalization and Mortality : Evidence from New Jersey

Abstract

Hispanics in New Jersey have low mortality rates for many major causes of death. This pattern has been widely observed, and attributed to data artifacts, selective migration, and/or cultural factors. However, hospitalization rates for diagnoses related to major causes of death are higher among Hispanics, particularly among those aged over 65 years. I examine this seemingly paradoxical pattern by linking hospital discharge and death data for several major causes of admission. Hospitalized cohorts are followed for twelve months. Cox proportional hazards models are employed to estimate the probability of re-hospitalization and/or death. Preliminary findings suggest that the probability of re-hospitalization is higher among Hispanics, while the probability of mortality is lower. These results suggest the inconsistency between hospitalization and death rates among Hispanics is not a data artifact, but may be due to factors such as differential disease processes, differential access to outpatient care, or potentially, selective outmigration of Hispanics in poor health.

Introduction

Much attention has been paid to the Hispanic mortality advantage, or the frequent finding that Hispanic mortality rates are lower than those for Non-Hispanic Whites. This phenomenon is sometimes referred to as the Hispanic “epidemiological paradox”, in light of the fact that while Hispanics as a group have socioeconomic characteristics associated with high mortality, on balance they appear to have low mortality. There are several potential explanations for this Hispanic mortality advantage: data artifact, selective migration, and a cultural explanation emphasizing reduced risk factors among Hispanics in the United States.

This study closely examines an issue which relates to our understanding of the Hispanic mortality advantage and its causes – the observation that in New Jersey, while Hispanic mortality rates are very low compared with non-Hispanic Whites for most major causes of death, hospitalization rates among Hispanics for many diagnoses related to these causes of death are relatively high. We begin by discussing the major literature on Hispanic mortality and findings from other states with large Hispanic populations. We then discuss potential explanations for the incongruous nature of death rates and hospitalization rates among Hispanics. The four most likely explanations are data artifact, selective migration, differential care-seeking behavior/access, or differential disease process. We test these theories by selecting cohorts of hospitalized Hispanics and non-Hispanic whites from New Jersey hospital discharge data, with particular diagnoses, and follow them for twelve months following discharge, using Cox proportional hazards models to estimate the probability of subsequent re-hospitalization or death. We are able to include demographic, socioeconomic, and clinical variables in the hazard models, as well as information on Hispanic subgroup membership.

Background

A number of studies using various data sources have found evidence of a Hispanic mortality advantage (Markides, 1983; Rogers et al. 1996; Rosenwaike, 1987; Singh and Siahpush, 2001; Hummer et al; 2000). A recent analysis using the NHIS-MCD file (Palloni and Arias (2004)) offers some qualifications, noting that the Hispanic mortality advantage is limited to foreign born Mexicans, and foreign born “other” Hispanics. This finding is consistent with some of the conclusions in Hummer et al, (2000) and other prior work. Elo et al (2004) used adjusted vital records and census data as well as Medicare and NUMIDENT records to examine the mortality advantage among elderly Hispanics. Among their finding was that adjusting vital statistics and census data reduces the difference between Hispanic and non-Hispanic mortality rates. They also found evidence of a Hispanic mortality advantage for most subgroups, although the difference was greatest among Mexicans and “other” Hispanics, as well as among the foreign born.

The major explanations for the Hispanic mortality advantage are data artifact, selective migration, and cultural explanations. The most straightforward example of a data artifact is when there are mismatches between numerators and denominators in conventionally calculated mortality rates, in which numerators come from vital statistics and

denominators come from the Census. In particular, the potential to under-report Hispanic ethnicity on death certificates has been thought to bias downward mortality rates by as much as seven percent (Rosenberg et al, 1999). The tendency for the Census to undermeasure Hispanics is another factor, although this data error works to upwardly bias Hispanic mortality rates. Yet recent studies have found evidence of a mortality differential even when using either adjusted versions of Vital Statistics and Census data (Elo et al, 2004) or linked data sets such as the NHIS-MCD where individuals who self-identify their ethnicity in survey data are individually linked to their death certificates (Palloni and Arias, 2004). Another data set, Medicare-NUMIDENT which links applicants for Social Security cards with Medicare Beneficiaries, was used by Elo et al, and also had the advantage of internal consistency of ethnic identification, although Hispanic identity had to be imputed for earlier years. Other types of data artifacts include age misreporting by older Hispanics (Dechter and Preston, 1991) which can occur in both numerators and denominators, but which is believed to bias mortality rates downward. Recent work on Hispanic mortality advantage, particularly that of Elo et al, 2004, suggests that data artifacts increase the Hispanic mortality advantage, but do not entirely explain it.

The concept of selective migration pertains to the foreign born Hispanic population, and encompasses both the idea of a “healthy migrant” bias, meaning that in-migrants are healthier than average residents of their country of origin, and the so-called “salmon” hypothesis, referring to the possibility that foreign born migrants in ill health may return home to die, thus downwardly biasing mortality rates, particularly at older ages. The recent study by Palloni and Arias (2004) provided evidence consistent with return migration, particularly among Mexicans. The idea of selective return migration is also consistent with findings that the Hispanic mortality advantage appears to the greatest at older ages and among the foreign born population.

It could be argued that selective out-migration is a kind of data artifact, as those with increased likelihood of dying exit both the numerator and the denominator by out-migrating, making their mortality impossible to count. Selective in-migration, or the “healthy migrant bias”, on the other hand, is less interpretable as a data artifact. While it doubtless true that international migrants are somewhat healthier than average – those with debilitating conditions such as cystic fibrosis, for example, are unlikely to be international migrants, this theory is difficult to test, since the vast majority of mortality at early ages is due to causes such as motor vehicle crashes and assaults, and it is not clear how those who are more healthy than average would be far less likely than others to succumb to these causes. Even if the healthy migrant bias is a factor in the Hispanic mortality advantage, it would probably not affect mortality at younger ages, but may instead diminish the likelihood of developing chronic diseases at older ages. So the healthy migrant bias may serve to increase additional life expectancy conditional on survival to age sixty-five, for example.

Palloni and Arias(2004) evaluated major explanations for the existence of the Hispanic mortality advantage. Of these, the idea of return migration received the most support. Data artifacts are thought by many to account for some but not all of the mortality

differential. The cultural explanation, or the idea that Hispanics as a group have healthier behaviors and therefore lower risk factors received considerable amount of attention by Palloni and Arias, but was not substantiated.

Prior studies of Hispanic mortality in general consider mortality from all causes combined, and have paid relatively little attention to morbidity. However leading explanations of the Hispanic mortality advantage result in different expectations about morbidity. For example, if one believes a data artifact is primarily responsible for the Hispanic mortality advantage, expectations about hospitalization rates would depend on beliefs about the comparative ability of hospital discharge data, as opposed to death certificate data, to record Hispanic ethnicity. In the calculation of both rates the denominator would be the same. If the healthy migrant bias is considered responsible for the Hispanic mortality advantage, we might expect hospitalization rates to be lower among Hispanics, as befits their superior health. If selective return migration is a factor, then the implications for hospitalization are a bit ambiguous. Out-migrants in ill health may in fact receive care in the United States before returning to their country of origin.

In New Jersey we observe a combination of age-specific mortality and hospitalization rates among Hispanics that is somewhat incongruous. The ratio of Hispanic to non-Hispanic White death rates in general decreases with age, while the ratio of Hispanic to non-Hispanic white hospitalization rates increases with age. As a result, the ratio of hospitalizations to deaths increases far more rapidly with age among Hispanics as compared with other groups. Figure 1 shows age adjusted death rates for all causes combined as well as the five leading causes of death for non-Hispanic Whites and Hispanics. As can be seen, Hispanic rates are significantly lower, with the exception of diabetes. Figure 2 shows age specific death rates for the population aged 45 years and over for heart disease, cancer, and diabetes. It can be seen that differences between groups increase with age, with the exception of diabetes. Figure 3 shows age specific mortality rates for unintentional injury. Again, it can be seen that differences between non-Hispanic whites and Hispanics increase after age sixty five. Figure 4 shows age specific hospitalization and mortality rates for unintentional injury. While mortality rates become lower relative to non-Hispanic whites, hospitalization rates among Hispanics are becoming relatively higher. Hospitalization rates for several diagnoses related to heart disease and diabetes are shown in Figure 5. It can be seen that hospitalization rates among Hispanics are far higher than are those for non-Hispanic whites, even though mortality rates are lower for heart disease and only somewhat higher for diabetes. This pattern becomes particularly evident at ages over sixty-five years.

These rates are calculated using death certificate data and hospital discharge data, respectively as numerators, and Census data as the denominator in both cases. Therefore the denominator is the same for both hospitalization and mortality rates. Differences in the age pattern of these rates then could be accounted for by differential reporting of Hispanic ethnicity on hospitalization data as compared with death certificate data. Alternatively, higher relative hospitalization rates among Hispanics may reflect poorer access to outpatient care or differential kinds of care-seeking behavior, which may result in more hospitalization but less likelihood of mortality. Another possibility is that the

disease process is different among Hispanics, making them more likely to be ill enough to require hospitalization, but also more likely to survive as compared with non-Hispanic whites. Finally, these differences may reflect selective return migration, in which Hispanics seek medical care in the United States, but then return to their countries of origin before dying. The fact that these patterns are observed for unintentional injuries as well as chronic conditions complicates matters, and makes the theory of differential disease processes less compelling. It also casts some doubt on return migration, unless Hispanics may be more likely to return to their home country after they have been injured. It is known that this does occur when younger Hispanic have catastrophic injuries resulting in ongoing needs for rehabilitation. They are often flown back to their country of origin due to lack of insurance coverage for continued care. However, this pattern is most noticeable among elderly Hispanics, most of whom receive Medicare.

Data and Methods

Several analytical strategies are employed to examine these patterns in hospitalization and mortality. To assess the potential of the data artifact explanation, we first look at reported ethnicity for hospitalized deaths, for which there is data on ethnicity from both the discharge record and the death certificate. This allows us to assess whether Hispanic ethnicity is more likely to be reported in hospital discharge data as compared with the death certificate. Death certificates in New Jersey indicate the location of death, and if it is indicated that the death occurred in a hospital, it is then possible to match discharge records with death certificate data using name, date of death and date of birth. Social Security numbers are included on death certificates but not hospital discharge records in New Jersey.

To assess potential differences in care-seeking behavior resulting from access to care or insurance coverage we can employ some initial descriptive approaches. One would be to control for insurance coverage by limiting the comparison to those aged sixty-five and over, the majority of whom are enrolled in Medicare. While Hispanics are less likely to be covered by Medicare as compared with non-Hispanic whites, the difference in coverage is unlikely to be sufficient to account for the magnitude of the differences in hospitalization rates. We can also control for insurance coverage in the multivariate analysis, as well as in descriptive tables. By examining the types and numbers of procedures, length of stay, and other features of the admission, we may be able to draw some conclusions about whether hospitalizations among Hispanics are as a group, less severe than those of non-Hispanic whites. Additionally, to capture ethnic differences in out of state hospitalization patterns, we can include discharge data for New Jersey residents hospitalized in New York and Pennsylvania, in order to see whether ethnic differences in hospitalization rates decline. This however, would not affect mortality differences, as out of state deaths of New Jersey residents would still receive New Jersey death certificates.

For the main analysis, we employ a proportional hazard model to assess survival and rehospitalization patterns among Hispanics and non-Hispanic whites who are hospitalized with selected diagnoses. We limit our analysis to those aged sixty-five and over

hospitalized during 2003. We selected non-Hispanic Whites and Hispanics hospitalized with AMI, congestive heart failure, stroke, hip fracture, pneumonia, and complications from diabetes. These are hospitalizations with relatively high probabilities of mortality within six months, although this is less so for the diabetes-related hospitalizations. However, diabetes is a major cause of death, particularly for Hispanics. Separate models are estimated for the separate diagnoses, and include demographic and clinical characteristics of patients, as well as hospital characteristics. These cohorts are followed for twelve months after discharge, and the probability of rehospitalization and/or mortality are estimated.

Preliminary Results

Preliminary results from these analyses suggest that the differences are unlikely to result of a data artifact. As expected, Hispanic ethnicity is reported more completely on death certificates than on hospital discharge data, consistent with prior knowledge of the relatively poor completeness of race and ethnicity information on New Jersey hospital discharge data. This implies that the differences in hospitalization rates between Hispanics and Non-Hispanic Whites are in fact understated, and that hospitalization rates among Hispanics are downwardly biased relative to mortality rates. While mortality rates are doubtlessly downwardly biased as well, due to some under-reporting of Hispanic ethnicity on death certificates, it appears that this is even more likely to be true with hospitalization data.

Preliminary descriptive analysis suggests that differences in insurance coverage do not appreciably alter the observed differences between older Hispanics and Non-Hispanic whites, since close to ninety-five percent of Hispanics aged 65 years and older are enrolled in Medicare, only several percentage points lower than non-Hispanic Whites of the same age. Finally, the inclusion of discharges from New York and Pennsylvania, while they do reduce the differences somewhat, do not entirely account for them by any means. A preliminary comparison of the characteristics of the hospitalizations of non-Hispanic Whites and Hispanics suggests that Hispanic hospitalizations have somewhat shorter lengths of stay, and have somewhat fewer reported co-morbidities, although this is more true for heart disease than for injury or diabetes admissions.

Finally the results of the proportional hazard model (preliminary) is consistent with our expectations given the descriptive results. Hispanics are more likely than are non-Hispanic whites to be re-hospitalized for diabetes related conditions, but are less likely to die within twelve months of the index hospitalization. In the case of AMI, congestive heart failure, and hip fracture, Hispanics are only slightly more likely to be rehospitalized within twelve months, but are also significantly less likely than are non-Hispanic whites to die during the period. The addition of clinical and hospital characterizations has little effect on this basic result. There are some interesting differences among sub-groups. For example, Cubans are not significantly less likely to die within twelve months of their hospitalization, as compared with non-Hispanic whites.

Conclusion

Overall, these results are consistent with either some difference in care-seeking behavior between Hispanics and non-Hispanic whites, or selective return migration. The difference in care-seeking behavior does not appear to be related to health coverage, as the vast majority of all patients were Medicare recipients. It may be the case that there is a difference in access and/or use of outpatient care independent of coverage, or a difference in patient behavior and disease management that results in increased hospitalization among Hispanics relative to both non-Hispanic Whites and to Hispanic mortality. However, the fact that this pattern is also observed for hip fracture creates a difficulty with that interpretation, as this injury is less sensitive to outpatient care or patient behavior, although it is related to various co-morbidities as well as bone density. It is also worth noting that patients that were treated at the emergency department and released are not included in the study, therefore excluding a major category of access-related care-seeking behavior. The possibility of some unmeasured clinical differences cannot be ruled out with this study, and receives some support from the finding that length of stay is shorter among Hispanics and the prevalence of co-morbidities is lower among Hispanics, but more work can be done on this issue.

In a very preliminary way, it can be argued that these results are consistent with the theory of selective out-migration, suggesting that Hispanics in poor health are disproportionately likely to return to their country of origin, but may first seek medical treatment in U.S. hospitals. When looking at specific Hispanic subgroups, we might expect to find certain patterns which are consistent with that theory. For example, Cubans are relatively unlikely to return to Cuba, so if selective migration is the underlying process explaining these patterns in hospitalization and death rates, we would expect Puerto Ricans and Mexicans to have lower probabilities of mortality compared with Cubans and perhaps South Americans, whose countries of origin are less accessible. It is the case that Cubans are not less likely to die within twelve months of discharge, as compared with non-Hispanic whites, but this difference is not significant for South Americans.