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Identifying Patient Readmissions: Are Our Data Sources Misleading?

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Abstract

Background: The accuracy of data is vital to identifying hospitalization outcomes for clinical trials. Patient attrition and recall bias affects the validity of patient reported outcomes, and the growing prevalence of Medicare Advantage (MA) could mean Fee-for-Service (FFS) claims are less reliable for ascertaining hospital utilization. Statewide health information exchanges (HIEs) may be a more complete data source but have not been frequently used for research.

Design: Secondary analysis comparing identification of readmissions using three different acquisition approaches.

Setting: Randomized controlled trial of heart failure (HF) disease management in 37 skilled nursing facilities (SNFs).

Participants: Patients with HF discharged from the hospital to SNF.

Measures: Readmissions up to 60 days post-SNF admission collected by patient self-report, recorded by nursing home (NH) staff during the SNF stay, or recorded in the state HIE.

Results: Among 657 participants, (mean age 79±10, 49% with FFS), 295 unique readmissions within 60 days of SNF admission were identified. These readmissions occurred among 221 patients. Twenty percent of all readmissions were found using only patient self-report, 28% were

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only recorded by NH staff during the SNF stay and 52% were identified only using the HIE. The readmission rate (first readmission only) based only on patient self-report and direct observation was 18% rather than 34% with the addition of the enhanced HIE method.

Conclusions and Implications: More than one-quarter (34%) of HF patients were rehospitalized within 60 days post-SNF admission. Use of a statewide HIE resulted in identifying an additional 153 admissions, 52% of all the readmissions seen in this study. Without use of a HIE, nearly half of readmissions would have been missed due to incomplete patient self-report or loss to follow-up. Thus, HIEs serve as an important resource for researchers to ensure accurate outcomes data.

Brief Summary:

Statewide health information exchanges (HIEs) may be an additional useful data source to improve accuracy of identifying outcomes. Use of a statewide HIE identified an additional 153 admissions, 52% of all readmissions in this study.

Keywords

Health information exchange; Patient self-report; Readmissions; Heart failure; Skilled nursing facilities

Introduction

Research studies rely heavily on patient self-report, medical records review and/or administrative data for outcomes data.[1,2] However, these methods present their own challenges in terms of accuracy and completeness. Reliance on patient self-report runs the risk of attrition and recall bias. Medical records review can result in variation in data acquisition and quality and are time-consuming. Administrative data such as Medicare claims data provide accuracy in terms of outcomes data for Fee-for-Service (FFS) Medicare beneficiaries, but fail to report outcomes data for Medicare Advantage (MA) beneficiaries who comprise 33% of the Medicare population.[3] Medicare claims data are also only available to researchers on a quarterly basis.[4]

State Health Information Exchanges (HIEs) present a novel opportunity to ascertain health care utilization. Statewide HIEs were funded under the Health Information Technology for Economic and Clinical Health (HITECH) Act as part of the American Reinvestment and Recovery Act (ARRA) of 2009.[5,6] Under the HITECH Act, 56 states and territories submitted for funding of HIEs.[7] Funding under the HITECH Act lasted four years and during that time there was a substantial increase in the number of hospitals and providers who participated within the HIEs.[7] HIEs offer the potential advantage of capturing utilization by patients regardless of payer source but their utility in traditional research studies is rarely discussed.[8] In this manuscript we describe the relative value of a HIE compared to self-report and readmissions recorded by nursing home (NH) staff during a skilled nursing facility (SNF) stay for ascertaining outcomes data in a randomized, controlled trial.

Methods

The SNF Connect Trial

The SNF Connect trial was a randomized controlled trial of heart failure (HF) disease management vs. usual care (UC) in 37 SNFs from July 2014-September 2017 in Colorado (final results not yet available).[9] Upon enrollment into the trial, patients were either randomized to UC or a HF disease management program (HF-DMP) intervention.[9] Patients had to have a history of HF and qualify for SNF admission either under the Medicare skilled benefit or receiving skilled rehabilitation via another form of payment (e.g. as private pay or other private insurance coverage). Patients were excluded if they originated from long-term care or if they had a life-threatening condition that predicted mortality in ≤ 6 months such as metastatic cancer, inoperable valvular disease or end-stage renal disease with dialysis. The primary outcome was a composite endpoint of death, emergency department visit and readmission 60 days post-SNF admission. The trial was approved by the Institutional Review Board. Of 671 individuals with HF who enrolled in the SNF Connect trial, 14 participants withdrew, resulting in a sample size of 657 for this analysis.

Methodology for Collection of Readmission Outcomes at 60 Days Post-SNF Admission

Patient Self-Report or Readmission Recorded by NH Staff During the SNF Stay—During the SNF stay, all readmissions recorded by NH staff were then documented by study staff, regardless of intervention group. Patients were also contacted by phone at 60 days post-SNF admission to gather post-SNF discharge outcomes. Three attempts were made by study staff to complete the 60-day phone call within 15 days. Upon contacting the patient, study staff asked the patients if they had been back to the hospital since discharge from the SNF. If yes, patients were asked where, when and for how long they were at the hospital. Using the patient's self-report, study staff then faxed the hospital(s) for the complete medical record for each readmission for the clinical endpoints committee adjudication.

Insurance Type—Type of insurance was collected during the study period and classified into Medicare FFS versus Medicare Advantage (MA) or private insurance/other coverage. This allowed us to estimate hospitalizations if the FFS claims database were used in the analysis.

Statewide HIE—The statewide HIE in this study provides access to both hospitalization dates and hospital notes. Data in the HIE include hospitalization records, labs, pathology and radiology reports for over 80 providers including 69 regional hospitals. The HIE includes data on all patients who receive care from a participating provider regardless of payer source. Patients may elect to opt out of having their data shared on the HIE. Following each 60-day phone call, study staff used the HIE database to look for all readmissions that occurred during the 60-day timeframe that were not self-reported by the patient or recorded by NH staff during their SNF stay. Readmissions found using the HIE were then compared to the standard method of patient self-report and/or recorded by NH staff to determine if and how many readmissions were underreported.

Results

Of 657 participants, the mean age was 79 (±10) years, 59% were women, 94% were Caucasian, and 5% Hispanic. The average length of stay in the SNF was 16 (±11) days. Insurance coverage was split with 49% FFS, 49% MA plans and 2% other coverage (e.g. private pay). Sixty-two percent of participants overall (n=405) completed their 60-day phone call with study staff.

In total, there were 295 readmissions among 221 (34%) patients within 60 days post-SNF admission. Sixty patients were admitted more than once. Twenty percent of i all readmissions were found using only patient self-report, 28% were only recorded by NH staff during the SNF stay and 52% were identified only using the HIE.

The total readmission rate (first readmission only) was 7% using patient self-report only, 11% recorded by NH staff during the SNF stay only and 15% using the HIE only (see Figure 1). Therefore, with the inclusion of the use of the HIE, the total 60 day readmission rate (first readmission only) increased to 34% as opposed to 18% if only I rates from self-report and recorded by NH staff during the SNF stay were used.

Regardless of readmission source, 95% of all readmissions were confirmed by study staff using the HIE following the 60-day phone call. Readmissions that were not found using the HIE (2% self-reported and 3% of those that were recorded by NH staff during the SNF stay) were likely because the patient opted out of participating in the HIE or the hospital was not part of the HIE.

In this sample, patients with FFS accounted for 53% of readmissions while those ; with MA or other insurance accounted for 47%. Because 51 % of patients were enrolled in a MA plan or had other insurance coverage, their readmissions would not have been I known if the trial had relied on the use of Medicare FFS claims data only.

Discussion

This research supports the use of HIEs to provide valuable information that may be unobtainable with standard methods such as patient-self report or recorded by NH staff. Researchers who rely on patient self-report and/or Medicare FFS claims data may have a false sense of effect size and outcomes. Readmissions were consistently underreported by patients in this trial. Without the use of the HIE, the rates of readmission for the SNF Connect clinical trial would have been underestimated and may have had the potential to skew the results of the study. The federal funding and expansion of HIEs under the State Health Information Exchange (HIE) Cooperative Agreement Program of 2009 affords researchers the opportunity to improve the accuracy of readmission data.

Relying solely on patient-self report of readmissions in the beginning of the trial was labor intensive and required multiple phone calls to reach patients. Many patients were unable to provide specific dates of readmissions and often reported being unsure how many times they had been readmitted. The use of the HIE allowed us to use patients' estimates of dates of readmissions to find the exact dates as well as to find readmissions not self-reported.

Outcomes data can be underreported for a number of reasons including age and cognitive abilities.[10–13] Patients who are older tend to have more difficulty recalling outcomes and may have higher rates of attrition compared to younger cohorts.[10–12] Individuals recruited for the SNF Connect trial tended to be older and therefore it is possible that their recollection of previous readmissions was harder to obtain compared to a younger population.

It is plausible that the 60-day time period lent itself to the underreporting of readmissions because the timeframe was too long for patients to recall; thus leading them to "telescoping" in which they shortened the length of time they were reporting on.[2] Recommendations to reduce issues of telescoping include performing a sensitivity analysis that inflates the number of self-reported outcomes to account for over- and under-reporting, reduce the length of recall time periods, and stratify recall time periods based on the type of population being studied (e.g. individuals expected to have a number of events should have a shorter recall time period compared to individuals expected to have fewer events).[14,15] Regardless of the timeframe, patients with HF tend to experience a number of readmissions from SNFs – termed "the revolving door".[16] Therefore, their higher rates of events may have lent itself to the underreporting of readmissions.

Obtaining data solely from the Medicare FFS claims database would have also proven insufficient for accounting for the number of readmissions of patients with MA. While the data provided are extensive and highly reliable, there are limitations to the use of such data. One key limitation is that the Medicare claims database currently only provides data from traditional FFS beneficiaries and not those Medicare beneficiaries receiving their benefits from private managed MA plans. Over the years, there has been a consistent increase in the number of individuals enrolling in MA plans. In 2017, 33% of all Medicare beneficiaries were enrolled in Medicare managed care plans – up from 13% in 2004.[3] In a recent announcement, the Centers for Medicare and Medicaid Services (CMS) will start providing researchers with MA data as well as other payer source data starting with the release of data from 2015.[17] However, until this release of information catches up to current data claims and with Medicare FFS claims data missing over 33% of Medicare beneficiaries, it is difficult to justify relying on Medicare claims data as the sole source for health care utilization research.

The use of the HIE for finding unreported readmissions for the SNF Connect trial proved invaluable. However, there were a number of limitations that should be reported in this research. The HIE database, as are other medical records databases, is not a complete dataset.[18] Not all hospitals in the Denver metropolitan area are contracted with the HIE; however, this number was quite low. Additionally, any out of state readmissions are also not included. Therefore, it is possible that more readmissions were not identified (unless they were self-reported by the patient). It is important when researchers use a HIE that they understand the availability of the data within it to ensure that their results are accurate. Lastly, 5% of the readmissions were not listed in the HIE due to patients and/or the hospitals not participating with the HIE; therefore study staff were unable to obtain the medical records from the HIE for adjudication.

This analysis focused on describing the methodology and data sources used to identify the rates of readmissions for HF patients in SNFs rather than reasons for readmissions or any confounding variables; this analysis will be presented in a future manuscript.

Conclusions and Implications

The method for acquiring outcomes data for patients receiving SNF care is important to obtain reliable results. Both attrition and poor patient self-report can underestimate readmission rates. Similarly, the use of Medicare claims data currently only provides outcomes data for FFS beneficiaries. This research demonstrates the importance of using state-based all-payers data because it improves upon patient self-report of readmissions.

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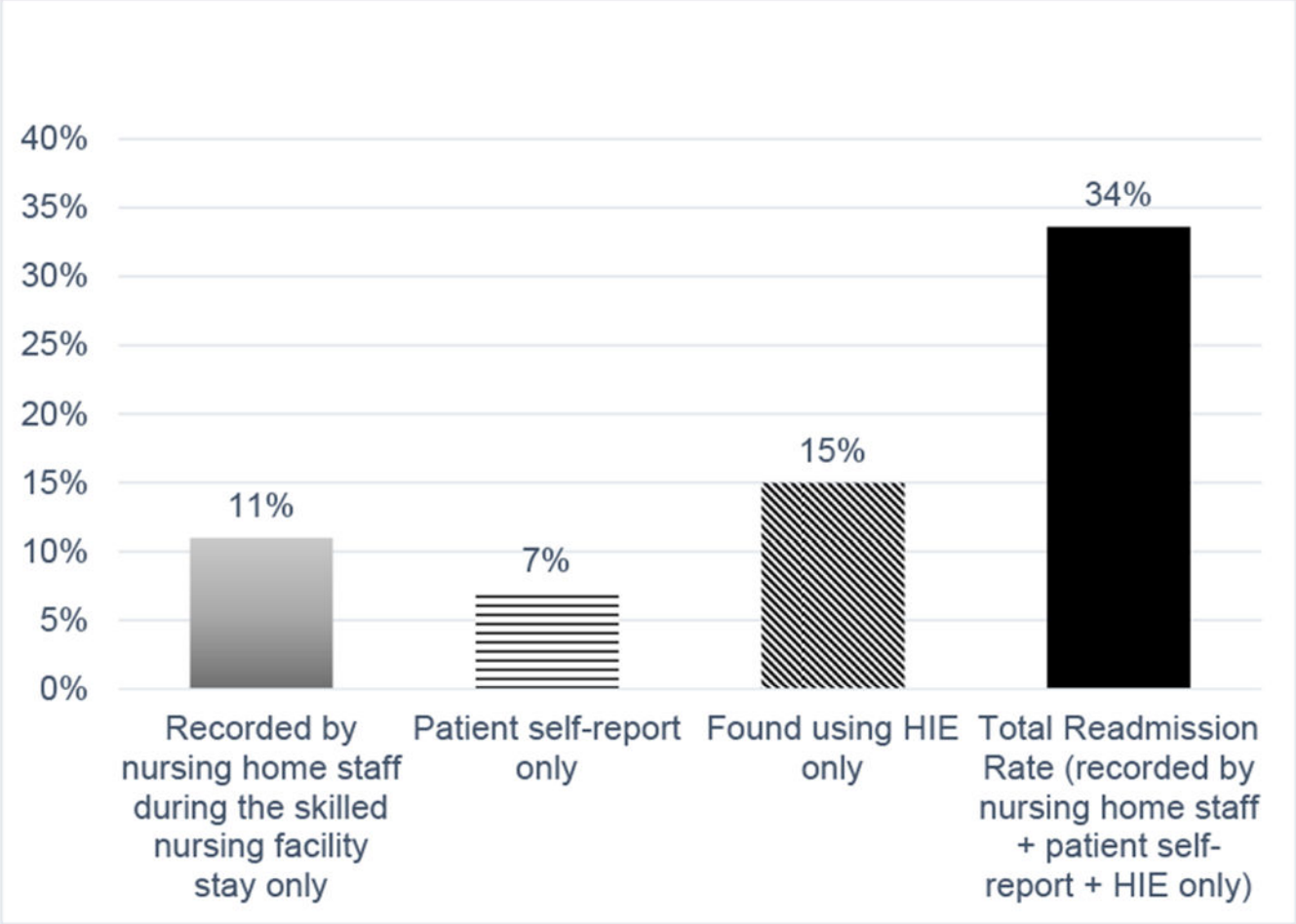

Figure 1.

Figure 1 shows the readmission rates by three different acquisition sources (recorded by nursing home staff during the skilled nursing facility stay only, patient self-report only and found using the HIE only) and the total readmission rate of all three sources combined during a 60 day period.