Hospital readmission performance and patterns of readmission: retrospective cohort study of Medicare admissions

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EDITORIAL by Drozda Jr
RESEARCH, p 12

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STUDY QUESTION

Do high performing hospitals with low 30 day readmission rates have a unique spectrum of readmissions with regard to diagnoses and timing compared with lower performing hospitals with higher rates of readmission?

SUMMARY ANSWER

Hospitals with different 30 day readmission rates had a similar spectrum of readmissions with regard to their diagnoses and timing. High performing hospitals had a lower absolute number of readmissions while maintaining a similar pattern of readmission diagnoses and timing as lower performing institutions.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Rates of readmission after hospital admission for heart failure, acute myocardial infarction, and pneumonia vary greatly across hospitals. Study findings suggest that hospitals could best reduce readmissions with strategies that lower readmission risk globally rather than for specific diagnoses or time periods after admission.

Participants and setting

Medicare beneficiaries in the United States aged 65 and older who were readmitted for any cause to a short term acute care hospital within 30 days after an index admission for heart failure, acute myocardial infarction, or pneumonia in 2007-09.

Design, size, and duration

Retrospective cohort study of Medicare readmissions. Readmission diagnoses were classified with a modified version of the condition categories from the Centers for Medicare and Medicaid Services, and timing of readmission was classified by day after hospital discharge. We used public reporting methods of the US federal government to calculate hospital 30 day risk standardized readmission rates over the three years of study and categorized hospitals using bootstrap analysis as having high, average, or low readmission performance for each index condition. The main outcome was readmission diagnoses and timing among hospitals with high, average, and low 30 day readmission performance.

Main results and the role of chance

In the 30 days after the index admission, we identified 320 003 readmissions after 1 291 211 admissions for heart failure (4041 hospitals), 102 536 readmissions after 517 827 admissions for acute myocardial infarction (2378 hospitals), and 208 438 readmissions after 1 135 932 admissions for pneumonia (4283 hospitals). The distribution of readmissions by diagnosis was similar across hospital performance categories for all three conditions. High performing hospitals had fewer readmissions for all common diagnoses. Median time to readmission was similar by performance for heart failure and acute myocardial infarction, though it was 1.4 days longer among high versus low performing hospitals for pneumonia (P<0.001). Findings were unchanged after adjustment for other hospital characteristics potentially associated with readmission patterns.

Bias, confounding, and other reasons for caution

We relied on claims data to assign diagnoses to admissions. We restricted analyses to hospitals with more than 25 admissions and at least one readmission within 30 days during the three year study period.

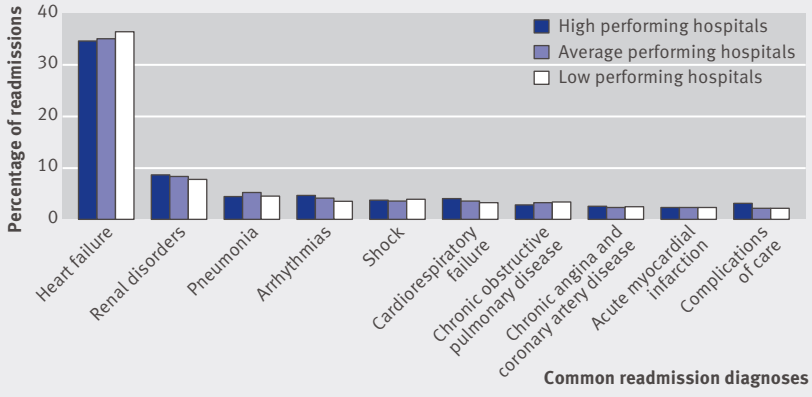
Generalizability to other populations

Findings should be generalizable to other hospitals as we looked at readmissions at more than 4000 hospitals caring for older patients. The study shows consistent findings across the most common cardiopulmonary conditions resulting in admissions among older people. Data, however, were derived from the US only; findings have not been replicated in international settings.

Study funding/potential competing interests

This study was funded by grant 1U01HL105270-03 from the National Heart, Lung, and Blood Institute (NHLBI). ZL, JSR, LIH, NK, LGS, SMB, EED, and HMK work under contract with the Centers for Medicare and Medicaid Services (CMS) in the United States to develop and maintain performance measures. Neither the NHLBI nor CMS had a role in the design or conduct of the study, in the analysis and interpretation of the data, or in the preparation or approval of the manuscript.

Readmission diagnoses by hospital performance group after admission for heart failure



Causes and patterns of readmissions in patients with common comorbidities: retrospective cohort study

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EDITORIAL by Drozda Jr
RESEARCH, p 11

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STUDY QUESTION

What are the most frequent primary diagnoses of potentially avoidable 30 day readmissions in US medical patients with each of the most common comorbidities

SUMMARY ANSWER

The five most common primary diagnoses of potentially avoidable readmissions to an academic tertiary medical centre in the United States were possible complications of each underlying comorbidity; in many cases, these primary diagnoses were not related to those of the previous hospital admission.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Evidence shows that readmission diagnoses usually differ from the specific acute diagnosis responsible for the previous hospital admission. The most frequent causes of potentially avoidable readmissions in this cohort were possible complications of an underlying comorbidity.

Participants and setting

We analysed all consecutive discharged patients from any medical service of an academic tertiary medical centre in Boston, Massachusetts.

Design, size, and duration

This was a retrospective cohort study in which we analysed 10 731 hospital admissions between 1 July 2009 and 30 June 2010. The main outcome was the primary readmission diagnoses of readmissions within 30 days of discharge and potentially avoidable 30 day readmissions. Patients had one or more of the most common comorbidities, including diabetes, chronic heart failure, atrial fibrillation, ischaemic heart disease, neoplasm, chronic obstructive pulmonary disease, and chronic kidney disease.

Main results and the role of chance

Overall, the most likely primary diagnoses of potentially avoidable 30 day readmissions were infections (12%; n=99), neoplasm (8%; n=72), and heart failure (7%; n=61). Patients discharged with a comorbidity of neoplasm were most frequently readmitted for care of their neoplasm (16%; n=72) or possibly related complications such as infection (13%; n=57), metabolic disorder (4%; n=19), gastrointestinal disorder (4%; n=17), or renal failure (3%; n=12). We found similar relations between readmission diagnoses and comorbidities for patients with diabetes, cardiac comorbidities, chronic obstructive pulmonary disease, and chronic kidney disease. Patients with any of the cardiac comorbidities shared the same most frequent causes of readmission: heart failure (14-26%), ischaemic heart disease (3-8%) and renal failure (3%). Chronic comorbidities of neoplasm, chronic heart failure, and chronic kidney disease were significantly associated with a higher risk of potentially avoidable 30 day readmission, with a relative risk of 1.83, 1.23, and 1.26, respectively. When readmitted, patients with chronic kidney disease had a significantly higher risk of the readmission being potentially avoidable than unavoidable (relative risk 1.18, 95% confidence interval 1.00 to 1.40).

Bias, confounding, and other reasons for caution

The results depend in part on the validity of the algorithm used to determine potentially avoidable readmissions.

Generalisability to other populations

These findings are from a single centre study in a tertiary care hospital and might not be generalisable to other types of hospital such as community hospitals.

Study funding/potential competing interests

JD was supported by the Swiss National Science Foundation and the Swiss Foundation for Medical-Biological Scholarships. JLS is a consultant to QuantiaMD, for whom he has helped to create online educational materials for both providers and patients regarding patient safety during transitions in care (the findings of this study are not a part of those materials), and has received grant funding from Sanofi Aventis for an investigator initiated study to design and evaluate an intensive discharge and follow-up intervention in patients with diabetes.

Most frequent primary diagnoses of potentially avoidable 30 day readmissions for common chronic comorbidities

	Five most likely primary readmission diagnoses		
Comorbidity	First	Second	Third
Neoplasm (n=441)	Neoplasm (72; 16%)	Infection (57; 13%)	Metabolic disorder (19; 4%)
Diabetes mellitus (n=236)	Heart failure (30; 13%)	Infection (21; 9%)	Neoplasm (15; 6%)
Chronic heart failure (n=207)	Heart failure (54; 26%)	Infection (17; 8%)	Ischemic heart disease (16; 8%)
COPD (n=86)	Infection (14; 16%)	Heart failure (14; 16%)	Neoplasm (8; 9%)
Chronic kidney disease (n=184)	Heart failure (38; 21%)	Infection (15; 8%)	Renal failure (13; 7%)
Entire cohort (n=854)	Infection (99; 12%)	Neoplasm (72; 8%)	Heart failure (61; 7%)

COPD=chronic obstructive pulmonary disease.

Primary hip replacement prostheses and their evidence base: systematic review of literature

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STUDY QUESTION

To what extent are prostheses with no readily available evidence to support their use being implanted in primary total hip arthroplasty?

SUMMARY ANSWER

A quarter of prostheses available to orthopaedic surgeons in England and Wales have no readily available evidence of clinical effectiveness to support their use.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

The high failure rate of some metal-on-metal hip replacements has highlighted the need for an adequate evidence base for orthopaedic implants. A considerable number of prostheses available to the surgeon for use in primary total hip arthroplasty in the UK have no available evidence of clinical effectiveness to support their use.

Selection criteria for studies

We analysed prostheses used in primary total hip arthroplasty as published in the 9th annual report of the National Joint Registry of England and Wales. We searched PubMed, Cochrane, Embase, OVID, and Google databases to look for peer reviewed papers of any evidence level relating to prostheses that had been identified by the NHS Orthopaedic Data Evaluation Panel as pre-entry or unclassified. We did not search for custom, revision, or discontinued prostheses. We excluded literature yielded by the search if it reported animal, non-orthopaedic, non-total hip arthroplasty, or non-device related studies.

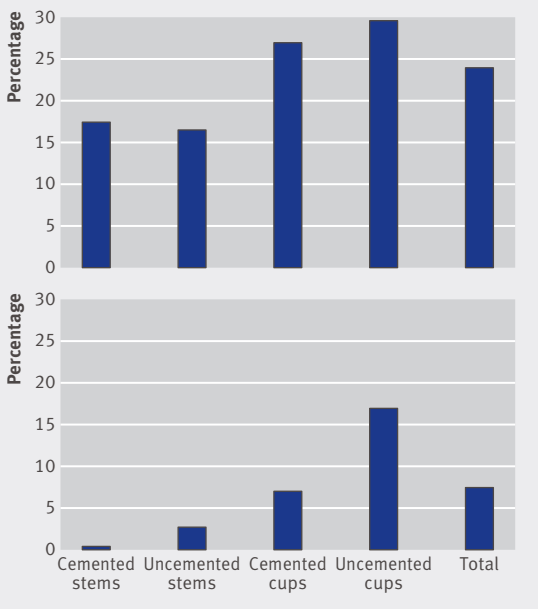
Primary outcome(s)

The main outcome was all levels of evidence showing clinical effectiveness for the primary total hip arthroplasty device in question.

Main results and role of chance

This systematic review found that 24% (57/235) of all hip replacement implants available to surgeons in the United Kingdom have no evidence for their clinical effectiveness. Furthermore, 10 617 (7.8%) of 136 593 components used in primary hip replacements in the United Kingdom in 2011 were implanted without readily identifiable evidence of clinical effectiveness. These comprised 157 cemented stems (0.5% of those implanted), 936 (2.8%) uncemented stems, 1732 (7.1%) cemented cups, and 7577 (17.1%) uncemented cups.

Percentage of available prosthesis brands (top) and prostheses implanted (bottom) with no evidence of clinical effectiveness in 2011



Bias, confounding, and other reasons for caution

A major limitation to our study relates to the requirement that a prosthesis be specifically named in a publication to meet our inclusion criteria. Relevant published evidence may therefore not have been identified. Evidence for some early phase implants will not have been detected if they are part of ongoing prospective cohort studies or randomised control trials that have yet to report.

Study funding/potential competing interests

Support was received from the NIHR Musculoskeletal Biomedical Research Unit, University of Oxford to provide staff, resources, and consumables.

Effect of socioeconomic disparities on incidence of dementia among biracial older adults: prospective study

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STUDY QUESTION

Do differences in rates of dementia exist between black and white older people, and can any differences be explained by socioeconomic factors?

SUMMARY ANSWER

Among a group of community dwelling older people living in the United States, black people had higher rates of dementia than white people; after control for differences in risk factors, particularly socioeconomic status, differences in dementia rates were no longer statistically significant.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Black older people have a higher incidence of Alzheimer's disease and other dementias than do white older people, but the reason for this difference is unclear. Differences in participants' characteristics, in particular socioeconomic status, may contribute to disparities in the incidence of dementia among black and white older adults.

Participants and setting

We studied 2457 community dwelling older people (mean age 73.6 years; 1019 (41.5%) black; 1233 (50.2%) women) from two clinic sites in the United States (Pittsburgh, PA, and Memphis, TN).

Design, size, and duration

As part of a prospective study, incidence of dementia was determined over 12 years (ending January 2011) by examining prescribed dementia drugs, hospital records, and decline in global cognitive scores. Information on demographic, health, lifestyle, and socioeconomic factors was obtained through clinic visits and self report. We studied the influence of these factors on rates of dementia with a series of Cox proportional hazard models in which these variables were added sequentially in covariate blocks.

Main results and the role of chance

After 12 years of follow-up, 449 (18.3%) participants developed dementia. Black participants were more likely to develop dementia (20.7% *v* 16.6%, P<0.001; unadjusted hazard ratio 1.44, 95% confidence interval 1.20 to 1.74) and had a greater burden of risk factors than white participants. Black participants continued to have a greater risk of dementia after adjustment for demographics, apoliporotein E e4 status, comorbidities, and lifestyle factors (1.37, 1.12 to 1.67). When we adjusted for socioeconomic status, differences in dementia rates were greatly reduced and no longer statistically significant (1.09, 0.87 to 1.37).

Bias, confounding, and other reasons for caution

Our diagnosis of dementia was not based on a formal clinical evaluation, so some participants may have been misclassified. We were also not able to account for severity or duration of disease, and we did not have information on early life adversity.

Generalisability to other populations

We think these results are generalisable to other community dwelling older people.

Study funding/potential competing interests

This study was supported in part by the National Institute on Aging, the Intramural Research Program of the NIH, and a grant from the American Health Assistance Foundation. KY has served on data safety monitoring boards for Takeda, the NIH, Pfizer, and Medivation and served as a consultant for Novartis.

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- Research: Perceived job insecurity as a risk factor for incident coronary heart disease: systematic review and meta-analysis (*BMJ* 2013;347:f4746)
- News: Health professions pledge action against socioeconomic factors responsible for health inequalities (*BMJ* 2013;346:f1814)
- News: Key risks to children's health are socioeconomic, says global health report (*BMJ* 2013;346:f1001)
- Research: Contribution of modifiable risk factors to social inequalities in type 2 diabetes: prospective Whitehall II cohort study (*BMJ* 2012;345:e5452)
- Research: Health, employment, and economic change, 1973-2009: repeated cross sectional study (*BMJ* 2012;344:e2316)

Cox proportional hazard ratios for time to dementia by race* (n=2457)

Model	Cox proportional hazard ratio (95% CI)
Unadjusted	1.44 (1.20 to 1.74)
Model 1: Demographics and apolipoprotein E e4 status	1.36 (1.12 to 1.64)
Model 2: Demographics, apolipoprotein E e4, and comorbidities	1.38 (1.14 to 1.67)
Model 3: Demographics, apolipoprotein E e4, comorbidities, and lifestyle	1.37 (1.12 to 1.67)
Model 4: Demographics, apolipoprotein E e4, comorbidities, lifestyle, and socioeconomic measures	1.09 (0.87 to 1.37)

*White as reference.