

Original Article

The Completeness of Medical Records to Assess Quality of Hospital Care: The Case of Acute Myocardial Infarction in a District-level General Hospital in Iran

Saeid Shahraz MD¹, Amjad Barzanjeh MD², Asmar Bahari MD², Yaqob Nadery MSc², Farshad Farzadfar MD PhD³, Mohammad Reza Beyranvand MD⁴, William B. Stason MD¹

Abstract

Background: Quantifying the quality of care in high-cost and fatal conditions such as acute myocardial infarction (AMI) is a crucial step toward improving clinical outcomes in these patients. The main objective of this pilot study is to show whether abstraction of medical charts would be a useful method to systematically assess quality of care in patients hospitalized for AMI in a general hospital that has no interventional cardiac technology.

Methods: A general physician and a cardiologist working with Shahid Gholipour Hospital in Bukan, Northwest Iran, retrospectively abstracted medical records of all patients with verified diagnoses of myocardial infarction who were hospitalized between April 1, 2010 and March 31, 2011. The targeted outcome variables were risk-adjusted mortality and risk-adjusted length of hospital stay. Process quality indicators were selected from those developed by the National Quality Forum (NQF) of the United States. We reported completeness of selected variables used to build and calculate quality indicators in this study.

Results: For most variables, missing values were negligible. However, missing data on fields related to contraindications for prescribed medications were common.

Conclusions: Medical chart abstractions provide useful first steps in assessing differences in the quality of hospital care for patients with AMI. Extension of our pilot study is highly recommended and may help trigger policy decisions to promote hospital quality in Iran.

Keywords: Hospital records, Iran, myocardial infarction, quality of healthcare

Cite the article as: Shahraz S, Barzanjeh A, Bahari A, Nadery Y, Farzadfar F, Beyranvand MR, Stason WB. The Completeness of Medical Records to Assess Quality of Hospital Care: The Case of Acute Myocardial Infarction in a District-level General Hospital in Iran. *Arch Iran Med.* 2012; **15(10)**: 592 – 595.

Introduction

It has been shown that clinical cardiac care is the salient determinant, even more important than controlling risk factors, in saving lives following acute myocardial infarction (AMI).¹ Despite this proven role the clinical care for patients with AMI is suboptimal even in European countries.² Extensive research has shown that even in developed countries the gap between quality of care and what we know about the best possible delivery of care is tremendous.³ To address this massive healthcare problem systematized efforts have been accelerated in the last two decades.⁴ For example, the recent healthcare reform in the United States focuses on quality of care as a means of promoting the health of the population and reducing the cost of care. The reform consists of several parallel and interrelated actions to restructure the healthcare system in the United States. These actions aim to coordinate the care of patients across different care settings and over time. In doing so, the role of representative healthcare data is undeniable. Inpatient-based information is one of the varieties of healthcare information that help make informed policy decisions

for patients treated for a variety of life-threatening diseases and injuries. Unfortunately such information is either lacking or not accessible in most developing countries. In Iran, systematized inpatient-based data (medical charts/abstracts, hospital discharge data, or insurance claims) have not been published as government reports or research papers. This is unfortunate because such invaluable information assist policymakers at any level of policy decision to monitor the burden of uncountable number of important medical conditions, compare the quality of care by looking at differential outcomes of care (e.g. mortality), and importantly, the cost of care. Such inputs guide policymakers through better decisions to promote healthcare delivery in settings that are sub-optimal or at an average level of health care.⁵

The main objective of this pilot study was to show the quality of medical records for AMI as an example of a high-cost, fatal condition in a district-level general hospital in Iran. We were particularly interested in aspects of care directly related to hospital quality. In order to improve the quality of medical records in Iran, we aimed to address the quality gaps in medical records and call attention to the need for improvement.

Materials and Methods

Settings

We collected the data from Shahid Gholipour Hospital located in downtown Bukan. The town is one of the districts (shahrestan in Persian) of the West Azarbaijan Province in northwestern Iran.

Authors' affiliations: ¹Heller School of Social Policy and Management, Brandeis University, Waltham, MA, USA. ²Shahid Gholipour Hospital, Bukan, Iran. ³Tehran University of Medical Sciences, Tehran, Iran. ⁴Loghman Hakim Hospital, Tehran, Iran.

Corresponding author and reprints: Saeid Shahraz MD, Heller School of Social Policy and Management, Brandeis University, 415 South Street, Waltham, MA 02453, United States. Tel: +1-617-417-4927 E-mail: shahraz@brandeis.edu

Accepted for publication: 18 April 2012

Most of the 230,000 population of the town are Kurds. The hospital, established in 2000, has five general and three subspecialty wards with a total of 140 beds. The Emergency Department (ED) admits about 400 patients per day and is the only accessible center for patients with acute cardiovascular events. The nearest comparable hospital is 60 kilometers away. The hospital launched a coronary care unit (CCU) in 2002, which has four beds and accommodates most patients with suspected acute coronary syndrome (ACS), severe congestive heart failure (pulmonary edema and cardiogenic shock), and acute pericarditis. The hospital lacks a cardiac surgeon and, therefore, emergency interventions such as Coronary Artery Bypass Surgery (CABG) and Percutaneous Transluminal Coronary Angioplasty (PTCA) are not performed. If patients need any of these interventions, they are transferred to hospitals in Urmia on an emergent or outpatient basis.

Abstraction of medical records

Two physicians from our team retrospectively abstracted all medical records of patients with the discharge diagnosis of AMI during a one year period from April 1st 2010 to March 31, 2011. A total of 100 medical records were abstracted. The data fields (variables) were pre-selected and displayed in an Excel spreadsheet. We quantified five types of information: 1) demographics of patients such as sex, age, ethnicity, and place of residence; 2) important dates such as date of admission to ED and CCU, dates of discharge and times that cardiovascular drugs were administered; 3) medical history data that included risk factors and comorbidity profiles; 4) medical diagnosis variables such as electrocardiographic characteristics and cardiac enzymes; and 5) AMI-specific hospital quality indicators.

Quality indicators

Quality indicators are a set of variables introduced by multiple legitimate healthcare administration/research organizations such as the National Quality Forum (NQF) or Agency for Healthcare Research and Quality, both based in the United States. Each indicator is built after exhaustive expert consensus and endorsed subsequent to multiple updates. First, we have reviewed and summarized all available information in a typical medical chart and made a vis-à-vis comparison between our summary and the NQF endorsed quality indicators. We found that our medical charts provided information on 10 out of 70 quality indicators introduced by the NQF. For comparability sake it was important to keep with the standardized peer-reviewed indicators such those built up by the NQF. The complete list of indicators can be found on

the NQF website.⁶ The indicators were: a) risk-adjusted in-patient AMI mortality, b) fibrinolytic therapy received within 30 minutes of ED arrival, c) aspirin at arrival, d) aspirin at discharge, e) beta blockers at discharge, f) beta blockers administered within 24 hours of arrival, g) angiotensin converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARB) for left ventricular systolic dysfunction, h) evaluation of left ventricular systolic function, i) low density lipoprotein (LDL) cholesterol assessment, and j) severity-standardized average length of stay-special care.

To build a process quality indicator, both numerator and denominator data are required. The numerator is the number of cases that receives an index intervention (for example beta blocker at discharge). The number of eligible population is considered as the denominator. To determine the eligibility, two or more than two types of information may be necessary. For instance, to build a quality indicator on a prescription drug, it is necessary to eliminate patients with contraindications to the medication from the inpatient population. With timing of medication as an additional factor for some quality indicators (for example a drug that should be administered in the first 24 hours) the time of prescription is needed as supplementary information to build that indicator. If one of the building blocks of an indicator is missing the indicator cannot be constructed. This formula also applies to outcome indicators such as mortality and length of hospital stay.

Results

Demographics of patients were complete in all 100 cases. None of the key dates were missing. Risk factor profile of patients for pre-defined fields such as measures of blood pressure and family history of AMI did not have any missing values. Comorbidity profile was complete for the pre-selected fields such as diabetes, congestive heart failure, and chronic obstructive pulmonary disease. The variables related to diagnostic measures, except for creatine kinase (CKMB) with 6% missing cases, did not contain missing values. The variables on prescription drugs had non-missing values for all observations. However, the variables on contraindications of prescribed medications contained missing values that ranged from 4% for aspirin to 29% for ACEIs. Table 1 conveys summary information on missing values of different fields.

Discussion

We sought to determine if abstracting medical records in a dis-

Table 1. Completeness of the selected variables needed to construct the quality indicators.

Variable	Completeness (%)	Variable	Missing (%)
Sex, age, ethnicity, place of residence (city), urban-rural	100	Past history of AMI/IHD	100
Admission information (diagnosis, date)	100	Six co-morbidities and five risk factors	100
Information on referrals, transfers, and status (live, dead) at discharge	100	Aspirin/streptokinase/beta-blockers/ACEI administration at admission/during stay/at discharge	100
Length of stay	100	Time of administration of cardiac drugs	100
EKG indicating MI	100	Aspirin contraindications	96
Troponin test	100	Streptokinase contraindications	83
CKMB test	94	Beta-blocker contraindications	84
Sub-lingual TNG	100	ACEI contraindications	71
LVSD assessment	100	In-hospital mortality	100
LDL level	100	—	—

district-level hospital in Iran could provide adequate detail to quantify a standard set of newly introduced hospital quality measures for AMI by NQF. We would be able to discern the strengths and weaknesses of the medical records and provide useful information for future hospital quality assessment projects by using the results of our study. We have found that hospital staff, including physicians and nurses, made complete notes of patient demography, timing of the events (e.g., transfers from the ED to the CCU or time of medicine administration), co-morbidity profile, and risk factors. Extracting specific information from these three fields was critical to the process of assessing quality of hospital care. We determined that information on contraindication of cardiovascular medicine was missing in a considerable number of cases. Having high missing values imposed two shortcomings; it lowered the power of estimations and lead to biased estimates in the absence of missing data analysis.

In our study we purposefully selected two outcome quality indicators (risk adjusted mortality and risk adjusted length of stay) and nine process quality indicators (see above) out of 70 indicators endorsed by the NQF. This selection was based on availability of information. For example, the percent of patients who received smoking cessation consultations at discharge was one of the indicators for which we had no data in our records. The list of quality indicators for which we did not have any data was lengthy. Among them, 30-day mortality (or any longer term mortality data) seemed to be the most important missing field. Traditionally, in Iran, hospital medical recording staff do not follow the fate of patients after discharge. This lack of follow-up makes it difficult to link the process indicators to after-discharge mortality. It has been also shown that the correlation between process quality indicators can be high⁷ for some pairs of indicators but it is not safe to assume this high correlation eliminates the need for thorough assessment of different aspects of quality process at hospitals.

The result of our study ensures that medical abstracting in Iran can be a useful candidate method to assess quality of medical care for a variety of fatal and high cost conditions. However, one pilot study does not seem sufficient to draw any conclusions about the adequacy of information in medical records to be used for quality indicator assessment. For example it might be the case that in small hospitals only one cardiologist is responsible for writing notes in patient records. If so, the quality of the medical records strongly depends on how detailed and accurate the notes of a single physician are.

Thus, this study should be piloted in similar size as well as larger hospitals that employ multiple specialists of the same medical field. It is important to note that our study is not the only study that has investigated quality indicators in AMI patients. Beyranvand et al.⁸ and Kabir et al.⁹ have conducted two studies similar to the current study. Both research teams have selected a prospective approach to data collection. Prospective studies for quality indicators generate more accurate results than retrospective medical record abstraction, however, are costly and not recommended. Prospective medical chart abstracting can serve as the gold standard for retrospective data abstracting. However, they should be limited to research and be utilized as a reference to improve the quality of passive data collection made by hospital administrations.

Despite shortcomings of medical record abstracting as a way of quality of care valuation, it may serve as the gold standard benchmark for hospital quality assessment.¹⁰ However, abstraction may be expensive and does not promise uniform data collection/

coding across different hospitals. To evaluate the quality of hospital care in the United States the usual source of information is medical claims data sent from hospitals to insurance companies. The Center for Medicare and Medicaid Services (CMS), as the largest governmental medical insurer in the United States, cleans such data and uses them as one of the sources to evaluate quality. Of note, reporting quality indicators to the CMS is legally mandated. There are expectations that CMS uses these inputs to make fundamental changes to the current payment system. The data will help the insurer balance the incentives to providers with higher performance. This method that has been piloted in different settings is known as pay-for-performance (p4p) and is a strong candidate to substitute or complement the traditional fee-for-service payment schedules.¹¹ Unfortunately, there is no single effective body to systematize the nationwide insurance claims data in Iran.

We have indicated that retrospective medical chart abstracting for the purpose of hospital quality assessment is feasible and deserves more study. Examining one disease in one hospital for one year severely limits the external validity of our study. Extending this pilot study to a few other similar settings will ensure that such studies will generate useful and comparable results. This extension is the first step toward documenting the quality differential across hospitals. This crucial first step will enable policymakers to have an agenda to devise a policy for nationwide quality assessment and reporting across hospitals. Without such fundamental reform none of the higher political bodies can make hospitals responsible for their performance. Clearly there would not be enough incentive for the providers to keep the clinical outcomes at the desired level. Under the current system poor performers are viewed no less than medical centers with excellent outcomes. Above all, patients who pay considerable out of pocket payments to private hospitals lack any knowledge on the value of services they receive.

We suggest a three-step model to help formulate a policy for nationwide hospital quality assessment through reporting. The first step is to investigate the extent to which medical records can help build a set of process and outcome quality indicators for a group of high-cost diseases such as AMI, heart failure, diabetes, asthma, and major depression (the five diseases with highest costs in the United States³). Our study is an example of this first step. The output of such studies will provide information on fields for which medical staffs either do not operate well or do not adequately record the operation. For example, the current study and a study by Kabir⁹ have shown that cardiologists need to provide consultations on cigarette-smoking cessation for AMI patients and document this in the patients' medical charts.

After summarizing inputs from the pilot studies completed in the first step, a group of experts (cardiologists, data analysts, and medical coding specialists) make a systemic assessment of how to build a set of quality indicators out of existing standard indicators for the selected conditions. The exemplary publication that assists with understanding this second step has been recently published by Sun et al.¹² Using the Delphi method they assembled a 17-member team and systematically selected the quality indicators for AMI to be used in China.

The final step entails a consensus of policymakers on how acceptably formulate a national policy through which the Ministry of Health and Medical Education can effectively mandate hospitals to report quality indicators for a specific set of conditions and how to audit the accuracy of such reports. In addition to the

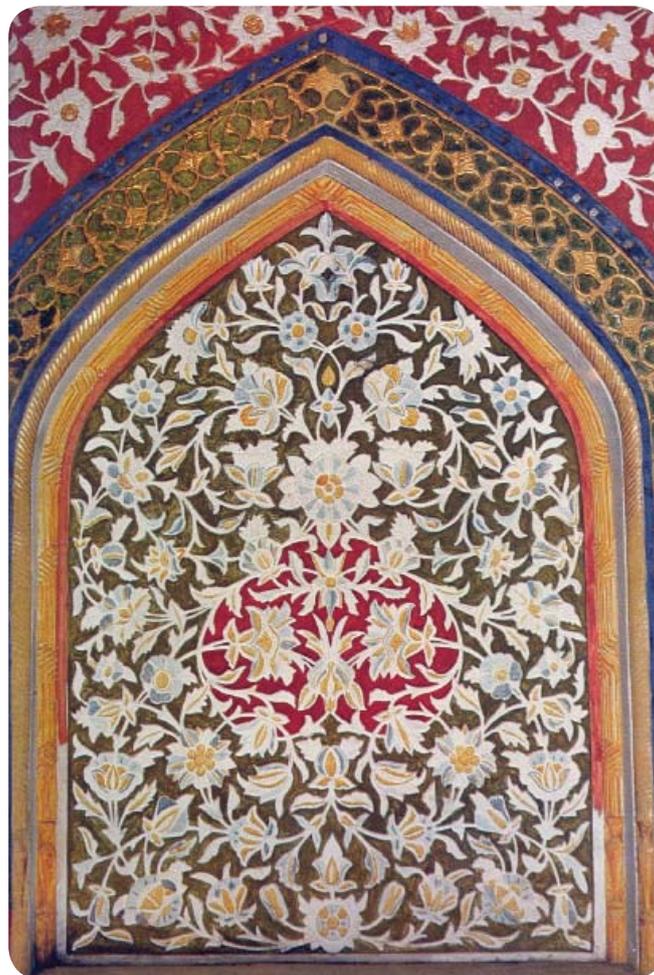
Western countries some developing countries such as China and Brazil are attempting to implement such policies to improve the quality of hospital care. Iran can benefit from their experiences.

Conflict of Interest

None

References

1. Ford ES, Ajani UA, Croft JB, Critchley JA, Labarthe DR, Kottke TE, et al. Explaining the decrease in U.S. deaths from coronary disease, 1980 – 2000. *N Engl J Med.* 2007; **356**: 2388 – 2398.
2. Clark AM, Findlay IN. Improving evidence based cardiac care and policy implementation over the patient journey: the potential of coronary heart disease registers. *Heart.* 2005; **91**: 1127 – 1130.
3. Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century.* 1st ed. Washington, D.C.: National Academies Press; 2001.
4. Filson CP, Hollingsworth JM, Skolarus TA, Quentin Clemens J, Hollenbeck BK. Health care reform in 2010: transforming the delivery system to improve quality of care. *World J Urol.* 2011; **29**: 85 – 90.
5. Shahraz S. More life expectancy through reduction of cardiovascular mortality. *Arch Iran Med.* 2006; **9**: 455.
6. National Quality Forum Website. Acute myocardial infarction measures-Summary; 2007. Available from: URL: www.qualityforum.org/Projects/n-r/Prioritization.../Attachment_B.aspx (Access date August 12, 2011)
7. Peterson ED, Roe MT, Mulgund J, DeLong ER, Lytle BL, Brindis RG, et al. Association between hospital process performance and outcomes among patients with acute coronary syndromes. *JAMA.* 2006; **295**: 1912 – 1920.
8. Beyranvand MR, Kolahi AA, Ghafelebashi SHR. Characteristics and final diagnosis of patients with primary diagnosis of acute myocardial infarction [in Farsi]. *J Babol Univ Med Sci.* 2008; **10**: 6.
9. Kabir K, Nojomi M, Motafaker M, Jamali A, Sadr Bafghi M. The Effect of Quality Improvement Program on In-Hospital Acute Myocardial Infarction Care in Afshar Hospital(Yazd-2004) [in Farsi]. *Iran Univ Med Sci J.* 2005; **13**: 8.
10. Krumholz HM, Normand SLT, Galusha DH, Mattera JA, Rich AS, Wang Y, et al. *Risk-adjustment models for AMI and HF 30-Day Mortality.* New Haven, CT: Yale University; 2011.
11. Van Herck P, Annemans L, De Smedt D, Remmen R, Sermeus W. Pay-for-performance step-by-step: introduction to the MIMIQ model. *Health Policy.* 2011; **102**: 8 – 17
12. Sun H, Liu M, Hou S. Quality indicators for acute myocardial infarction care in China. *Int J Qual Health Care.* 2011; **23**: 365 – 374.



A wall plasterwork decoration and printing at the Ashtaf Pavillion, Isfahan, Iran. (Source: 'A Glance at Esfahan, City of Art' by Parviz Dabiri MD, Mehr Afrouz Publication, Isfahan, Iran, 2005; p: 74)