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The impact of introducing a new hospital financing system (DRGs) in Poland on hospitalisations for atherosclerosis: An interrupted time series analysis (2004–2012)

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ABSTRACT

Objectives: Hospital payment based on diagnosis-related groups (DRGs) was introduced in Poland in July 2008. We evaluate the impact of this policy on the frequency of hospitalisation for atherosclerosis in internal medicine units of district hospitals and non-public hospitals in Poland.
Methods: Data were collected between 2004 and 2012 from each district and non-public hospital participating in the General Hospital Morbidity Study (165 hospitals in total). Atherosclerosis was defined using the ICD-10 code I70. Hospitalisation patterns were examined using interrupted time series with segmented regression analysis.
Results: were compared between public and non-public hospitals and across patient age groups.
Results: The rate of hospitalisation for atherosclerosis rose by 27.05 per 10,000 total hospitalisations immediately following the implementation of DRGs in 2008. It then rose by 2.5 per 10,000 hospitalisations monthly between 2008–2012. The largest changes were observed for patients aged 85+ and 75–84. Rates rose by 117.5 and 54.2 per 10,000 hospitalisations in these two groups respectively following implementation of DRGs. The response to introduction of DRGs was less striking in non-public hospitals than in public hospitals.
Conclusions: Implementation of a DRG-based system in Poland was associated with substantial increases in atherosclerosis hospitalisation rates. Failing to take into account this change in financing and not accounting for long-term trends in hospitalisation rates may result in inaccurate epidemiological data.

1. Introduction

Diagnosis-related groups (DRGs) have become one of the most widely-used systems for classification and payment for hospital services [1]. The introduction of DRGs occurred relatively late in Poland (July 2008) compared to other European countries. The implementation was prepared very quickly, over a period of approximately 12 months, and with a transition period of only 3 months. In contrast, introduction of DRGs took several years in most other European countries (e.g., Portugal, Germany, Estonia, and England). Furthermore, unlike elsewhere, extensive cost calculations were not used in Poland to prepare DRG valuations. In most cases, DRG weights were not based on actual costs incurred by hospitals but were instead derived from the English HRG (Healthcare Resource Group) system. Due to the absence of relative weights, it was also impossible to calculate case mix index. [1–4] The implementation of the DRG valuation process, coupled with the fact that the system was prepared by a public payer – the National Health Fund (NFZ) – may have led to unintended consequences differing from those observed in other countries.

Generally, the impact of changing the financing system for healthcare institutions is evaluated with respect to effectiveness and quality of medical services. For the introduction of DRGs, both intended and unintended consequences are generally studied. A

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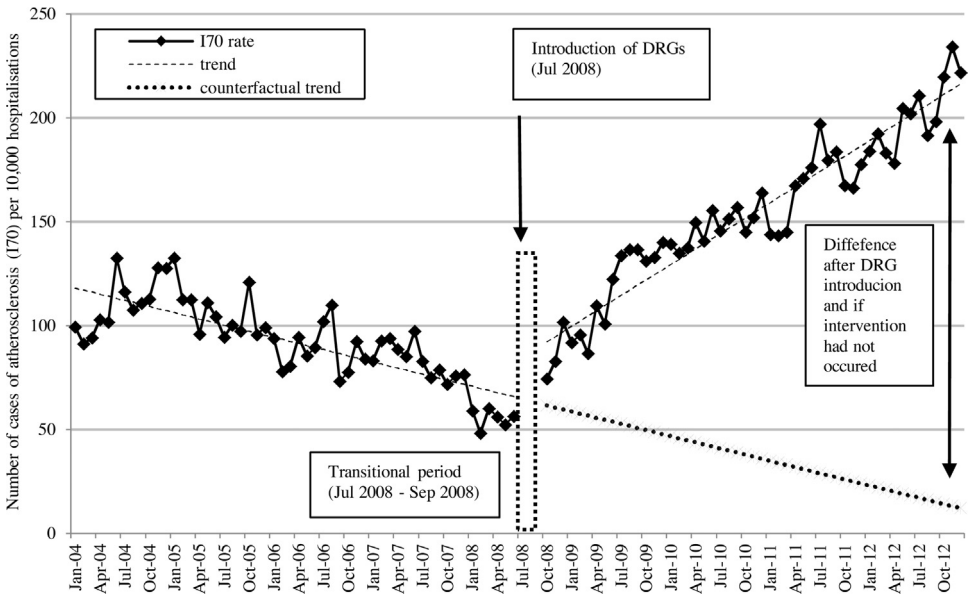

Fig. 1. Monthly hospitalisation rates due to atherosclerosis per 10,000 hospitalisations before and after introduction of DRGs.

multitude of studies over the past several years have measured the impact of introducing DRGs. [5–10] However, studies conducted in different countries often show contradictory findings, which likely stems in part from differences in the local context, the design of the DRG-based system, and other reforms implemented concurrently [11–15].

Changes to the healthcare financing system may lead to profound but often unpredictable consequences. This may in turn lead to incorrect calculations regarding hospitalisation rates and associated trends, as well as hospital morbidity rates. This is particularly problematic when data are compiled from multiple hospitals to generate official statistics for a large population. [16] For example, incorrect recording of key indicators related to sepsis mortality was observed in the USA [17]. To ensure that changes in the healthcare system are accurately evaluated, extensive data must be made available, ideally permitting time series analyses, and appropriate statistical methods must be applied.

Circulatory diseases are one of the most common causes of hospitalisations in Poland and in the world, and are the most common cause of death in Poland [18,19]. Moreover, atherosclerosis is one of the most common reasons for hospitalisations in internal medicine units of district hospitals and non-public hospitals in Poland. Cardiovascular diseases cover a range of illnesses. Unlike to the research related to ischemic heart disease (I20-I25) or cerebrovascular diseases (I60-I69) the research related to atherosclerosis (I70) is not that comprehensive. In the study period, there were few healthcare reforms, mainly linked to outpatient settings [20–22]. The chosen intervention – introduction of DRGs – is the only change that was implemented in the inpatient reimbursement system. We therefore chose to study the effects of implementation of a DRG-based system on rates of hospitalisation for atherosclerosis (ICD-10 I70 – International Classification of Diseases 10th Revision). We hypothesized that the introduction of DRGs may have led to artificially inflated atherosclerosis rates, particularly in view of the lack of relevant data on costs in the calculation of DRG weights. While differences in hospitalisation rates would most likely be minor for a single hospital ward, they could be substantial at the national level.

The principal objective of this study was to evaluate the impact of the implementation of a new hospital financing system – DRGs – on the frequency of hospitalisations due to atherosclerosis in internal medicine units of district hospitals and non-public hospitals in Poland between 2004 and 2012. Our secondary objectives were to compare atherosclerosis hospitalisation patterns following the introduction of DRGs between public and non-public hospitals, as well as to evaluate the impact of the system change across different patient age groups.

2. Materials and methods

2.1. Study design

The study uses interrupted time series with segmented regression analysis to evaluate the impact of implementation of DRGs on atherosclerosis hospitalisation rates. The intervention under study is the implementation in July 2008 of a DRG-based system for financing hospital stays in Poland. This change was applied across all hospitals in Poland with the exception of psychiatric hospitals. The study covers a period of 9 years (from January 2004 to December 2012), including 54 months before the implementation of DRGs, a 3-month transition period, and 51 months after the launch of the system.

2.2. Data sources and measurements

Data were collected as part of the General Hospital Morbidity Study (GHMS) conducted by the Polish National Institute of Public Health – National Institute of Hygiene (NIZP-PZH). The database contains information on reasons for hospitalisation (ICD-10 codes), procedures performed (ICD-9 codes), length of stay, as well as demographic information on all patients treated in hospitals regardless of their insurance status. [16] The GHMS included 91.4% of hospitals in Poland overall. Between 2004 and 2012 the participation rate fluctuated between 87.1% (758 hospitals) in 2004 and 94.5% (849) in 2011. The participation rate in 2008 was 87.5%.

Analysis for the present study included hospitals participating in the GHMS between 2004 and 2012 (398 hospitals). Of these, only hospitals with an internal medicine unit were selected (165 hospitals). Data on hospital ownership structure was obtained from the Centre of Healthcare Information Systems established by the Ministry of Health, which formed and oversees the Registry of Health Care Providers.

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