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Exploring the Impact of Health Insurance on Health Care Utilization and Outcome Using Electronic Medical Record Data

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Objective

With tremendous potential for research and policy use, the development of Electronic Medical Record (EMR) is unprecedentedly growing in China. The rich clinical and financial data in the Chinese EMR provides us a unique chance to examine the impacts of health insurance on health care utilization and outcomes, controlling for patient's disease severity.

Approaches

Our study population included patients with cirrhosis or primary liver cancer (PLC), from a large teaching hospital in Beijing. The comorbidity and disease severity variables were defined using EMR automated extraction methods that were validated in previous study. Health insurance was measured by actual reimbursement ratio (RR), which better captures patients' actual financial burden than type of health insurance. Generalized linear regression model was used to analyze the impacts of health insurance coverage on total hospital expense, ratio of medication cost to total expense, and number of major procedures (i.e., transcatheter arterial chemoembolization, TACE) for cirrhosis. Logistic regression was used to assess the impact of health insurance on hospital mortality and the rate of TACE. We employed a wide range of risk factors in our models to adjust for disease severity and comorbidities, including Charlson comorbidities, MELD-Na score, and etiological factors of liver diseases.

Results

In total, 5,465 cirrhosis patients and 3,357 PLC patients were included in the study. Among the PLC patients we identified 534 patients underwent TACE. After adjusted for comorbidities, disease severity and other confounders, RR was found to be associated with hospital mortality with odds ratio 3.2 in cirrhosis

patients and 6.0 in PLC patients. Higher RR was correlated to lower total hospital cost (logarithm transferred coefficient -0.08 in cirrhosis patients and -0.15 in PLC patients) but related to higher ratio of medication cost (logarithm transferred coefficient 0.09 in both cirrhosis and PLC patients). Additionally, higher RR was associated with higher rate (odds ratio 1.6 in PLC patients) and also more times of TACE (logarithm transferred coefficient 0.31 in TACE patients). The results were consistent between cirrhosis patients and PLC patients.

Conclusions

This study provided evidences that physicians' behavior was influenced by health insurance. Patients with more generous health insurance coverage (higher RR) were found to have relatively lower total hospital cost but higher ratio of medication cost, higher rate and more times of TACE, and were more prone to die in hospital. These are evidences for physician's gaming reacting to the economic incentives of the payment systems in China.

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