Can in-hospital fatality rates following hip fractures be explained? A meta-regression analysis

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INTRODUCTION

Patients with an hip fracture are at higher risk of mortality, compared to non-hip fracture population. This risk is likely to be elevated through long periods after the fracture.
The aim of this study is to explain mortality rates of patients hospitalized due to hip fracture, according to multiple co-variables.

MATERIALS & METHODS

A systematic review on Medline was conducted and studies, published between 2000 and 2010 were included if data for in-hospital fatality rates, following a hip fracture admission (International Codification of Diseases ICD- 10 S72.0 – S72.2 or ICD- 9- CM 820), was available for patients older than 50 years. Experimental, review and case studies were excluded as well as studies comparing different treatments. Economic, social, health data were retrieved from the Organisation for Economic Co-operation and Development, International Human Development Indicators from United Nation Programme and Global Health Observatory Data Repository from World Health Organization. Following a heterogeneity assessment, a multivariate meta-regression model was achieved using a stepwise based on backward selection.

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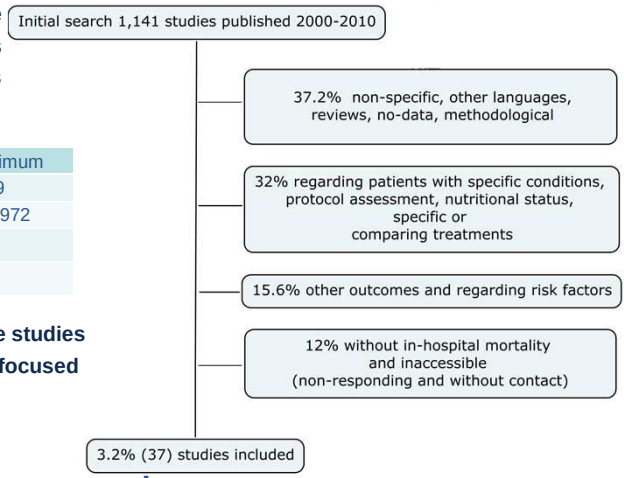
RESULTS & DISCUSSION

Study Selection

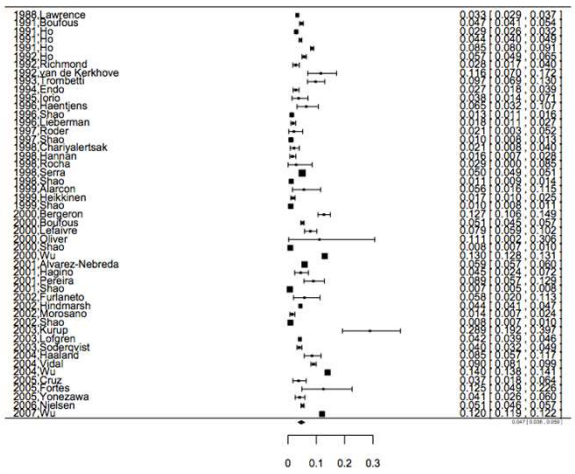
37 studies from 20 different countries were selected, comprising a total of 972 ,552 cases of hip fractures. The selection process is illustrated in the flow-chart.

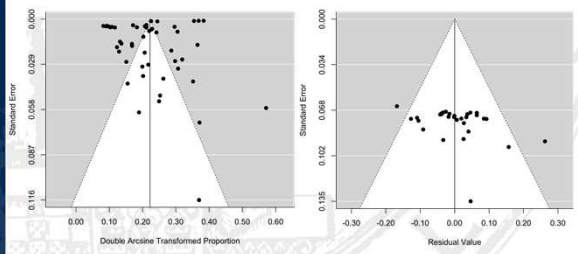


	Minimum	Maximum
Year of data collection	1982	2009
Sample Size	18	551,972
Proportion of female patients	0.6	1
Case fatality rates (per 100)	0.6	28.9

The type of information available in each of the studies was also very different, namely the age group focused and the availability of information by gender.

Meta-regression





Variables with possible interference in the heterogeneity observed on case fatality results

Sources of heterogeneity (estimate, p-value)
Total expenditure on health, % of gross domestic product (-0.0016, 0.005)
Total Health expenditure per capita, US$ PPP
Private expenditure on health, % total expenditure on health (PEH) (-0.002, 0.09)
Prevention and public health services, % current expenditure on health
Hospital beds, density per 1000 population
Practicing physicians density per 1000 population (PP)
Human Development Index
GINI Income distribution – Inequality (GINI) (-0.590, 0.022)

Mixed-Effect Model	Point Estimate	Standard error	95% Lower	95% Upper
Intercept	0.520	0.082	0.3586	0.6804
PEH	-0.004	0.001	-0.006	-0.0013
PP	-0.070	0.024	-0.1181	-0.0211

CONCLUSIONS

The initial heterogeneity observed (I^2 99.8%) in the outcome measure was explained through economical variables such as "Private expenditure on health" (negatively) and resource allocation as "Practicing physicians" (negatively).
Individually, other variables also explained differences observed on in-hospital fatality rates.
Publication bias was detected, lacking smaller studies, however in this case smaller studies could lead to erroneous conclusions due to "small numbers".
Models explaining differences on in-hospital fatality rates should account for variables not related to patients, such as macro economic data.