

# Impact of Hospital Nurse Staffing on Out-of-pocket Cost and Patient Outcomes in China: A National Cross-sectional Study

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## INTRODUCTION

- The shortage of general practitioners has become a critical obstacle to improving healthcare quality in many countries<sup>1</sup>.
- Training and deploying nurse practitioners could help bridge this gap<sup>2-4</sup>. However, studies utilizing real-world data to evaluate the influence of nurse staffing in developing countries are scarce.
- This study aimed to explore the impact of hospital nurse staffing on Out-of-pocket cost and patient outcomes in China.

## METHODS

- Nurse staffing data from 2,338 tertiary hospitals were obtained from the China National Database of Nursing Quality (CNDNQ).
- A 5% random sample of inpatient electronic medical records from these hospitals (2021-2023) was extracted based on inpatient mortality rates from the Hospital Quality Monitoring System (HQMS) database.
- Log-linear and logistic regression models were used to evaluate the influence of nurse staffing, with coefficients and odds ratios (OR) reported, respectively.
- Nine control variables were included: age, gender, area, year, primary diagnostic segment type, major surgical operation level, hospital type, severity of condition, and Charlson Comorbidity Index (CCI).
- Subgroup analyses were conducted for patients with malignant neoplasms, respiratory system diseases, circulatory system diseases, and digestive system diseases.

## RESULTS

- This study included 12,216,142 inpatient admissions in China.
- An increase in a nurse's workload (higher nurse-to-patient ratio) was significantly associated with higher out-of-pocket cost (compared with nurse-to-patient ratio<(0,8), nurse-to-patient ratio∈[8,12), [12,16), [16,20), and ≥20, coefficient=0.27 [95%CI 0.27-0.28], 0.19 [95%CI 0.19-0.20], 0.13 [95%CI 0.13-0.14], and 0.11 [95%CI 0.11-0.12], respectively), longer length of stay (coefficient=0.02 [95%CI 0.02-0.02], 0.06 [95%CI 0.06-0.06], 0.09 [95%CI 0.09-0.09], and 0.05 [95%CI 0.05-0.05], respectively), increased the likelihood of inpatient in-hospital death (OR=1.11 [95%CI 1.1-1.14], 1.20 [95%CI 1.17-1.24], 1.08 [95%CI 1.05-1.12], and 1.13 [95%CI 1.10-1.17], respectively). (Figure 1-3)
- Subgroup analysis revealed that increasing nursing workload was associated with more substantial increases in hospital stays (coefficient=0.71 [95%CI 0.63-0.80], 1.27 [95%CI 1.18-1.35], 1.69 [95%CI 1.60-1.79], and 1.48 [95%CI 1.38-1.59], respectively) and in the likelihood of inpatient in-hospital death (OR=1.58 [95%CI 1.41-1.77], 1.84 [95%CI 1.65-2.06], 1.97 [95%CI 1.74-2.23], and 1.79 [95%CI 1.57-2.03], respectively) for patients with malignant neoplasms. (Figure 1-3)

## CONCLUSIONS

- Strengthening nursing workforce and training clinical nurse specialist, would be beneficial for lowering patients' out-of-pocket cost and improving outcomes.
- National-level policies to promote appropriate nurse staffing are needed to further improve the quality of care in China.

## REFERENCES

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## Figures

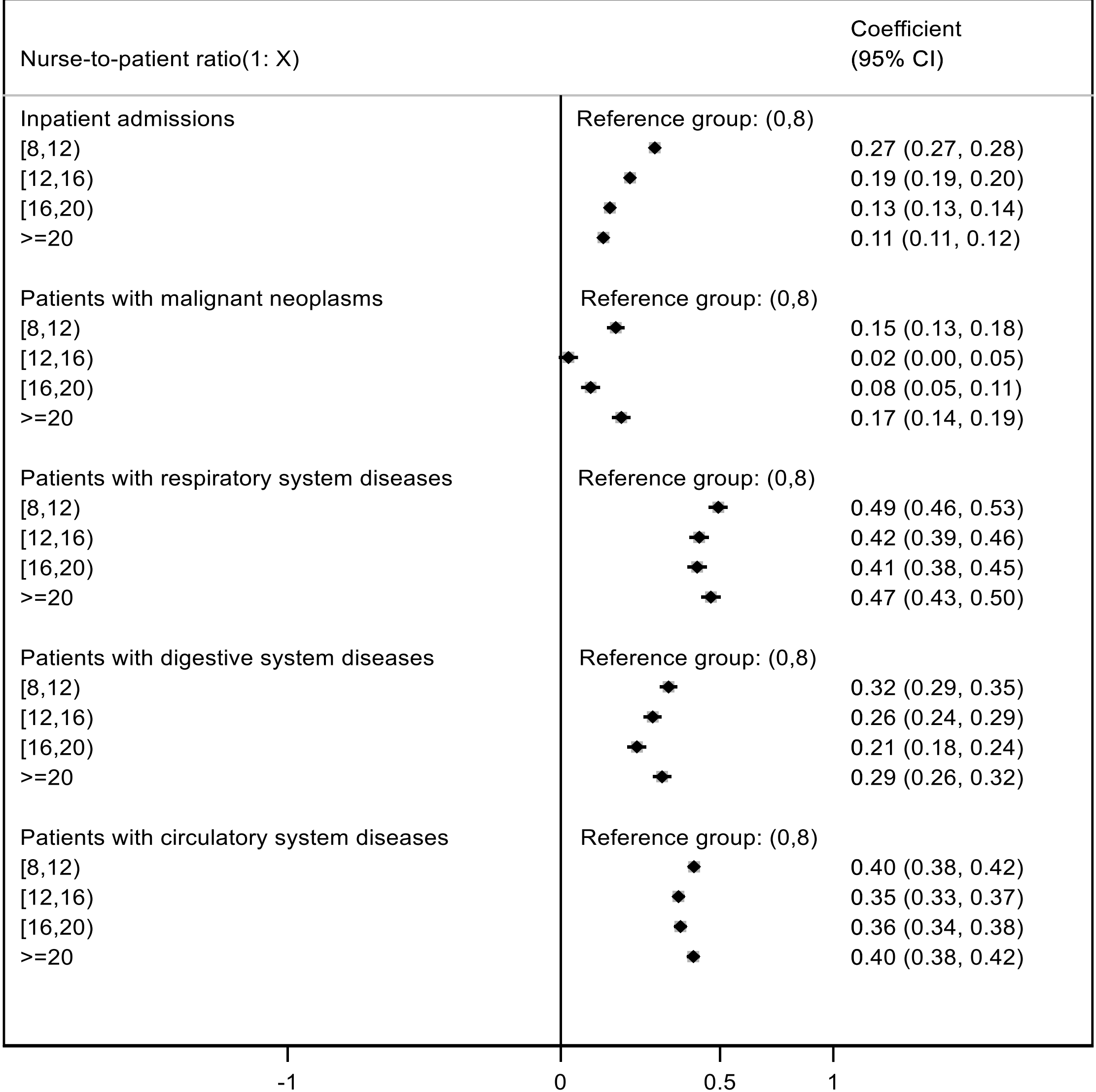


Figure 1 Impact of Hospital Nurse Staffing on Out-of-pocket Cost

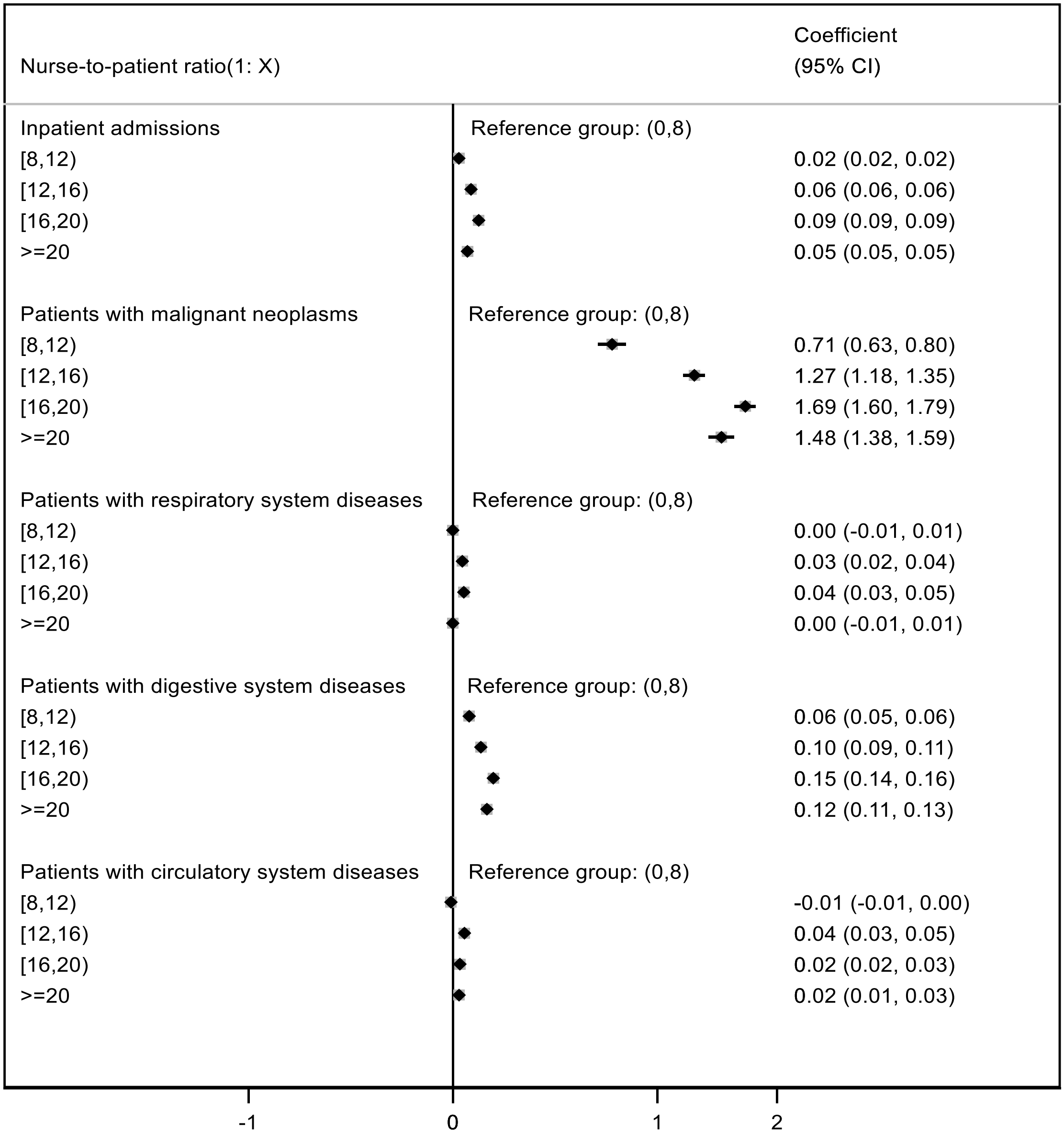


Figure 2 Impact of Hospital Nurse Staffing on Length of Stay

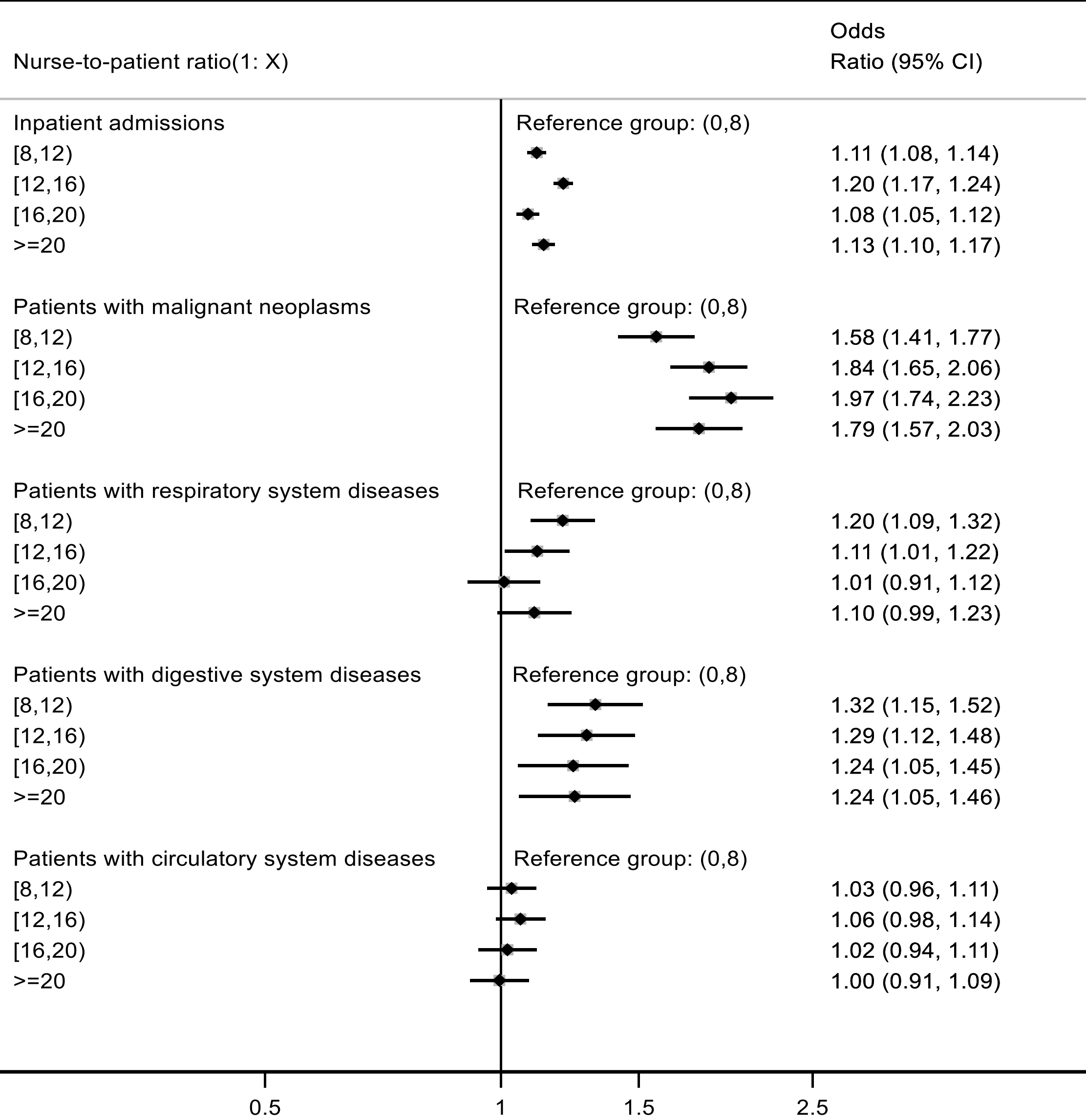


Figure 3 Impact of Hospital Nurse Staffing on In-hospital Death