



Foot for thought : The clinical and economic burden of diabetic foot ulcers

Zhiwen Joseph Lo, Naren Kumar Surendra, Akshar Saxena, Josip Car

DOI: 10.1111/iwj.13540

INTRODUCTION

- Up to a quarter of people with diabetes will develop diabetic foot ulcers (DFUs)^[1].
- Singapore has one of the most substantial increase in DFUs worldwide, escalating healthcare costs and morbidity rates^[2-4].

Our aim is to:

- Assess the predictors of mortality and major amputation in patients with DFUs
- Assess how patient comorbidities affect survival rates
- Quantify the healthcare costs per patient-year

METHODS

5-year retrospective cohort study

Selection Criteria	1. ≥1 visit to Specialist Outpatient Clinics for DFU-related treatment 2. ≥1 inpatient admission for DFU-related treatment
Outcomes Measured	Clinical: baseline patient comorbidities, amputation rates, survival rates Economic: mean healthcare cost per patient-year for ulcers-only versus major amputation
Statistical Analysis	Kaplan-Meier Method Stepwise Cox-proportional Hazard Model

RESULTS

1a. Significant predictors of both mortality and major amputation (Fig 1&2):

- Ischaemic heart disease (IHD):** most significant for mortality
- Peripheral arterial disease (PAD):** most significant for major amputation
- End-stage renal failure (ESRF)**

1b. **Major amputation** is an independent predictor of mortality (Fig 1).

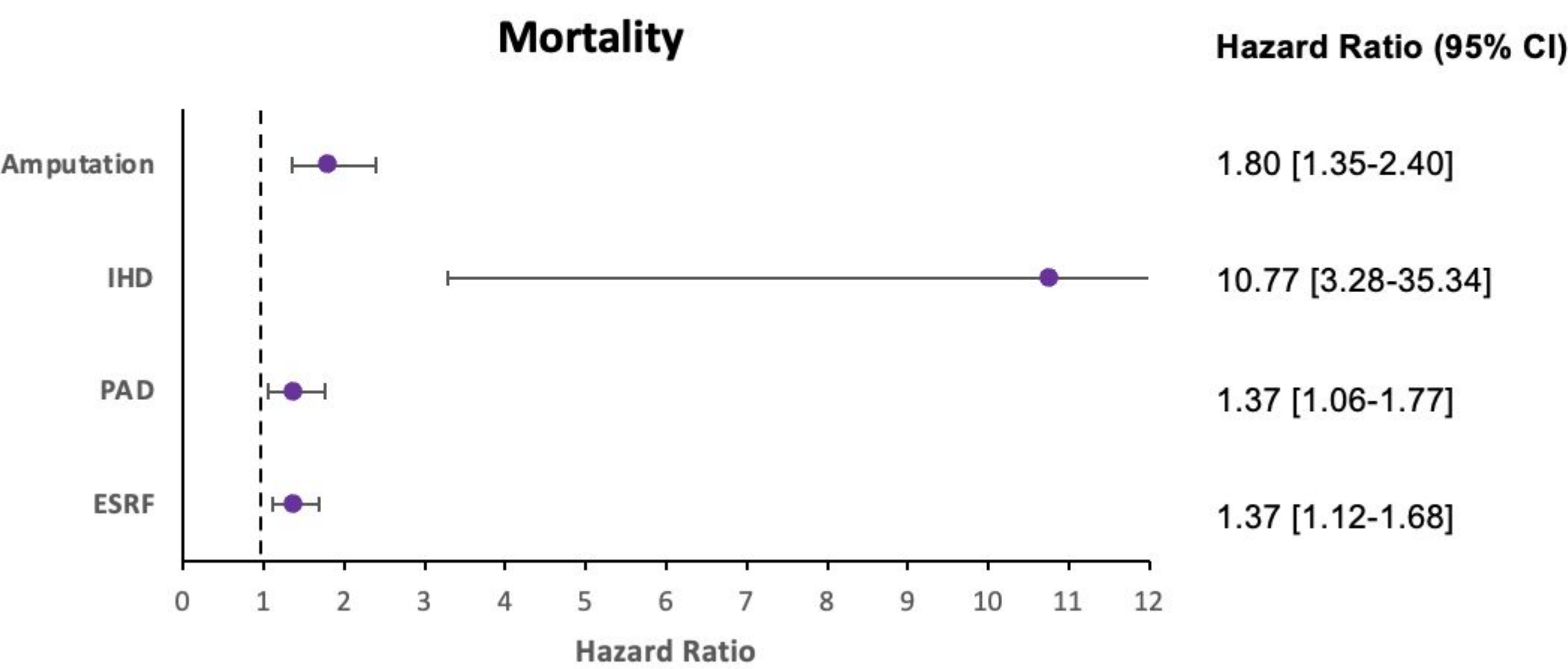


Figure 1. Forest plot depicting the effect of various comorbidities on the overall risk of mortality

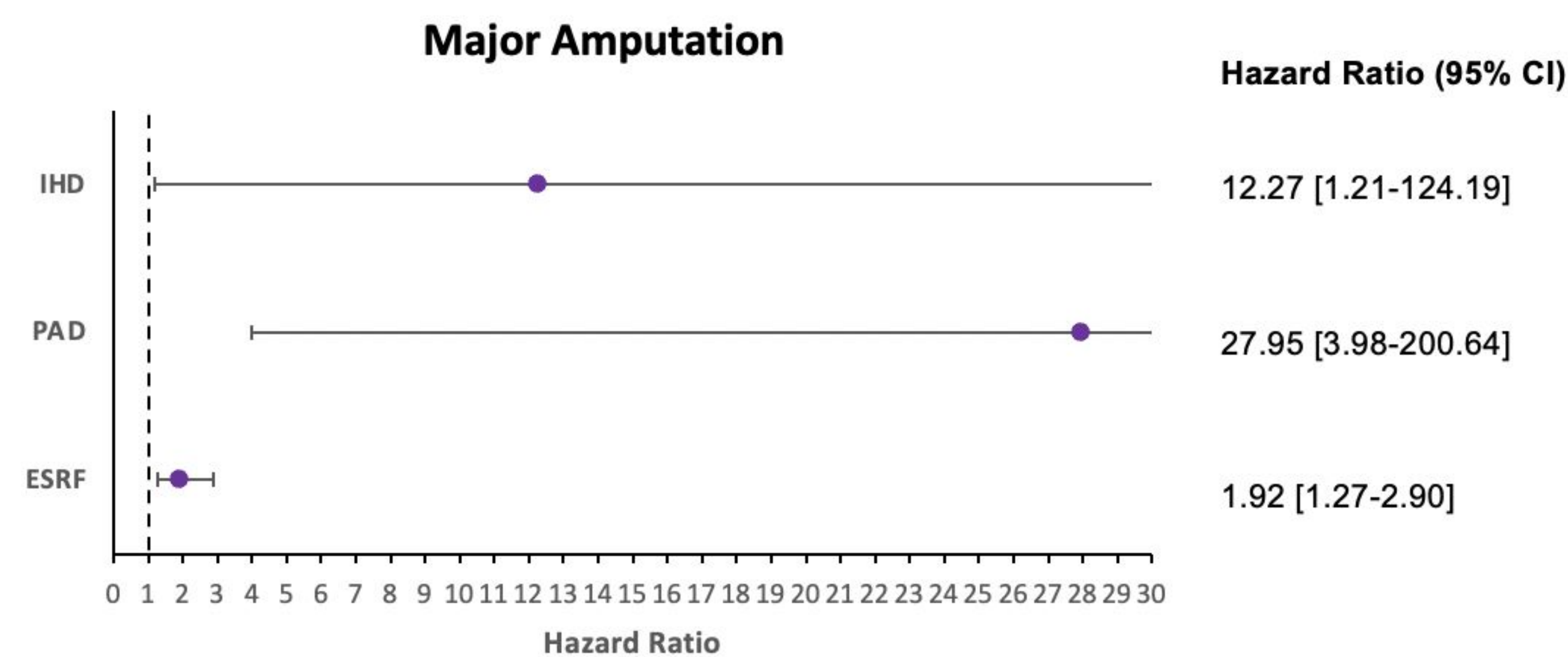


Figure 2. Forest plot depicting the effect of various comorbidities on the risk of major amputation

2. Major amputation, end stage renal failure, ischaemic heart disease and peripheral arterial disease all had varying detrimental effects on patient survival rates (Fig 3).

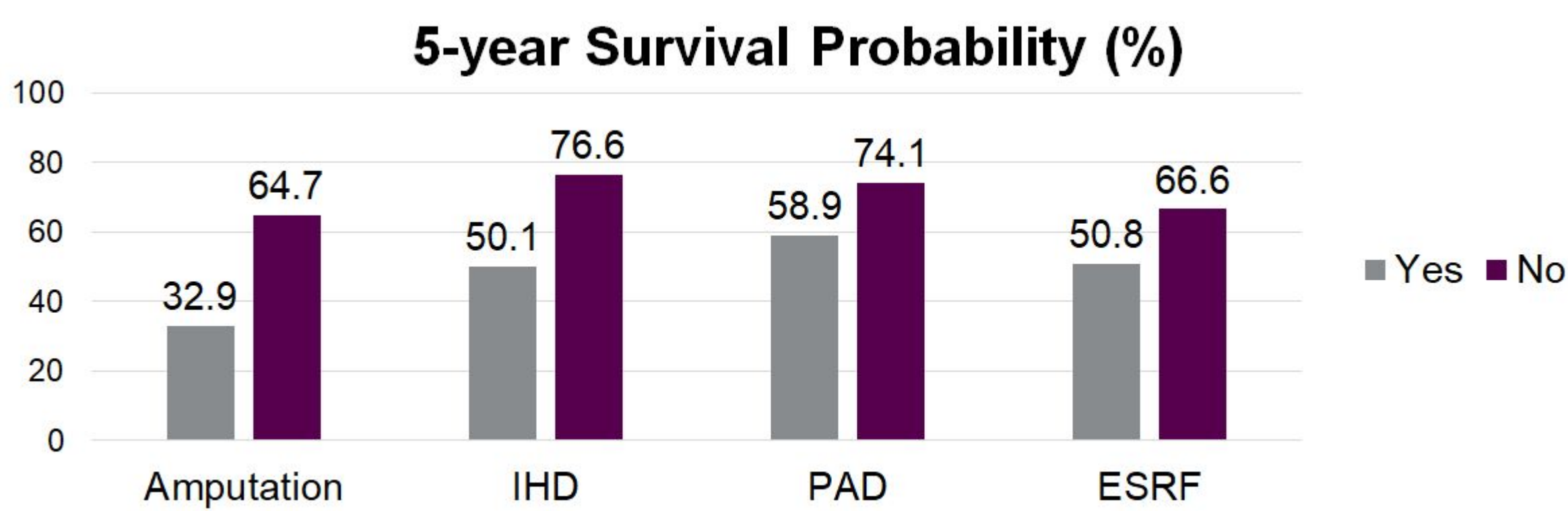


Figure 3. Bar graphs comparing the survival probability of individual predictors of mortality

3. Although number of patients with major amputations is far fewer, the cost each patient pays per year is 800% higher compared to patients with ulcers only (Fig 4).

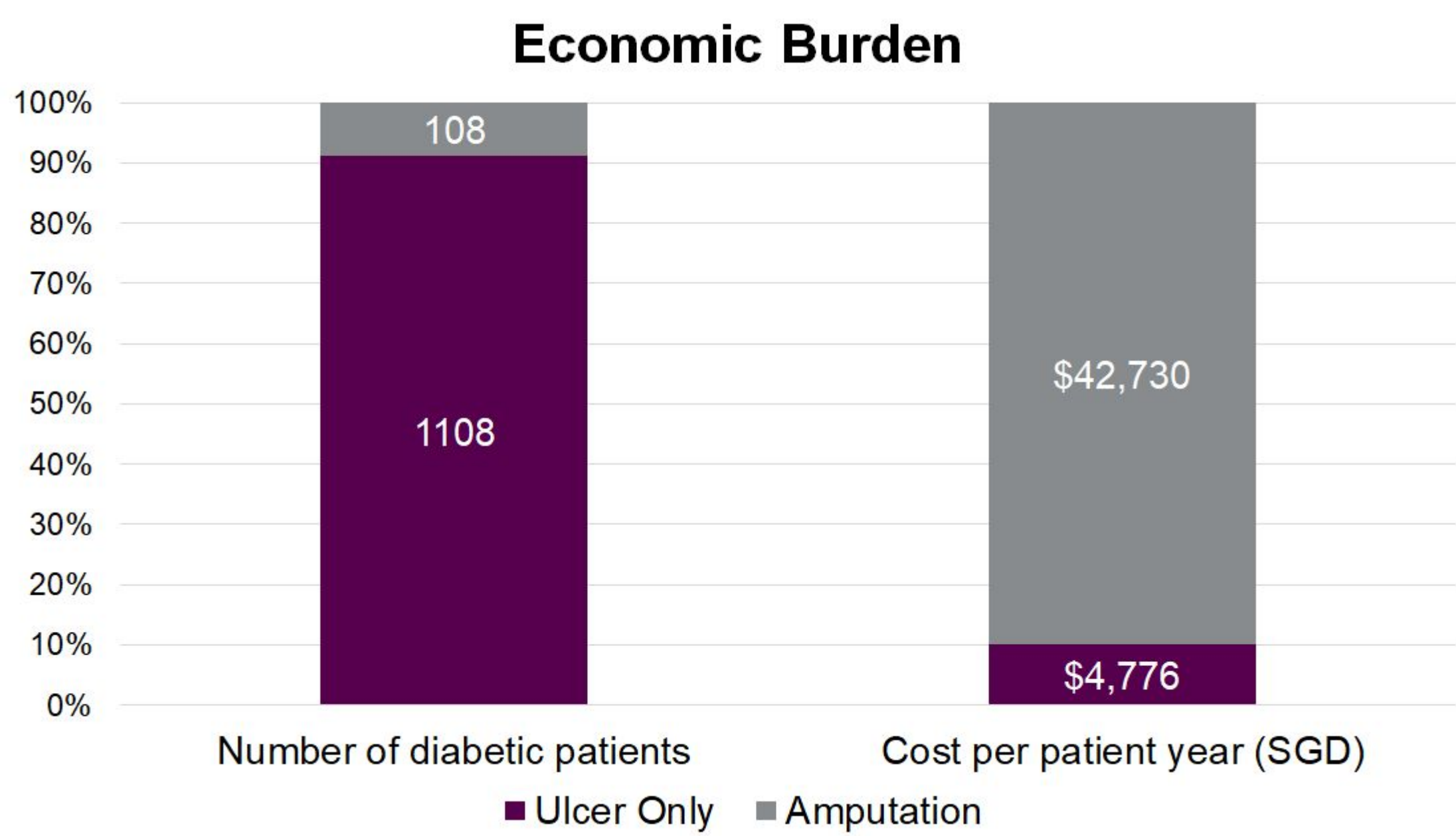


Figure 4. Bar graphs comparing the economic burden of DFU and a major amputation

DISCUSSION & CONCLUSION



Economic Burden

Huge potential economic benefit of amputation prevention strategies: 1 patient's amputation can pay for 10 patients' ulcer treatment over a year^[5-6]



Clinical Burden

Peripheral arterial disease is the most significant predictor for major amputation^[7] → importance of early and aggressive limb salvage interventions

End stage renal failure patients have a poorer survival outcome especially when coupled with major amputation while ischaemic heart disease is an important predictor for overall mortality → management of comorbidities is crucial



Real-life Application

Primary prevention via diabetes control should be the focus of health interventions → importance of raising awareness through public health education

Active measures to prevent DFU are also beneficial → encourage home monitoring of foot temperature and use of pressure-relieving footwear



Our Research Question

In patients with diabetes, is routine foot screening effective in reducing the likelihood of DFUs?

REFERENCES

- World Health Organization World Health Organization Fact Sheet on Diabetes. 2019 <https://www.who.int/news-room/fact-sheets/detail/diabetes>. Accessed June 1, 2020.
- Boulton AJ, Vileikyte L, Ragnarson-Tennvall G, Apelqvist J. The global burden of diabetic foot disease. *Lancet*. 2005;366(9498):1719-1724.
- National Healthcare Group Corporate Yearbook FY2018. 2019 <https://corp.nhg.com.sg/Lists/Corporate%20Year%20Book/Attachments/67/NHG%20Yearbook%202019%20Lowres%20Single1.pdf>.
- Lo ZJ, Lim X, Eng D, et al. Clinical and economic burden of wound care in the tropics: a 5-year institutional population health review. *Int Wound J*. 2020;17:790-803.
- Ragnarson-Tennvall G, Apelqvist J. Health-economic consequences of diabetic foot lesions. *Clin Infect Dis*. 2004;39(2):S132-S139.
- Ortega MM, Reddel WK, Niessen LW. Cost-effectiveness of prevention and treatment of the diabetic foot. *Diabetes Care*. 2004;27:901-907.
- Li X, Xiao T, Wang Y, et al. Incidence, risk factors for amputation among patients with diabetic foot ulcer in a Chinese tertiary hospital. *Diabetes Res Clin Pract*. 2011;93:26-30.

To watch the presentation, please click on the video below:

