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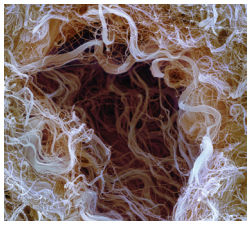

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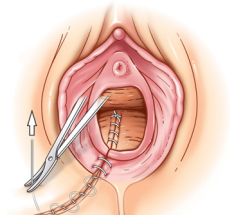

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Tropical cyclones and mortality risk

ORIGINAL RESEARCH Two stage, time series study

Cause specific mortality risks associated with tropical cyclones in multiple countries and territories

Huang W, Xu R, Yang Z, et al

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Study question What is the association between tropical cyclones and cause specific mortality across countries and territories?

Methods Mortality records were collected from nine countries or territories (Australia, Brazil, Canada, South Korea, Mexico, New Zealand, the Philippines, Taiwan, and Thailand), from 2000 to 2019. Physics based models were used to estimate wind and rainfall patterns for each tropical cyclone event. Community level associations between tropical cyclones and mortality were assessed with statistical models designed to capture complex and delayed effects while controlling for natural variations in mortality counts.

Study answer and limitations Mortality risks estimated from 14.8 million deaths from various causes after 217 tropical cyclone events consistently increased, with peaks occurring within the first two weeks, followed by a rapid decline. Particularly increased mortality risks were found for renal diseases and injuries, with a cumulative relative risk of 1.92 (95% confidence interval (CI) 1.63 to 2.26) and 1.21 (1.12 to 1.30), respectively, for each additional tropical cyclone day. Relatively smaller increases were found for diabetes (cumulative relative risk 1.15, 95% CI 1.08 to 1.21), neuropsychiatric disorders (1.12, 1.05 to 1.19), infectious diseases (1.11, 1.05 to 1.17), digestive diseases (1.06, 1.02 to 1.09), respiratory diseases (1.04, 1.00 to 1.08), cardiovascular diseases (1.02, 1.01 to 1.04), and neoplasms (1.02, 1.00 to 1.04). Substantially higher mortality risks were observed in communities with greater levels of deprivation and in those with historically fewer tropical cyclones, especially for renal, infectious, and digestive diseases, and for diabetes. Rainfall related to tropical cyclones was associated with an increased exposure-response relation to mortality, particularly for respiratory, cardiovascular, and infectious diseases. Potential limitations include possible misclassification of exposure and uncertainties about the generalisability of the results beyond the regions analysed.

What this study adds Increased mortality risks from tropical cyclones were associated with a range of causes beyond injuries, and especially for renal diseases. Socioeconomically deprived populations and communities with historically fewer tropical cyclones could have substantially higher mortality risks after such events. Rainfall, rather than wind speed, was associated with a higher risk of mortality, especially for respiratory, cardiovascular, and infectious diseases.

Funding, competing interests, and data sharing Full details of funding, competing interests, and data sharing on bmj.com.

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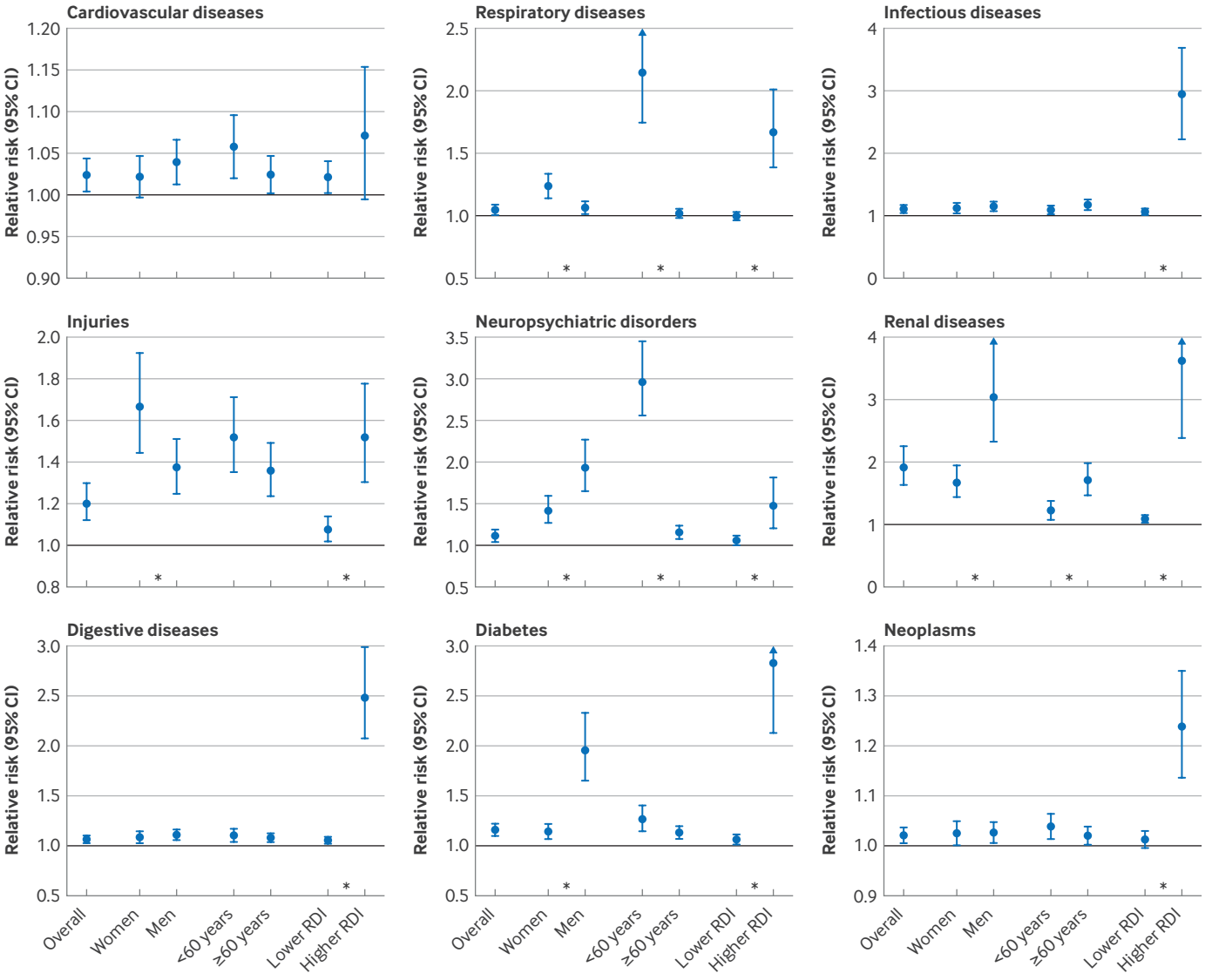

Overall and subgroup specific cumulative relative risk of cause specific mortality for each additional day during the first two weeks after a tropical cyclone. Subgroup analysis was performed by sex, age, and relative deprivation index (RDI) level (lowest 50% *v* highest 50%). Dots and whiskers indicate point estimates and 95% confidence intervals (CI), respectively. *P<0.05 for differences between groups

Tropical cyclones, commonly known as hurricanes, typhoons, or tropical storms, rank among the most destructive and costly climate extreme events worldwide.[1] As climate change accelerates, the proportion of very intense tropical cyclones (categories 4 and 5) is projected to rise by 13% globally.[2] With ongoing shifts in weather patterns, along with ageing populations and the rapid growth of coastal communities, tackling the risks posed by tropical cyclones is crucial for building resilient and sustainable communities. The urgency of this challenge has never been more pressing.

Exposure to tropical cyclones can lead to direct physical harm, such as drowning and injury, as well as indirect adverse effects, often stemming from interrupted healthcare services, contaminated floodwater, psychological distress, and infection outbreaks.[3] A growing body of epidemiological studies suggest that tropical cyclones are associated with a range of health outcomes,[3] including mortality,[4 5] hospital admissions,[6 7] adverse birth outcomes,[8] and mental health disorders.[9] Two key challenges have, however, limited previous research in this area. Firstly, most studies have focused on the health impacts of a single cyclone within a restricted geographical area and timeframe, limiting the generalisability of their findings. Secondly, exposure assessment methods and modelling strategies have varied considerably among studies, making it difficult to compare results or draw robust conclusions.

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The health impacts of tropical cyclones are predictable, disproportionate, and preventable with proper preparation

To address these gaps, Huang and colleagues examined the association between exposure to tropical cyclones and cause specific mortality across nine countries and territories, covering tropical, subtropical, and extra-tropical regions with diverse sociodemographic, infrastructure, and health service conditions.[10] Analysing data from 14.8 million deaths and 217 tropical cyclone events, the authors used well validated models to estimate wind speeds and cumulative rainfall associated with tropical cyclones, and applied a standardised two stage, time series analytical framework.

The study found that mortality risks were most pronounced for renal diseases and injuries, followed by diabetes, neuropsychiatric disorders, infectious diseases, digestive diseases, respiratory diseases, cardiovascular diseases, and neoplasms.[10] Tropical cyclone related rainfall, which typically leads to more indirect health impacts, was more strongly associated with mortality risk than tropical cyclone associated windspeeds. These findings highlight the critical importance of the indirect health effects of tropical cyclones, as many of the highest risk conditions arise not from immediate trauma but from disrupted healthcare systems, environmental contamination, and prolonged stress.

Preparedness matters

Importantly, Huang and colleagues identified substantially higher mortality risks in communities with greater deprivation, which highlights the need for targeted public health strategies that prioritise the most vulnerable populations. Socioeconomically disadvantaged communities often face multiple barriers to preparedness, response, and recovery, including limited healthcare access, inadequate housing, poor basic amenities, and lower levels of disaster awareness.[11]

Huang and colleagues' study further found that areas with less frequent cyclone exposure experienced higher mortality risks during such events.[10] Limited experience with tropical cyclones can lead to a lack of preparedness and adaptive response capabilities. One of the key limitations of this study is that tropical cyclone exposure was assessed at the community level, with all individuals in a given community assigned the same exposure level despite differences in their actual experiences. This approach can introduce exposure measurement error, potentially biasing the results towards the null and underestimating the true association.

Policy imperatives

The health impacts of tropical cyclones are predictable, disproportionate, and preventable with proper preparation. Effective adaptation planning could prioritise several key areas.

Firstly, strengthening health surveillance systems by integrating climate monitoring with public health data can provide timely and accurate warnings about tropical cyclones. This proactive approach will empower governments and communities, especially in low income and high risk areas, to prepare in advance and allocate medical resources swiftly and effectively.

Secondly, investment in resilient infrastructures against tropical cyclones is essential, with a particular focus on electrical grids, hospitals, clinics, and shelters.

Thirdly, disseminating information on health risk management after cyclones can empower individuals and communities to respond more effectively to flooding, contamination, and mental health challenges, thereby reducing indirect impacts.

Fourthly, policies must explicitly deal with the needs of the most vulnerable populations. Targeted interventions, such as prioritising these groups for evacuation, healthcare access, and recovery assistance, can help minimise the adverse health impacts of tropical cyclones.

As the intensity and frequency of tropical cyclones continue to increase, we must translate these research insights into developing cyclone specific health policies that protect the most vulnerable, building resilience against the direct and indirect health impacts of these devastating events.

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Find the full version with references at http://dx.doi.org/10.1136/bmj.r2208

Greenness and hospital admissions for cause specific mental disorders

Ye T, Huang W, Xu Z, et al

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Find this at doi: 10.1136/bmj-2025-084618

Study question Is local exposure to greenness associated with hospital admissions for mental disorders, and what proportion of hospital admissions could be reduced under greening intervention scenarios?

Methods This ecological time series study examined 11.4 million hospital admissions for mental disorders across 6842 locations in seven countries (Australia, Brazil, Canada, Chile, New Zealand, South Korea, and Thailand) between 2000 and 2019. Exposure to greenness was measured using the normalised difference vegetation index, and associations were estimated using quasi-Poisson regression models adjusted for weather, air pollution, socioeconomic indicators, seasonality, and long term trends. Hospital admissions were analysed for all cause mental disorders and six specific categories: psychotic disorders, substance use disorders, mood disorders, behavioural disorders, dementia, and anxiety. Models were stratified by sex, age, season, and urbanisation. Greenness related hospital admissions were estimated using exposure-response functions under baseline and hypothetical intervention scenarios.

Study answer and limitations During 2000-19, of hospital admissions related to mental health disorders, 30.8% (3 522 749 patients) were for psychotic disorders, 24.7% (2 821 860) for substance use disorders, 11.6% (1 325 305) for mood disorders, 7.4% (845 561) for behavioural disorders, 3.0% (348 149) for dementia, and 2.5% (283 914) for anxiety. A 0.1 increase in normalised difference vegetation index was associated with a 7% reduction in the risk of hospital admissions for all cause mental disorders (relative risk 0.93, 95% confidence interval 0.89 to 0.98) in pooled analyses. However, associations varied across countries and disorder types. Brazil, Chile, and Thailand showed consistent protective associations across most disorder categories, while modest adverse (ie, harmful) associations were observed in Australia and Canada for hospital admissions for all cause mental disorders and for several specific disorder categories. Exposure-response relations were approximately linear without clear thresholds. Limitations include potential residual confounding, ecological design, and lack of individual level exposure or outcome data.

What this study adds This large multicountry study found evidence of a statistical association between greenness and hospital admissions for mental disorders, particularly in urban areas. Findings suggest that greening interventions could contribute to reducing the burden of mental disorders, although associations were not uniformly protective across all settings.

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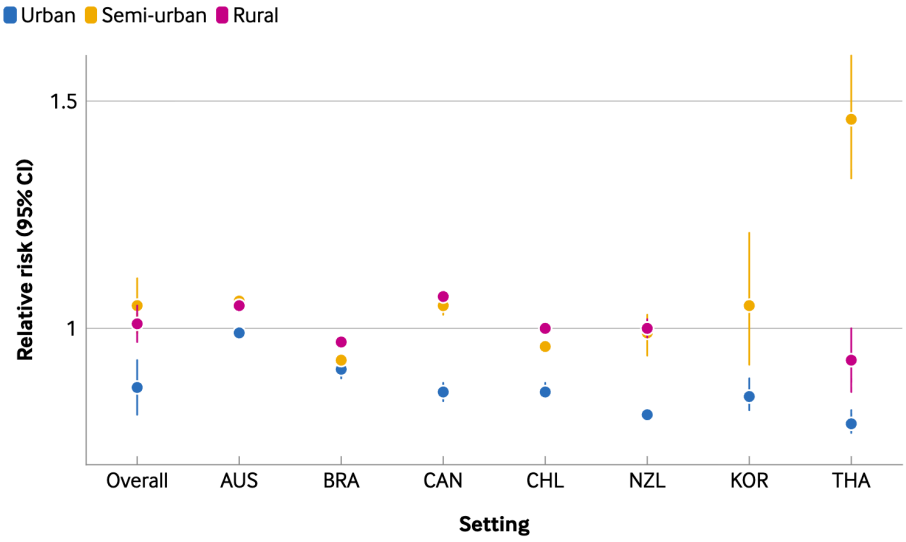

Overall pooled estimates and country specific relative risk of hospital admissions for mental disorders associated with exposure to greenness in different urbanisation categories. AUS=Australia; BRA=Brazil; CAN=Canada; CHL=Chile; CI=confidence interval; KOR=South Korea; NZL=New Zealand; THA=Thailand

Funding, competing interests, and data sharing
This study was supported by the Australian Research Council (DP210102076) and Australian National Health and Medical Research Council (GNT2000581). No competing interests declared. Environmental exposure data used in this study are publicly available from global repositories.

Prevention of acute myocardial infarction induced heart failure by intracoronary infusion of mesenchymal stem cells

Attar A, Mirhosseini SA, Mathur A, et al

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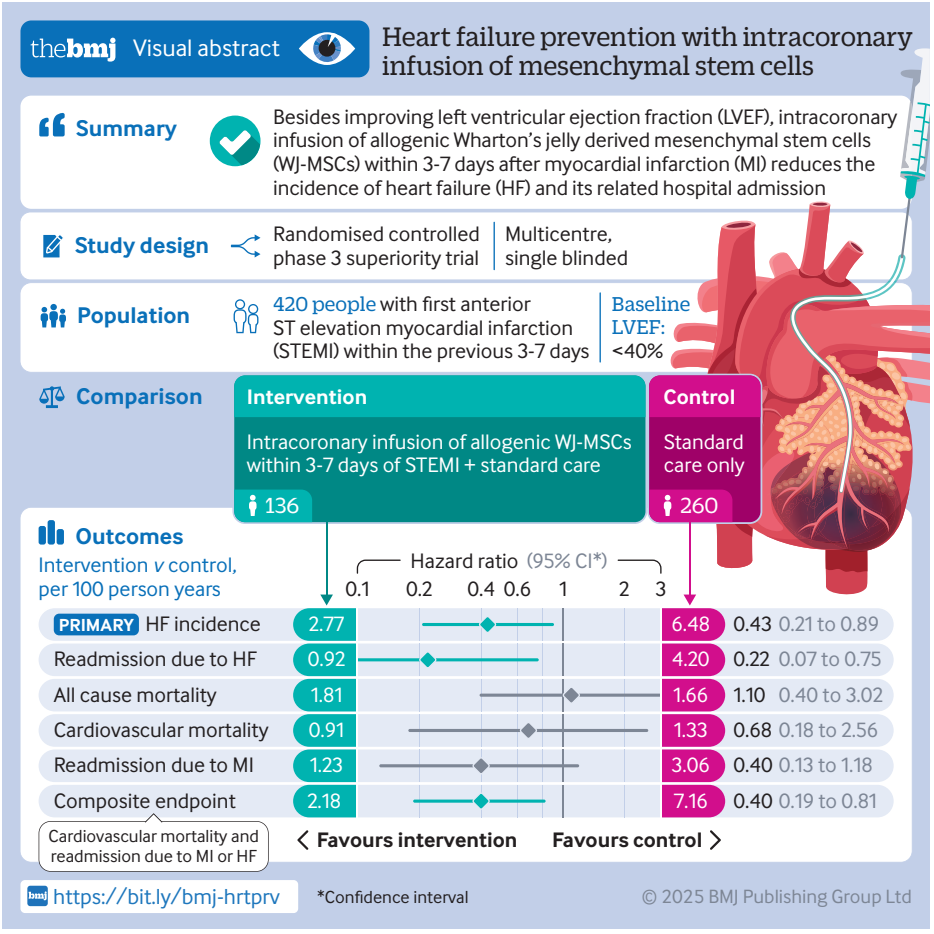
Study question Can the intracoronary infusion of Wharton's jelly derived mesenchymal stem cells (WJ-MSCs) within three to seven days of acute myocardial infarction reduce the risk of myocardial infarction induced heart failure?

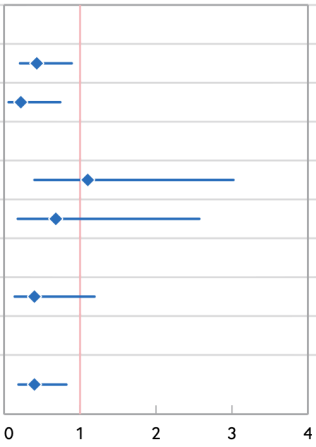
Methods This phase 3 randomised, single blinded trial was conducted at three tertiary teaching hospitals in Shiraz, Iran. Patients with a first ST segment elevation acute myocardial infarction and a left ventricular ejection fraction ‹40% were randomised to receive either intracoronary WJ-MSC infusion in addition to standard care or standard care alone. The primary outcome was the incidence of heart failure, with secondary outcomes including readmission to hospital for heart failure, all cause mortality, cardiovascular mortality, readmission for myocardial infarction, and changes in left ventricular ejection fraction at six months.

Study answer and limitations Of 420 patients recruited, a total of 136 in the intervention group and 260 in the control group were included in the final analysis. Intracoronary infusion of WJ-MSCs reduced heart failure incidence (2.77 *v* 6.48 per 100 person years; hazard ratio 0.43; P=0.024), readmission to hospital for heart failure (0.92 *v* 4.20 per 100 person years; hazard ratio 0.22; P=0.015), and a composite endpoint of cardiovascular mortality and readmission for myocardial infarction or heart failure (hazard ratio 0.40; P=0.012). Improvement in left ventricular ejection fraction was significantly greater in the intervention group (β=5.88; P‹0.001). Limitations include single blinding and lack of assessment of heart failure biomarkers.

What this study adds As well as improving left ventricular ejection fraction, intracoronary infusion of WJ-MSCs within three to seven days after acute myocardial infarction reduces the incidence of heart failure and its related hospital admission.



Outcome	Crude hazard ratio (95% CI)	P value
Heart failure		
HF incidence	0.43 (0.21 to 0.89)	0.024
Readmission to hospital for HF	0.22 (0.06 to 0.74)	0.015
Mortality		
All cause mortality	1.10 (0.40 to 3.02)	0.856
Cardiovascular mortality	0.68 (0.18 to 2.57)	0.57
Myocardial infarction		
Readmission to hospital for MI	0.40 (0.14 to 1.19)	0.099
Composite endpoint		
Cardiovascular mortality, readmission to hospital for MI or HF	0.40 (0.19 to 0.82)	0.012



Crude hazard ratios from Cox regression analysis for trial endpoints. CI=confidence interval; HF=heart failure; MI=myocardial infarction

Funding, competing interests, and data sharing The study was funded by the Office of the Vice-Chancellor for Research of Shiraz University of Medical Sciences and the National Institute for Medical Research Development. No competing interests declared. De-identified participant data underlying the results are available at https://doi.org/10.6084/m9.figshare.29375153.v2.

Study registration ClinicalTrials.gov NCT05043610.

ORIGINAL RESEARCH Single centre, double blind, placebo controlled, randomised trial

Risk of infection and wound dehiscence after prophylactic antibiotics in episiotomy or second degree tear (REPAIR study)

Perslev K, Klarskov N, Bergholt T, Jangö H

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Find this at doi: 10.1136/bmj-2025-084312

Study question Does prophylactic antibiotic treatment reduce the risk of wound complications after episiotomy or second degree tear?

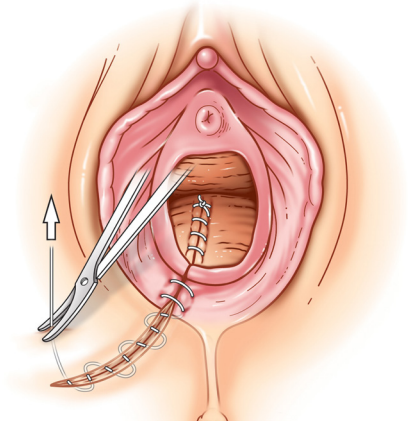
Methods This trial was conducted at a university hospital in Denmark. 442 women with an episiotomy or second degree tear were enrolled between March and December 2023. All initial clinical consultations were conducted between March 2023 and January 2024, and all long term follow-up consultations were conducted between March and November 2024. Exclusion criteria were treatment allergy (or risk of cross reactivity with related antibiotics), antibiotic use within 24 hours of delivery, non-Danish speakers, caesarean section, or episiotomy extension. Participants were randomly allocated to receive either three doses of oral amoxicillin (500 mg) with clavulanic acid (125 mg) or matching placebo, starting within six hours post partum and repeated at eight hour intervals. Follow-up was conducted four to 14 days and nine to 12 months post partum. The study only covered data from the initial consultations. The primary outcome was any wound complication, the secondary outcome was clinically relevant wound complication.

Study answer and limitations The intention-to-treat analysis of 433 women completing follow-up showed that overall wound complications occurred in 47 (22%) of 218 participants in the antibiotic group versus 62 (29%) of 215 participants in the placebo group, with a risk difference of −7.2% (95% confidence interval (CI) −15.4% to 0.8%) and a relative risk of 0.75 (95% CI 0.54 to 1.04). Clinically relevant wound complications occurred in 19 (9%) of 218 women in the intervention group versus 36 (17%) of 215 women in the placebo group, with a risk difference of −8.0% (−14.3% to −1.8%) and a relative risk of 0.52 (0.31 to 0.88). The number needed to treat was 12 (95% CI 7 to 56). Limitations include the single centre design and limited generalisability to populations with different obstetric practices.

What this study adds Prophylactic antibiotic treatment significantly reduced the risk of clinically relevant wound complications after episiotomy or second degree tear. There was no significant effect on overall wound complications, but a reduction in clinically relevant wound complications was found.

Summary of results for primary and secondary outcomes

Outcome	Antibiotic (n=218)	Placebo (n=215)	P value	Risk difference (%; 95% CI)	Relative risk (95% CI)
Primary: wound complications	47 (21.6)	62 (28.8)	0.10	−7.2 (−15.4 to 0.8)	0.75 (0.54 to 1.04)
Secondary: clinically relevant wound complications	19 (8.7)	36 (16.7)	0.01	−8.0 (−14.3 to −1.8)	0.52 (0.31 to 0.88)



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Funding, competing interests, and data sharing
Funded by the Research Unit and Department of Gynaecology and Obstetrics, Herlev Hospital, Denmark. No competing interests declared. Data are openly and publicly available at https://dataverse.deic.dk/dataset.xhtml?persistentId=doi:10.60612/DATADK/WTK5BD.

Study registration 2022-501930-49-00 (euclinicaltrials.eu), NCT05830162 (ClinicalTrials.gov).

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***BMJ* 2025;391:e084729.**
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Profit margin and odds of treatment use.