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**Proceedings Paper:**

Webster, J., Greenwood, D.C. [orcid.org/0000-0001-7035-3096](https://orcid.org/0000-0001-7035-3096) and Cade, J.E. (2023) Risk of hip fracture in meat-eaters, pescatarians, and vegetarians: results from the UK Women's Cohort Study. In: *Annals of Nutrition and Metabolism*. IUNS 22nd International Congress of Nutrition, 06-11 Dec 2022, Tokyo, Japan. Karger , pp. 822-823.

<https://doi.org/10.1159/000530786>

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## **Risk of hip fracture in meat-eaters, pescatarians, and vegetarians: results from the UK Women's Cohort Study**

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**Background and objectives:** Hip fracture affects 18% of women globally, increases morbidity and mortality, and reduces quality of life. There are growing concerns regarding the adequacy of plant-based diets for bone health, but their association with hip fracture risk is unclear. We aimed to investigate the risk of hip fracture in occasional meat-eaters, pescatarians, and vegetarians compared to regular meat-eaters in the UK Women's Cohort Study, and to determine if potential associations between each diet group and hip fracture risk are modified by body mass index (BMI).

**Methods:** UK women, ages 35–69 years, were classified as regular meat-eaters, occasional meat-eaters, pescatarians, or vegetarians based on a survey that collected dietary and lifestyle information at recruitment (1995–1998), including a validated 217-item food frequency questionnaire. Incident hip fractures were identified by record linkage to Hospital Episode Statistics up to March 2019. Cox regression models were used to estimate associations between each diet group and hip fracture risk, with regular meat-eaters as the reference, over a mean follow-up time of 21.1 years.

**Results:** Among 30,244 women, 993 hip fracture cases were observed (637,427 person-years). After adjustment for confounders, vegetarians (HR (95% CI): 1.36 (1.06, 1.75)) but not occasional meat-eaters (1.01 (0.86, 1.19)) or pescatarians (0.99 (0.76, 1.28)) had a greater risk of hip fracture than regular meat-eaters. Hip fracture risk appeared higher in vegetarians with a BMI < 23.5 (1.52 (1.12, 2.07)) than in vegetarians with a BMI > 23.5 (1.04 (0.68, 1.60)), but there was no evidence of effect modification by BMI in any diet group.

**Conclusions:** Vegetarian women had a higher risk of hip fracture than regular meat-eaters. Further research is needed to confirm this in other populations, and to identify factors responsible for the observed risk difference. In particular, further research exploring the role of BMI and nutrients abundant in animal-sourced foods is recommended.

**Keyword:** Nutrition, Vegetarian, Hip fracture, BMI, cohort study