

The association between wearing a personal floatation device and death by drowning among recreational boaters; a matched cohort analysis of United States Coast Guard data

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Personal flotation devices (life jackets, life vests) were devised to float persons thereby preventing drowning. Descriptive studies from Canada and US show very low PFD use (15%) in fatal boat related drowning. However, scientific evidence for their ability to prevent drowning death has been missing. Randomized controlled studies that could show causation are lacking. Case control studies cannot prove causation but could evaluate the association between PFD use and survival.

To estimate the association between wearing a PFD and drowning death among recreational boaters, we conducted a matched cohort study analysis of U.S. Coast Guard (USCG) data. Matched cohort analysis has been used to assess the efficacy of seatbelts and airbags in motor vehicles. It compares persons from the same vessel, who can be considered a matched set, has the advantage of comparing people at the same time of day, water and weather conditions, distance to shore, and proximity to help. The USCG collects boating accident reports of fatalities. From these we studied recreational boaters during 2000–2006 who were with others in a boat that capsized or sunk and where at least one person died of drowning.

We evaluated each boaters' age, gender, and whether they were wearing a PFD, whether they died or survived. The main outcome measure we assessed was the risk ratio [RR] for drowning death of boaters who were wearing a PFD compared to those not wearing a PFD. We excluded boaters who died of causes other than drowning, those who would have died regardless of PFD use, and those with missing records.

Approximately 4915 boater records from 1809 vessels may have been eligible for our study, but due to missing records and other problems we restricted our analysis to 1597 boaters in 625 vessels with 878 drowning deaths. We used multiple imputation for missing data on age and sex. When we compared persons from the same vessel, the unadjusted RR was 0.50 (95% CI 0.34 to 0.71); when we adjusted for sex and age, it was 0.51 (95% CI 0.35 to 0.74). When we omitted the 120 boaters in 50 vessels with a person who entered the water for rescue or to swim to safety, the adjusted RR was 0.53 (95% CI 0.36 to 0.77). When we analyzed only the 201 vessels with complete data for their 497 boaters and accounted for matching, the adjusted RR was 0.49 (95% CI 0.31 to 0.78).

Our RR estimate might have differed if we could have analyzed data from all vessels that met our study criteria. The direction and severity of any bias is unknown, but it could be substantial. While we adjusted for age and sex, we could not adjust for some variables that may be important such as alcohol use and swimming ability because that information was not available.

Conclusions: If the estimated association is causal, wearing a PFD may potentially prevent 1 in 2 drowning deaths among recreational boaters. But this estimate may be biased because we had to exclude many vessels from the analysis.

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