Watching Television and Risk of Mortality From Pulmonary Embolism Among Japanese Men and Women

The JACC Study (Japan Collaborative Cohort)

Although case series reporting pulmonary embolism or deep vein thrombosis after prolonged television watching have been published,1 no prospective study has examined the association between time spent watching television and the risk of mortality from pulmonary embolism. We examined this association in a large cohort study of Japanese men and women.

The Japanese Collaborative Cohort Study is a population-based cohort study that started between 1988 and 1990 in 45 regions of Japan involving 110 585 participants 40 to 79 years of age.2 Written or verbal informed consent was obtained according to the guidelines of the Council of International Organizations of Medical Science.3 This study was approved by the ethics committees of the Nagoya University and Osaka University. After the exclusion of those who did not provide information about time spent watching television and those who reported a history of cancer, stroke, myocardial infarction, or pulmonary embolism, 86 024 participants (36 006 men and 50 018 women) were included in the analysis. Baseline information was collected by a self-administered questionnaire that included items about demographic characteristics, medical history, and lifestyle factors. Participants were asked for their average time spent watching television in hours per day and were classified into the prespecified 3 categories of <2.5, 2.5 to 4.9, and ≥5.0 h/d. Mortality from pulmonary embolism was ascertained on death certificates until the end of 2009.

Hazard ratios for mortality from pulmonary embolism according to hours spent watching television were estimated with a Cox proportional hazards model. Hours spent watching television was evaluated as a categorical variable and separately as a continuous variable for each 2-hour increment. Covariates in the models were age (continuous), sex (female or male), body mass index (quintile), history of hypertension (yes or no), history of diabetes mellitus (yes or no), smoking status (nonsmokers, ex-smokers, or <20 or ≥20 cigarettes per day), perceived mental stress (low, moderate, or high), educational level (13–15, 16–18, or ≥19 years of age on completion of education), walking activity (almost never or 0.5, 0.6–0.9, or ≥1 h/d), and sports activity (almost never or 1–2, 3–4, or ≥5 h/wk). Missing data were allocated to another category for each covariate. All statistical analyses were performed with SAS 9.4 software (SAS Institute, Cary, NC).

During the median follow-up of 19.2 years, 59 deaths resulting from pulmonary embolism were documented. Television time was positively associated with the risk of mortality from pulmonary embolism, with multivariable hazard ratios of 1.7 (95% confidence interval, 0.9–3.0) for those watching television for 2.5 to 4.9 h/d and 2.5 (95% confidence interval, 1.2–5.3) for ≥5 h/d compared with <2.5 h/d (Table). The mortality rate from pulmonary embolism was 8.2 per 100 000 person-years among those watching television ≥5 h/d. An additional 2 hours of watching television was associated with an increased risk of mortality from pulmonary embolism, with a multivariable hazard ratio of 1.4 (95% confi-
Among the covariates, advancing age was positively associated with pulmonary embolism mortality. The exclusion of deaths within 5 years from the baseline survey did not change the results.

Our results are consistent with previous studies. In the Nurses’ Health Study, time spent sitting at home was linearly associated with an increased risk of incident pulmonary embolism among 99,290 nurses 44 to 69 years of age.\(^4\) The participants in the highest category, who sat for ≥41 h/wk, had an increased risk of incident pulmonary embolism (multivariable hazard ratio, 2.3; 95% confidence interval, 1.3–4.2) compared with those in the lowest category, who spent <10 hours sitting per week. A meta-analysis of 14 studies (11 case-control studies, 2 cohort studies, and 1 case-crossover study) showed that long-distance travel is associated with an increased risk of incidence of or mortality from deep vein thrombosis or pulmonary embolism, with an 18% higher risk for each 2-hour increment in travel duration.\(^5\)

The potential mechanism may be venous stasis caused by prolonged sitting. Although hypercoagulability and endothelial abnormality may also be involved in the pathogenesis, related risk factors such as obesity, history of hypertension, history of diabetes mellitus, and cigarette smoking were not significantly associated with the risk of mortality from pulmonary embolism in the present study.

Our study has several limitations. First, mortality from pulmonary embolism was confirmed from death certificates; therefore, the observed mortalities from pulmonary embolism may be underestimated. Second, the information about hours spent watching television was collected on only 1 occasion during the baseline survey. Changes in television watching time during the follow-up period may have affected the relationship we examined herein. Time sitting before personal computers or smartphones may be replacing time spent watching television, which needs further research in the future.

In conclusion, our prospective cohort study suggests that prolonged television watching is a substantial risk factor for mortality from pulmonary embolism.

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**Disclosures**

None.

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**Footnotes**

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REFERENCES


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