INTRODUCTION

Over six million U.S. adults smoke smokeless tobacco products (ST). However, few studies have systematically evaluated the relationship between ST use and a broad array of mortality outcomes, and these studies are generally limited by sample size and others were conducted decades in the past. Since ST remains a significant source of tobacco exposure in the USA, a current assessment of the possible mortality risks associated with ST use is needed.

METHODS

We estimated mortality hazard ratios (HR) using Cox proportional hazards regression models. The models included gender, race/ethnicity, age, body mass index (BMI), educational status, income, self-assessed health status, and tobacco use variables. We defined gender (male vs. female), race/ethnicity (nonwhite vs. nonwhite), family income (at least $20,000 or less than $20,000), educational status (no more than high school or more than high school), and self-assessed health status at the time the survey was administered (at least good health or less than good health) as dichotomous variables. Age and BMI were used as continuous variables.

RESULTS

We used the National Health Interview Surveys (NHIS) for 1987, 1991-1992, 1998, 2000, and 2005 to determine survey respondents’ ST use and cigarette smoking status in the USA. These surveys were chosen because they include survey items required to determine respondents’ relevant tobacco use status and contain sufficient numbers of respondents linkable to mortality data. We calculated the public use 2011 update to the NDI data linkable to these survey years from the National Center for Health Statistics (NCHS) and merged these onto the NHIS survey data using the merge key specified by NCHS. We merged survey years to provide a larger pooled dataset following NHIS guidelines.

The data set comprised 151,539 total observations with 29,093 mortality events, including 3,048 current ST users with 659 mortality events and 36,990 current smokers with 6,334 mortality events. We conducted similar analyses using mortality linkages for National Health and Nutrition Examination Survey (NHANES) III and Continuous NHANES.

MATERIALS AND METHODS

Data Sources

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Variables

We defined current ST users and cigarette smokers as those respondents who indicated they used either product category at the time of the survey. ST users included both “snuff” and “chewing tobacco” users. The NHIS survey instrument skip pattern first ascertains whether respondents have met lifetime criteria but indicated not using the product(s) at least good health or less than good health) as dichotomous variables. Age and BMI were used as continuous variables.

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RESULTS

A. All-Cause Mortality

B. Malignant Neoplasms

C. Diseases of the Heart

D. Chronic Lower Respiratory Diseases

CONCLUSIONS

• HR for current ST users who reported never smoking cigarettes were not significantly different from those for never tobacco users for any of the outcomes assessed.

• In contrast, HR for current smokers who reported never using ST were significantly elevated compared to never tobacco users for all causes mortality, certain chronic diseases, neoplasms, diseases of the heart, chronic lower respiratory diseases, cerebrovascular disease, diabetes, influenza/pneumonia, and other (residual) causes of mortality. Our findings linked to the health risks associated with cigarette smoking are generally similar to those reported in the published literature.

• HR were not different for current smokers who also reported use of ST (dual users) relative to current smokers who never used ST.

• In addition, HR for former smokers who reported current ST use were not different compared to former cigarette smokers who reported never using ST.

• The strengths of this study are its large size, prospective nature, and that respondents are drawn from a nationally representative probability sample. A limitation of this study is that exposure assessed at baseline only and people may change their tobacco use behavior over time.

REFERENCES


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