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CIGARETTE SMOKING, MORTALITY, INSTITUTIONAL AND COMMUNITY-BASED CARE UTILIZATION IN AN ADULT COMMUNITY

Robert M. Kaplan, PhD; Deborah L. Wingard, PhD; Janice B. McPhillips, MS; Denise Williams-Jones; and Elizabeth Barrett-Connor, MD

ABSTRACT: We evaluated mortality and health services utilization in a prospective study of 630 older residents of a Southern California community. All participants were 65 years or older when initially evaluated in 1973-1975. In addition to being followed for vital status each year, participants were reinterviewed in 1984-1986 and asked about nursing home, hospital, and community-based care for the interim period. Current cigarette use in 1973-1975 was a significant predictor of mortality for both men and women. In addition, former smoking status (before 1973-1975) significantly predicted both mortality and hospital inpatient utilization in men and women combined. However, smoking was not significantly associated with nursing home utilization or use of three categories of community-based care services. More research is necessary to identify the relationship between cigarette smoking and outpatient service use. The findings for mortality and inpatient hospital service utilization reaffirm the hazards of cigarette smoking.

INTRODUCTION

Despite the volume of literature on the risks of cigarette smoking, there are relatively few published studies describing the impact of cigarette smoking upon the later need for institutional care. Wingard

Robert M. Kaplan is Professor of Community and Family Medicine and Associate Director of the Cancer Center, University of California, San Diego; Deborah L. Wingard is Associate Professor of Community and Family Medicine, University of California, San Diego; Janice B. McPhillips is Research Analyst, Pawtucket Heart Health Program, Memorial Hospital of Rhode Island; Denise Williams-Jones is Staff Research Associate, Department of Psychiatry, University of California, San Diego, California; and Elizabeth Barrett-Connor is Professor and Chair, Department of Community and Family Medicine, University of California, San Diego.

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Requests for reprints should be addressed to: Robert M. Kaplan, PhD, Division of Health Care Sciences, 0622, Department of Community and Family Medicine, University of California, San Diego, La Jolla, CA 92093-0622.

and colleagues[1] reviewed the literature on nursing home utilization and discovered that prospective and cross-sectional studies often produced conflicting results. In addition, prospective studies have rarely considered measures of health habits as predictors of later utilization. The effect of smoking upon health service utilization is not well studied. Data from the National Health Interview Survey[2] show that there is an excess of limitations in activity for male smokers older than 65 years of age in comparison to former and never smokers. However, there was no similar excess in limitations for younger male current smokers or for female current smokers in any age group.

In this paper, we consider the impact of cigarette use upon mortality, hospitalizations, nursing home admissions, and community-based care use among residents of an adult retirement community in Southern California.

METHODS

Between 1972 and 1974, residents of an upper-middle class community in Southern California were surveyed for heart disease risk factors as part of the Lipid Research Clinic Prevalence Study. Eighty-two percent of community residents who were 40 years or older participated (N = 4,510). The population has been described in detail.[3] Approximately one-third of this cohort (N = 1,504) was reexamined between 1973 and 1975. At this point, more detailed information was obtained. Cigarette smoking was determined by a standardized questionnaire. Three categories of smoking were created: former, current, and never smoking. Former smoker was defined as having been a smoker who had quit for at least two years. No questions were asked about duration or amount smoked. Between 1984 and 1986, information was obtained about nursing home and medical service utilization in the time since the latter visit.[4] The information included reason for institutionalization, duration, frequency, and type of admission to nursing homes, hospitals, or other institutions. In addition, information about community-based alternative service use was obtained. Telephone interviews were conducted with the participants, or, if deceased, with their next of kin. Vital status was known for 99% of the cohort. Death certificates were obtained for all decedents and coded to the 9th revision of the International Classification of Disease.

The target population for this analysis consisted of the 760 adults age 65 years or older when evaluated between 1973 and 1975. For this analysis, institutional care included two categories; hospital stay of two weeks or more and/or admission to a nursing home, convalescent hospital, or residential health care facility. Community-based care was separated into three categories: rehabilitative care services such as nursing or physical therapy, personal care serv-

ices such as bathing or dressing, and household chore assistance such as cooking and transportation. Because of the relative affluence of this population, maids, gardeners, handymen and laundry services were excluded from this definition.

Rates of institutional and community-based care, as well as death rates, were adjusted by the direct method using the age distribution of the entire sample as the standard. Differences in rates were compared via the Mantel-Haenszel Summary Chi Square with one degree of freedom.[5] Linear trends were evaluated using the Mantel Extension test for trend.[6]

RESULTS

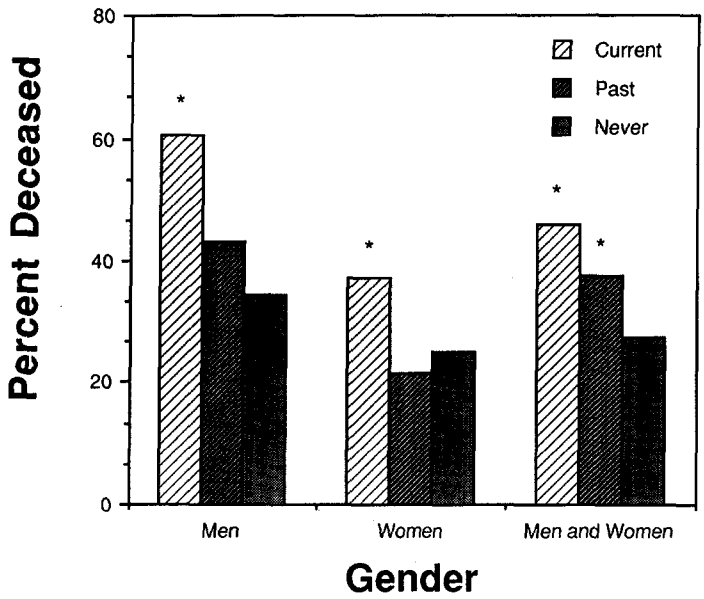
New data on 630 members of the original cohort, who were 65+ years of age at baseline were obtained in the 1984-1985 interview. This represents a response rate of 82%. Respondents and non-respondents were compared and found to be similar on a wide variety of variables.[7] Among comparisons on many variables, only two significant differences were observed. Respondents were somewhat younger at baseline than the non-respondents, (70.7 and 72.5 years, respectively, $p = 0.001$). In addition, a lower percentage of the respondents were hypertensive than the non-respondents (26.8% and 36.2%, respectively). The interval from the baseline visit to the current interview during which information on the use of services was ascertained ranged from 0 (a few participants died the same year as their baseline evaluation) to 14 years. The mean interval was 10.1 years. A total of 215 of these elderly subjects were deceased by the time of the interview, a 14 year death rate of 35%.

Mortality. The mortality experiences of male and female participants are shown by smoking status in Figure 1. By 1984-1986, 60% of the men who were smoking at the 1972-1974 visit had died in comparison to 43% of the past smokers and 34.6% of the never smokers. For women, 37.3% of those who reported that they were smoking at the initial visit had died in comparison to 21.7% of the past smokers and 25% of the never smokers. Differences between current smokers and never smokers were statistically significant for both men and women.

Institutional and Community Based Care. Use of 2 categories of institutional care and 3 categories of community-based care is presented in Table 1. For men, 45.2% of the current smokers had used institutional care as opposed to 42.0% of past smokers and 28.9% for never smokers. For women, 40.3% of the current smokers had used institutional care in comparison to 36.3% for past smokers and 32.7% for never smokers.

FIGURE 1

Age adjusted mortality by gender and smoking status: Rancho Bernardo, CA 1973–1986. * significantly different from never smokers (p 0.05).



The major diagnoses for those receiving institutional care were cancer, heart disease, and dementia. All differences for community-based care were non-significant.

Table 1 separates institutional care into hospital care and nursing home care for both men and women. As the table shows, current and past smokers were more likely to have used hospital care, but not more likely to have used nursing home care than never smokers. The findings for hospital use are statistically significant when men and women are combined. For community-based care, the relationship between smoking status and the use of rehabilitation, personal care, and assistance with household chores, was not systematic for men or women. Following initial hospitalization, smokers survived 1.6 years, while past and never smokers survived 1.8 and 2.1 years respectively. These differences were non-significant using an analysis of variance test for linear trend ($p=0.42$).

TABLE 1

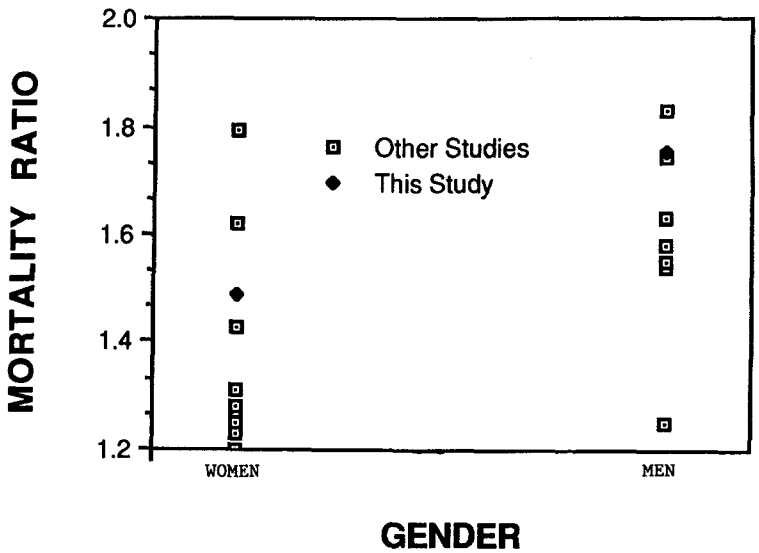
Age-Adjusted Rates of Specific Institutional Care and Community-Based Care By Smoking Status: Rancho Bernardo, CA, 1973-1986

Gender and smoking status	*N*	*Institutional care*				*Community-based care*					
		Hospital stay†		*Nursing Home stay‡*		*Rehabilitation care*		*Personal care*		*Household chores§*	
		n	*(%)*	*n*	*(%)*	*n*	*(%)*	*n*	*(%)*	*n*	*(%)*
Men											
Current	36	17	(45.2)	4	(10.2)	11	(29.5)	8	(18.8)	11	(29.5)
Past	189	82	(42.0)	26	(13.3)	54	(29.0)	44	(23.8)	47	(24.7)
Never	63	19	(28.9)	6	(9.5)	21	(34.8)	12	(19.4)	17	(27.9)
Women											
Current	51	20	(40.3)	5	(11.6)	15	(29.1)	13	(27.0)	15	(35.7)
Past	81	28	(36.3)	11	(14.9)	16	(18.4)	18	(23.5)	26	(34.1)
Never	199	65	(32.7)	29	(14.6)	54	(28.0)	49	(24.8)	70	(36.1)
Men & women											
Current	87	37	(42.3)*	9	(11.2)	26	(29.2)	21	(25.8)	26	(32.4)
Past	270	110	(41.0)*	37	(13.7)	70	(26.4)	62	(23.7)	73	(27.3)
Never	262	84	(31.9)	35	(13.1)	75	(29.5)	61	(23.3)	87	(33.8)

*p≤0.05 (compared to nonsmokers)
†two weeks or more
‡any duration
§excluding maids, gardeners, handymen and laundry workers

FIGURE 2

Comparison of present results with former studies.



DISCUSSION

As summarized in Figure 2, our results are consistent with a wide variety of studies demonstrating the relationship between cigarette use and mortality.[8] For women, the mortality ratio (1.48) in the present study exceeds all but two of the previously reported studies. For men, the present ratio (1.75) is within the range of those previously reported although somewhat higher than most studies. These results suggest that cigarette use in this population had the same detrimental health effects as it did in other epidemiologic studies, and that this effect persists into old age.

Our data also suggest that cigarette use increases the use of hospital care. These data are consistent with a retrospective study by Vogt and Schweitzer[9] which showed that cigarette smokers use more inpatient services than nonsmokers. The Vogt and Schweitzer study also observed increased inpatient hospital utilization for current smokers in comparison to former smokers and never smokers. However, they found that former smokers, but not current cigarette consumers, used more outpatient services than never smokers. Vogt and Schweitzer failed to find a

systematic relationship between the number of cigarettes smoked and service utilization. A recent analysis of data from the RAND Health Insurance Experiment found very weak associations between smoking and use of sick leave.[10] Freeborn, Mullooly, Pope and McFarland[11] compared smoking behavior of high and low users of the Kaiser health maintenance organization. They found that, between the years 1970 and 1974, high users of outpatient services were more likely to be current or former smokers than were low users. Further, there was a trend toward greater use of hospital care in the smoking groups. However, when the same group was followed an additional five years (1975-1979) differences between smoking groups were non-significant for the total ten year interval. Although more research is needed, our results appear consistent with several previous reports.

Studies of health services utilization may suffer from survivor bias. Because of the effect of smoking upon mortality, smokers may not live long enough to get into acute or chronic care situations. Early mortality may cause underestimates of hospitalization because smokers have a lower probability of reaching the ages most associated with long term care use. However, our data suggest that smokers do not die more promptly after an initial hospitalization than do never smokers. Further, smokers were rehospitalized more often after the initial episode. For both smokers and non-smokers, institutionalization increases dramatically in the year prior to death, regardless of baseline age.[4,7]

This study may also suffer from recall bias, since subjects were asked to recall service use over a long period of time. However, it is unlikely that such recall bias would vary by baseline smoking status. In order to check whether the utilization rates were reasonable, we reviewed studies of institutionalization that were summarized in our earlier review.[1] There is considerable variability across studies in the reported rates. However, previous prospective studies that have analyzed nursing home records have shown rates of 12% over time,[12] which is comparable to our rates for nursing homes. Although recall bias cannot be dismissed it is reassuring that our rates approximate rates observed by others. Our study may also have included a bias due to the self-reporting of smoking. However, the self-report bias may not have been severe, since self-reported smoking did predict mortality. A related problem was the crudeness of our smoking measure. The data base allowed only the categorization of current, past and never smoker instead of the more refined measure of pack-year exposure. We are uncertain if the results would be different had a more refined measure been used.

The weak association between smoking status and need for com-

munity-based care services is of interest. Despite limitations of this study, the results are consistent with the National Health Interview Survey[2] that also demonstrates weak relationships between smoking status and activity limitations for both men and women.

In conclusion, these findings confirm earlier studies linking cigarette smoking to mortality. In addition, they provide prospective evidence that cigarette smoking increases the use of hospital services. However, our data do not clearly suggest that current or past smokers are more likely to enter a nursing home or require assistance with self-care activities.

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