Antiperspirant Use and the Risk of Breast Cancer

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The rumor that antiperspirant use causes breast cancer continues to circulate the Internet. Although unfounded, there have been no published epidemiologic studies to support or refute this claim. This population-based case–control study investigated a possible relationship between use of products applied for underarm perspiration and the risk for breast cancer in women aged 20–74 years. Case patients (n = 813) were diagnosed between November 1992 and March 1995; control subjects (n = 793) were identified by random digit dialing and were frequency-matched by 5-year age groups. Product use information was obtained during an in-person interview. Odds ratios (ORs) and 95% confidence intervals were estimated by the use of conditional logistic regression. *P* values were determined with the Wald χ^2 test. All statistical tests were two-sided. The risk for breast cancer did not increase with any of the following activities: 1) antiperspirant (OR = 0.9; *P* = .23) or deodorant (OR = 1.2; *P* = .19) use; 2) product use among subjects who shaved with a blade razor; or 3) application of products within 1 hour of shaving (for antiperspirant, OR = 0.9 and *P* = .40; for deodorant, OR = 1.2 and *P* = .16). These findings do not support the hypothesis that antiperspirant use increases the risk for

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breast cancer. [J Natl Cancer Inst 2002;94:1578–80]

In the last decade, the public has been faced with a seemingly endless number of reports that claim another agent in the modern environment is associated with the risk of developing cancer. A news item appearing in the September 20, 2000 issue of the Journal *(1)* highlighted the increasing prevalence of such reports and their widespread circulation on the Internet. One rumor in particular, that antiperspirant use causes breast cancer, received such intense interest that a number of cancer research and information organizations were forced to post statements denying the link between breast cancer and the use of antiperspirants *(1)*. Although there are no published reports in the scientific literature to suggest a biologic mechanism by which the use of antiperspirants could cause breast cancer and no epidemiologic study of this question has been reported, public concern has persisted.

We conducted a population-based case–control study of breast cancer in western Washington State, described more fully elsewhere *(2,3)*. Eligible case patients were women aged 20–74 years who were first diagnosed with breast cancer from November 1992 through March 1995. Control subjects were women without breast cancer, identified by random-digit dialing from the same population as the case patients, who were frequency-matched to the case patients by 5-year age groups. An in-person interview was used to gather information on a large number of past exposures of interest. During the development of the questionnaire, we became aware of a concern that the use of products for underarm perspiration might be related to the risk for breast cancer. Specifically, there was concern that such products might contain harmful substances that could be absorbed via small nicks or abrasions caused by hair removal. Consequently, we included a question to ascertain whether the respondent regularly shaved under her arms. For those who responded affirmatively, we asked whether she applied anything for underarm perspiration and, if so, which products she used, and whether any of the products were applied within 1 hour of shaving. The Fred Hutchinson Cancer Research Center Institutional Review Board approved all procedures for contacting potential participants, obtaining informed consent, and collecting all data. All participants provided written informed consent before participation.

Several measures of antiperspirant use were constructed to evaluate a possible relationship to breast cancer, including ever regular antiperspirant use, exclusive use of antiperspirant (versus deodorant or talc products), and application typically within 1 hour of shaving. Because many subjects reported the use of deodorants, the three measures of product use listed above were also evaluated for deodorants. Additional analyses were conducted by stratifying on the use of a blade (i.e., nonelectric) razor to evaluate whether the relationship between antiperspirant use and the risk for breast cancer differed according to this method of underarm hair removal. This analysis was prompted by a concern that small nicks in the skin from the use of a blade might facilitate the absorption of harmful substances in the products. Odds ratios and 95% confidence intervals were used to estimate relative risks with conditional logistic regression *(4)* (SAS procedure PHREG, SAS/STAT release 6.11; SAS Institute, Inc., Cary, NC). All models were conditional on 5-year age strata, with adjustment for a number of factors associated with the risk for breast cancer previously identified in this study *(3)*. Statistical significance of the odds ratios was evaluated with the Wald χ^2 test. All statistical tests were two-sided.

Approximately 78% (n = 813) of the eligible case patients and 75% (n = 793) of the eligible control subjects agreed to participate and were interviewed for this study *(2,3)*. A total of 810 case patients and 793 control subjects provided complete information on underarm hair removal. Nearly all case patients and control subjects had at some point in their lifetime regularly used at least one method of underarm hair removal (94% of case patients and 93% of control subjects), with the most common method reported as shaving with a blade razor. Of the subjects who reported the use of at least one method of underarm hair removal, case patients were less likely than control subjects to have used antiperspirant regularly (50% of case patients versus 56% of control subjects), to have used antiperspirant exclusively (24% of case patients versus 30% of control subjects), or to report application of antiperspirant within 1 hour of shaving (36% of case patients versus 40% of control subjects). Table 1 displays the results from the regression analyses of product use and the risk for breast cancer. There was no evidence of an association between the risk of breast cancer and any of the three measures of antiperspirant use. Compared with subjects who did not use antiperspirant, there was no evidence that subjects who reported the use of a blade razor for underarm hair removal were at an increased risk for breast cancer from antiperspirant use, or that subjects who reported applying antiperspirant within 1 hour of shaving with a blade razor were at an increased risk for breast cancer (data not shown).

Deodorant use was more prevalent than antiperspirant use: among subjects who used at least one method of underarm hair removal, 71% of case patients and 65% of control subjects reported having used deodorant regularly. Case patients were more likely to report the use of deodorant exclusively compared with control subjects (43% of case patients versus 38% of control subjects) and were more likely to report applying deodorant within 1 hour of shaving (49% of case patients versus 43% of control subjects). Similar to the results for antiperspirant use, there was no evidence of an association between the risk for breast cancer and any of the three measures of deodorant use (Table 1). There was also no evidence that subjects who reported using a blade razor were at an increased risk for breast cancer from deodorant use, or that subjects who reported applying deodorant within 1 hour of shaving with a blade razor were at an increased risk (data not shown).

To our knowledge, this is the only epidemiologic evidence pertaining to a possible association of the risk for breast cancer with use of underarm antiperspirants or deodorants, and our results provide no indication that such a relationship exists. The strength of these results may be limited somewhat by the lack of more detailed information on specific patterns of product use and by the self-reported nature of the data. However, the comprehensive assessment of both antiperspirant and deodorant use helps to address the possibility that subjects may have reported the use of an antiperspirant when, in fact, the product ap-

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Table 1. Odds ratios (ORs) for breast cancer and self-reported regular use of antiperspirant or deodorant, for subjects who report the use of at least one method of underarm hair removal

Product use	No. of case patients (%)*	No. of control subjects (%)*	OR† (95% CI)‡	*P* value§
Antiperspirant				
Exclusively				
No	513 (75.1)	472 (69.5)	1.0 (referent)	
Yes	170 (24.9)	207 (30.5)	0.8 (0.6 to 1.0)	.12
Ever regularly				
No	331 (48.5)	296 (43.6)	1.0 (referent)	
Yes	352 (51.5)	383 (56.4)	0.9 (0.7 to 1.1)	.23
Regularly within 1 hour of shaving				
No	428 (62.8)	399 (58.8)	1.0 (referent)	
Yes	253 (37.2)	279 (41.2)	0.9 (0.7 to 1.1)	.40
Deodorant				
Exclusively				
No	400 (58.6)	421 (62.0)	1.0 (referent)	
Yes	283 (41.4)	258 (38.0)	1.1 (0.9 to 1.4)	.41
Ever regularly				
No	206 (30.1)	238 (35.0)	1.0 (referent)	
Yes	479 (69.9)	441 (65.0)	1.2 (0.9 to 1.5)	.19
Regularly within 1 hour of shaving				
No	355 (52.0)	381 (56.4)	1.0 (referent)	
Yes	327 (48.0)	294 (43.6)	1.2 (0.9 to 1.5)	.16

*Percentages were calculated from the total number of case patients/control subjects who reported the use of at least one method of hair removal and had complete data on risk factors and the product-use measure of interest.

†Logistic regression models are conditional on 5-year age strata; ORs were adjusted for parity, age at first pregnancy, mother/sister breast cancer, double oophorectomy when younger than age 40 years, oral contraceptive use, ever upper gastrointestinal x-ray series, and ever smoker (all subjects); mother/sister breast cancer when younger than age 45 years and alcohol intake (if premenopausal); and hormone replacement therapy (if postmenopausal).

‡CI = confidence interval.

§*P* values were determined by using a two-sided Wald χ^2 test.

plied was actually a deodorant (or vice versa) or the combination of an antiperspirant and a deodorant. These findings are based on data collected from a large population-based study of rigorous design, and as such, the absence of any observed associations may help alleviate the concern of many that use of underarm antiperspirants or deodorants could alter their risk for breast cancer.

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NOTE

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