Utilization of Preventive Health Care in Adults and Children With Eczema

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Introduction: Chronic disease is a barrier to delivery of preventive health care and health maintenance. However, health behaviors of adults and children with eczema, a chronic skin disorder, have not been examined. This study examined associations of eczema with vaccination, disease screening, health maintenance, and healthcare utilization.

Methods: This study investigated 34,613 adults and 13,298 children from the 2012 National Health Interview Survey, a prospective questionnaire-based study. Data were analyzed between August 2014 and January 2015.

Results: Adult eczema was associated with higher odds of vaccination for tetanus (OR [95% CI]= 1.37 [1.22, 1.54]); influenza (1.23 [1.10, 1.37]); hepatitis A (1.21 [1.04, 1.41]) and B (1.21 [1.07, 1.35]); human papilloma virus (1.66 [1.32, 2.08]); and pneumonia (1.35 [1.19, 1.54]), but not herpes zoster virus (1.07 [0.87, 1.31]). Adult eczema was associated with increased measurement of blood glucose (1.29 [1.16, 1.44]); cholesterol (1.19 [1.06, 1.34]); blood pressure (1.84 [1.56, 2.08]); and HIV infection (1.50 [1.34, 1.70]), but not Pap smears (1.11 [0.95, 1.30]); colon cancer screening (p=0.17); or mammograms (p=0.63). Adults with eczema were more likely to interact with general doctors, mid-level providers, mental health professionals, eye doctors, podiatrists, chiropractors, therapists, obstetrician/gynecologists, and other specialists ($p \leq 0.01$). Childhood eczema was associated with higher rates of vaccination for influenza ($p < 0.0002$); well child checkups (p=0.002); and interaction with most types of healthcare providers ($p \leq 0.01$). Many associations remained significant in multivariate models controlling for sociodemographics and healthcare interaction frequency.

Conclusions: Eczema in adults and children is associated with greater utilization of preventive health care and health maintenance, but not cancer screening.

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Introduction

Eczema is a chronic, relapsing, inflammatory skin disorder that can cause significant distress due to itch and a variety of comorbidities, including asthma,[1] allergic rhinitis,[1] sleep disturbances,[2] psychological and behavioral disorders,[3,4] warts and extracutaneous infections,[5] injuries,[4,6] lower bone mineral density,[7] and osteoporosis and fractures.[2,8–10] However, specific patterns of healthcare utilization in adults and children with eczema have not been fully elucidated.

Several studies examined whether various chronic diseases are associated with greater preventive healthcare utilization, including cancer screening and vaccination. However, no such studies have been completed on the behaviors of patients with eczema, which is the most common, chronic, pruritic, inflammatory skin disorder.[11] Chronic disorders have differential effects on health behaviors. For example, men with heart disease are less likely to undergo fecal occult blood testing for colon cancer.[12] Similarly, women with diabetes are less likely to undergo breast cancer screening, such as mammography.[13,14] By contrast, hypertension is associated with greater participation in cancer screening,[15] and cancer survival is associated with increased vaccination rates.[16] Determinants of altered preventive healthcare utilization in chronic disease are multifactorial and likely related to an increased number of outpatient clinic visits

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and focus on disease-centered care.[12] The authors hypothesized that patients with eczema have increased rates of preventive healthcare utilization and health maintenance. The present study examined the association between eczema and preventive care utilization, including vaccination, disease screening, and routine health maintenance.

Methods

National Health Interview Survey

The 2012 National Health Interview Survey (NHIS) was collected by the National Center for Health Statistics of CDC. NHIS is the principal source of information on the health of the civilian non-institutionalized population of the U.S. The questionnaires included a separate core module with questions to estimate the prevalence of various pediatric and adult health issues. The surveys were administered in person to selected households by the Bureau of the Census using approximately 400 trained interviewers with computer-assisted personal interviewing. Subsequently, one child or adult per household was randomly selected for the sample questionnaires. Interviews were conducted in English and Spanish. Using data from the U.S. Census Bureau, sample weights were created by NHIS that factored age, sex, race, ethnicity, household size, and educational attainment of the most educated household member using a multi-stage area probability sampling design. These sample weights are needed to provide nationally representative frequency and prevalence estimates for each state's population of non-institutionalized children and adults, respectively. Raw and weighted frequency and weighted prevalence estimates are presented, which reflect this complex weighting. Data were analyzed between August 2014 and January 2015. The study was approved by the IRB at Northwestern University.

Measures

One-year history of eczema was determined by an affirmative response to the question *During the past 12 months, have (you or your child) been told by a doctor or other health professional that (you or they) had eczema or any kind of skin allergy?* in adults and children, respectively.

A number of associations with adult eczema were examined, including age, sex, race, Hispanic origin, and household income. In adults (aged $\geq$18 years), history of vaccination was assessed for tetanus (past 10 years); influenza (past year); hepatitis A or B; human papilloma virus; herpes zoster or shingles; or pneumonia (ever). History of being screened for cervical cancer with Pap smear; colon cancer; breast cancer with mammogram (past year); and HIV (ever) were assessed. Colon cancer screening procedures included colonoscopy, fecal occult blood testing, or at-home kits to test for fecal blood. History of screening for diabetes with fasting glucose levels, high cholesterol, high blood pressure, and counseling by a physician about diet and smoking in the past year were also assessed. Finally, history of seeing different types of health care providers in the past year was assessed. In children (aged $\leq$17 years), history of well child checkups, vaccination for influenza, and seeing different types of healthcare providers seen in the past year was assessed.

Statistical Analysis

All data analyses and statistical processes were performed using SAS, version 9.4. Analyses of survey responses were performed using SURVEY procedures. Weighted frequencies and prevalences were determined. Bivariate and multivariable binary logistic regression models were constructed with the aforementioned measures of healthcare utilization as the dependent variables. One-year history of eczema was modeled as the binary independent variable. ORs and 95% CIs were estimated.

Multiple possible confounders were considered. Sociodemographic characteristics are associated with utilization of preventive care[17] and eczema.[18,19] Because health screening and maintenance might be related to increased frequency of healthcare visitation overall, the authors also wanted to control for the number of healthcare visits. Two different multivariate models were created to address these confounders. Model 1 controlled for age (continuous); sex (male/female); race (African American/black, Asian, Native American/American Indian, Caucasian/white, multiracial/other); Hispanic origin (yes/no); household income ($<$\$35,000, \$35,000–\$74,999, \$75,000–\$99,999, $\geq$\$100,000); highest level of education in the family (less than high school, high school degree or equivalent, greater than high school); and current insurance coverage (yes/no). Model 2 controlled for all of the variables included in Model 1 and additionally controlled for the number of visits per year to the physician's office and emergency department.

Post hoc correction for multiple dependent tests was performed by minimizing the false discovery rate with the approach of Benjamini and Hochberg,[20] and corrected p-values are presented. Two-sided adjusted p-values $\leq$0.05 were considered significant. Two-way interaction terms between covariates were tested and only included in the final models if significant ($p<0.01$) and modified the effect size by $>$20%. AORs and 95% CIs were estimated that controlled for these covariates.

Virtually all variables had missing values in $<$5% of respondents (Appendix Table 1, available online). In some multivariable models, however, missing values occurred for one variable in $>$15% of respondents. Several approaches were used to address missing values. First, complete data analysis was performed; that is, subjects with missing data were excluded. Second, multiple imputation models (n=5 imputations) were constructed for Model 1 (Appendix Tables 2, 3, available online). However, analysis of missing values patterns for each of the healthcare behavior variables found that missing values were more likely in certain age groups, family education levels, income levels, and racial/ethnic groups, depending on the outcome being measured. Therefore, sensitivity analyses excluding these subgroups were performed.

Results

Data were collected on 34,613 adults and 13,298 children, including all ages, genders, racial/ethnic groups, and levels of household income. The prevalence and associations of adult eczema from the 2012 NHIS were previously described.[21] Briefly, the prevalence of eczema in adults was 7.2% (95% CI=6.9%, 7.6%) and in children was 12.0% (11.3%, 12.7%).

Adults with eczema had higher odds of having been vaccinated for tetanus in the past 10 years (OR [95%