Published in final edited form as:

Prev Med. 2012 January 1; 54(1): 5–8. doi:10.1016/j.ypmed.2011.01.007.

Influenza Vaccination Among Chiropractic Patients and Other Users of Complementary and Alternative Medicine: Are Chiropractic Patients Really Different?

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Abstract

Objective—Previous studies suggest a possible association between using chiropractic care and lower influenza vaccination rates. We examined adult influenza vaccination rates for chiropractic patients to determine if they are different than those for users of other complementary and alternative medicine(CAM).

Method—We used the 2007 National Health Interview Survey to examine influenza vaccination rates among adult respondents who were considered high priority for the influenza vaccine($n=12,164$). We separated respondents into clinically meaningful categories according to age and whether or not they had recently used chiropractic care, some other type of CAM, or neither. We used adjusted logistic regression to determine whether user status predicted influenza vaccination.

Results—Only 33% of younger and 64% of older high priority Chiropractic Users were vaccinated in 2007; these rates approximated those of Non-CAM Users. However, younger Non-Chiropractic CAM Users were more likely than Non-CAM Users to have been vaccinated (p -value=0.05). In adjusted logistic regressions, we found statistically insignificant differences when comparing Chiropractic Users to Non-CAM Users for younger adults ($OR=0.93(95\% \text{ CI}:0.76-1.13)$), or for older adults $OR=0.90(95\% \text{ CI}:0.64-1.20)$.

Conclusion—Chiropractic Users appear no less likely to be vaccinated for influenza; whereas, younger Non-chiropractic CAM Users are more likely than Non-CAM Users to be vaccinated.

Introduction

Recently, there has been interest in examining adult influenza vaccination among users of specific forms of Complementary and Alternative Medicine (CAM) (Jones, et al., 2010; Morabia and Costanza, 2009). Nationally representative studies that have used data from the 2002 and 2007 National Health Interview Survey (NHIS) (in these years the NHIS included a supplement on adults' use of CAM) have reported seemingly divergent associations between the use of chiropractic care and adult influenza vaccination: a study of 2002 NHIS data reported higher adult influenza vaccination rates among chiropractic users when compared to non-CAM users (Stokley, et al., 2008) whereas a study of 2007 NHIS data found that those who used chiropractic care were less likely than non-users to be vaccinated (Jones, et al., 2010).

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Although personal beliefs regarding immunization among chiropractors vary, only a small fraction of the chiropractors still professionally oppose adult vaccination (Colley and Haas, 1994; Medd and Russell, 2009; Russell, et al., 2005). However, as lower vaccination rates were not found for other types of CAM (Jones, et al., 2010), it may imply that chiropractic patients are somehow different than other CAM users. If so, future efforts to improve national adult influenza vaccination rates could potentially target the nearly 13 million adults that use chiropractic care regularly (Davis, et al., 2010). Therefore, we used 2007 NHIS data to more closely examine the relationship between adult influenza vaccination, Chiropractic Users, and Non-chiropractic CAM Users.

Methods

Study Design and Data Source

We used data from the 2007 NHIS adult and supplemental CAM questionnaires. The NHIS is a nationally representative survey of the civilian, non-institutionalized adult US population. Details of the NHIS methodology can be found elsewhere (CDC 2009). An exemption of institutional board review was obtained from Dartmouth College's Committee for the Protection of Human Subjects because this study used publicly available and deidentified data.

Study Sample

We examined the 23,393 adult (age ≥ 18 years) respondents to the 2007 adult questionnaire (response rate 78%), of whom 22,783 (97%) answered at least one CAM questionnaire question. Respondents were asked whether they had used any of 18 different CAM modalities (Table 1) in the previous 12 months. Because 90 to 95% of spinal manipulation is performed by chiropractors (Shekelle, et al., 1992), we defined Chiropractic Users as those who reported use of "chiropractic or osteopathic manipulation" in the past 12 months.

We separated Chiropractic Users from all other CAM Users and excluded prayer therapy from our definition of CAM (Kaptchuk and Eisenberg, 2001). Therefore, we compared three groups: Non-CAM Users (adults that reported no CAM use whatsoever), Non-Chiropractic CAM Users, and Chiropractic Users.

Identification of Respondents as High Priority for the Influenza Vaccine—We used a number of NHIS items to identify respondents who were high priority for receiving the influenza vaccination based on age (≥ 50 years) and specific cardiovascular, respiratory, and malignancy co-morbidities according to the 2007 Advisory Committee on Immunization Practices (ACIP) guidelines for influenza vaccination (CDC, 2007). Because there are clinically significant differences between younger adults who are high priority due to co-morbidities and those who are high priority due to age, we compared high priority adults between age 18 and 65 to those aged 65 and older in separate analyses.

We defined respondents who reported receiving a "flu shot" or "flu spray" in the previous 12 months as influenza-vaccinated.

Analyses

Using Stata version 11.1 (College Station, TX), we applied complex survey design procedures that account for a respondent's probability of selection and for NHIS sampling methodology to generate national estimates. We used the χ^2 test to compare sociodemographic characteristics (Table 2) and the unadjusted vaccination rates.

We used logistic regression adjusted for sociodemographic variables, health status and health behaviors to determine whether having used chiropractic care or some other form of CAM in the previous 12 months was associated with influenza vaccination.

Results

We identified over 53% of NHIS adult respondents ($n=12,164$) as high priority for receiving the influenza vaccine. Of these, only 43% received the influenza vaccine within the previous year: 41% (95% CI: 37%–44%) of Chiropractic Users, 45% (95% CI: 42%–47%) of Non-Chiropractic CAM Users, and 43% (95% CI: 42%–45%) of Non-CAM Users were vaccinated (Table 2). We found statistically significant differences only when comparing younger adult Non-Chiropractic CAM Users to Non-CAM Users (36% vs. 31%, respectively, p -value= 0.05) (Figure 1).

Adjusting for sociodemographic differences, we found no statistical difference between Chiropractic and Non-CAM Users (OR=0.9: 95% CI 0.76–1.06); however, Non-Chiropractic CAM Users were more likely than Non-CAM Users to be vaccinated for influenza (OR=1.14: 95% CI 1.00–1.30). When examined by age category, Chiropractic Users appeared less likely to be immunized while Non-Chiropractic CAM Users were more likely to be immunized among younger and older adults; nevertheless differences between groups were statistically insignificant (Figure 2).

Discussion

Among high priority adults for the influenza vaccine, we found that Chiropractic Users were no less likely to be vaccinated than Non-CAM Users. Interestingly, our findings suggest that younger Non-Chiropractic CAM Users were actually more likely than the other groups to have been vaccinated for influenza, perhaps reflecting the health-seeking behaviors of this group as a whole (Downey, et al., 2009; Nahin, et al., 2007).

This nationally representative study offers additional insight into the potential relationship between chiropractic care and adult influenza vaccination and implies CAM user categorization is an important consideration for future research. Given the differences in our findings from 2007 NHIS to those of Jones et al. (Jones, et al., 2010), it is clearly important for future studies of adult vaccination to determine the most appropriate comparison group. In fact, because of heterogeneity it may be inappropriate to lump all CAM Users together (Morabia and Costanza, 2009). In a subanalysis we also examined whether use of other forms of CAM among Chiropractic Users was predictive of influenza vaccination; however, these findings were insignificant.

Although our categorization was similar to those of Stokely et al. (except for our analyses by age category), differences in NHIS CAM data collection (Table 1) and in the ACIP high priority criteria for the influenza vaccine makes direct comparison to 2002 NHIS data impossible (Stokely, et al., 2008). From 2002 to 2007 the ACIP recommended age for influenza vaccination decreased from ≥ 65 years to ≥ 50 years (CDC, 2002, 2007). To examine if this affected our results, we also performed all analyses with previous ACIP criteria. And while the overall influenza rates increased modestly among those between the ages 18 to 64, the relative differences across categories both in the rate of vaccination and the adjusted ORs remained unchanged.

As a potential study limitation we must acknowledge that the NHIS data are self-reported and collected retrospectively; therefore, recall errors may occur. Nevertheless, previous studies have shown that adult self-reported influenza vaccination is a reliable measure (MacDonald, et al., 1999; Skull, et al., 2007).

We were surprised to find vaccination rates among younger high priority adults that fall well below the Healthy People 2011 goal of 60%. Because many younger adults use CAM (Barnes, et al., 2008), CAM providers, in particular chiropractors, could be mobilized to improve vaccination rates (Johnson, et al., 2008).

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χ^2 used in comparisons between Non-CAM Users versus Chiropractic and Non-Chiropractic CAM User categories

* p-value ≤ 0.05

^a Non-Chiropractic, Non-CAM Users.

^b Chiropractic Users (may or may not have used other forms of CAM)

Figure 1.

Percent of High Priority Adults Vaccinated for Influenza Among Chiropractic and Non-Chiropractic Complementary and Alternative Medicine Users in 2007.

^a Odds Ratios compare Chiropractic and Non-Chiropractic CAM Users to Non-CAM Users
Adjusted for: age, sex, US region, race/ethnicity, level of education, health insurance type, having a place for routine healthcare, and smoking status

Figure 2.
Adjusted Odds Ratios^a for Chiropractic and Non-Chiropractic Complementary and Alternative Medicine Users in 2007.

Table 1Complementary and Alternative Therapies Used by the 2007 National Health Interview Survey.^a

Alternative Medical Systems
Acupuncture
Ayurveda
Homeopathy
Naturopathy
Traditional Healers
Biologically-Based Therapies
Chelation Therapy
Herbals and Non-Vitamin Supplements
Special Diets
Manipulative and Body-Based Therapies
Chiropractic or Osteopathic Manipulation ^b
Massage Therapy
Movement Therapies
Mind-Body Therapies
Biofeedback
Hypnosis
Relaxation Techniques
Yoga, Tai Chi, or Qi Gong
Energy Healing Therapy

^aPrayer Therapy excluded from the definition of CAM. Major differences between 2002 and 2007 NHIS data collection on CAM includes “traditional healers” vs. “folk healers,” “vitamins vs. mega vitamins” (not used in this Chiropractic or Osteopathic Manipulation Massage Therapy study), and “movement therapies.”

^bItem used to identify Chiropractic Users from the 2007 NHIS data. Note that the 2002 NHIS collected data specifically on Chiropractic Care (rather than “chiropractic or osteopathic manipulation”).

Table 2

The Characteristics of High Priority Adults for Receiving the Influenza Vaccine Among Chiropractic and Non-Chiropractic Complementary and Alternative Medicine Users in 2007.

	User Category (95% Confidence Interval)		
	Non-CAM Users ^a	Chiropractic Users ^b	Non-Chiropractic CAM Users
No. of NHIS Respondents (sample)	7,411	1,055	3,698
Projected National Estimates			
No. of US adults (millions)	66.5 (± 2.0)	10.1 (± 0.8)	34.6 (± 1.4)
US Region (%)		*	*
Northeast	18.2 (± 1.3)	14.7 (± 2.3)	16.3 (± 1.7)
Midwest	23.3 (± 1.7)	33.5 (± 4.1)	24.9 (± 3.1)
South	39.6 (± 1.9)	24.1 (± 3.8)	33.2 (± 2.5)
West	18.9 (± 1.5)	27.6 (± 3.3)	25.6 (± 2.2)
Sociodemographic Characteristics			
Age (%)		*	*
18 – 49	15.0 (± 1.1)	18.3 (± 3.0)	19.1 (± 1.6)
50 – 64	49.8 (± 1.5)	56.7 (± 3.6)	54.4 (± 2.0)
65+	35.3 (± 1.4)	25.0 (± 3.0)	26.5 (± 1.9)
% female	50.7 (± 1.3)	57.4 (± 3.9)*	60.0 (± 1.9)*
Race/Ethnicity (%)		*	*
Hispanic	11.3 (± 1.0)	4.3 (± 1.2)	6.9 (± 1.0)
Non-Hispanic white	70.6 (± 1.5)	87.5 (± 2.2)	79.2 (± 1.8)
Non-Hispanic black or African American	13.0 (± 1.1)	3.8 (± 1.2)	7.6 (± 1.0)
other or multiple races	5.0 (± 0.7)	4.3 (± 1.4)	6.2 (± 1.1)
Marital status (%)		*	
married	59.8 (± 1.3)	63.4 (± 3.2)	60.6 (± 1.9)
not married	40.2 (± 1.3)	36.6 (± 3.2)	39.4 (± 1.9)
Employment status (%)		*	*
unemployed	52.1 (± 1.5)	37.4 (± 3.4)	44.5 (± 2.0)
employed	47.9 (± 1.5)	62.6 (± 3.4)	55.5 (± 2.1)
Education (%)			
less than high school	36.6 (± 1.4)	38.0 (± 3.6)	37.6 (± 2.0)
high school graduate	22.3 (± 1.5)	21.8 (± 2.8)	24.4 (± 1.8)
more than high school	41.1 (± 1.6)	40.1 (± 3.2)	38.0 (± 2.1)
Health Insurance (%)			
private	31.7 (± 1.4)	35.5 (± 3.4)	33.5 (± 2.1)
public	51.9 (± 1.5)	47.5 (± 3.5)	49.5 (± 1.9)
uninsured	16.4 (± 1.1)	17.0 (± 2.7)	17.0 (± 1.7)
Place for Routine Care (% "yes")	89.9 (± 1.0)	93.6 (± 1.7)*	91.4 (± 1.4)*
Health Status and Behaviors			
% that Received Influenza Vaccine	43.3 (± 1.5)	40.5 (± 3.3)	44.5 (± 2.3)

	User Category (95% Confidence Interval)		
	Non-CAM Users ^a	Chiropractic Users ^b	Non-Chiropractic CAM Users
% "fair" or "poor" Health Status	10.0 (± 0.8)	10.1 (± 2.1)	8.9 (± 1.1)
% Obese	32.2 (± 1.3)	33.2 (± 3.4)	31.0 (± 1.9)
% Any Functional or Cognitive Limitation	43.7 (± 1.5)	50.5 (± 3.7) *	49.2 (± 2.0) *
% Smoker	18.8 (± 1.2)	16.8 (± 2.9)	17.4 (± 2.1)
% Drinker	49.0 (± 1.6)	65.9 (± 3.4) *	65.7 (± 1.9) *

χ^2 used in comparisons between Non-CAM Users versus Chiropractic and Non-Chiropractic CAM User categories

* p-value ≤ 0.05

^aNon-Chiropractic, Non-CAM Users.

^bChiropractic Users (may or may not have used other forms of CAM)