Implementation Of An Educational Intervention Program To Increase Influenza Vaccination Among Persons With Diabetes Mellitus

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Citation

D Galbis-Reig, M Oley, A Forburger, T Teekah. *Implementation Of An Educational Intervention Program To Increase Influenza Vaccination Among Persons With Diabetes Mellitus*. The Internet Journal of Internal Medicine. 2000 Volume 2 Number 2.

Abstract

Despite the availability and efficacy of an influenza vaccine that is 60% to 80% protective, the 1997 Behavioral Risk Factor Surveillance System (BRFSS) demonstrated that the influenza immunization rate among persons with Diabetes Mellitus in Virginia was only 44.4%, (well short of the 60% vaccination rate proposed as the national health objective for high risk individuals during the 2000-2001 influenza season).

Objective: The purpose of this outcomes study was to evaluate the effect of an educational intervention (utilizing educational materials provided by the Virginia Department of Health in coordination with the Centers for Disease Control and Prevention) on the rate of influenza vaccination among high-risk individuals within a number of Richmond, Virginia-based employer groups.

Design: Prospective cohort study with a pre/post cross-sectional intervention, using brochures developed by the Centers for Disease Control and Prevention (CDC), conducted during the 2000-2001 influenza season. A McNemar Test was applied to the rate of influenza vaccination before versus after implementation of the educational intervention.

Results: Data for 306 individuals who completed both the pre-intervention and post-intervention self-report survey were included in the analysis. 32 (10.5%) participants in the study reported having Diabetes Mellitus. Only 37.5% of respondents with Diabetes Mellitus reported receiving an Influenza Vaccine during the 1999-2000 Influenza season (baseline). Following the implementation of an educational intervention program during the 2000-2001 influenza season, the influenza vaccination rate among the diabetic population increased to 59.4% ($p<0.05$).

Conclusion: An educational intervention aimed at increasing awareness regarding the need for influenza vaccination among persons with Diabetes Mellitus produces significant increases in the influenza vaccination rate among individuals with diabetes mellitus.

INTRODUCTION

Influenza is an airborne viral illness that spreads from infected individuals to others via air droplets that enter the body through the nose and mouth. Influenza infection tends to occur primarily between the months of November and April in the United States and is characterized by the following symptoms: fever, chills, cough, sore throat, headache, and muscle aches. The standard of care for Influenza is primary prevention through immunization.[1]

Despite the availability and efficacy of an influenza vaccine that is 60% to 80% protective, the 1997 Behavioral Risk Factor Surveillance System (BRFSS) estimated that the influenza immunization rate among persons with Diabetes Mellitus (DM) in Virginia was only 44.4%, (well short of the 60% vaccination rate proposed as the national health objective for high risk individuals during the 2000-2001 influenza season).[2] According to the same report, only Alaska (37.7%), Arkansas (44.0%), and Puerto Rico (29.1%) had lower estimated influenza immunization rates.2

While factors influencing influenza immunization have been well defined in the elderly and nursing home population,[3,4,5] less work has been done to delineate these factors in other high-risk populations (e.g. individuals with DM). Although

several of these factors may be similar among elderly individuals and members of other at-risk populations, differences in vaccine education and publicity among the two populations may lead to significant differences in both the rate of influenza vaccination and the importance of the various factors in affecting the rate of vaccination. These differences have not been adequately assessed.

Several studies have also demonstrated the efficacy of educational programs and postcard reminders to increase compliance with influenza vaccination.[6,7,8] As with other studies involving influenza immunization, however, these studies have focused primarily on individuals greater than 65 years of age. Additional information is necessary to determine the effect of these educational programs in increasing influenza vaccination among individuals in other high-risk groups.

The purpose of this study was to evaluate the effect of an educational intervention (utilizing CDC-produced educational materials provided by the Virginia Department of Health Diabetes Control Project) on the rate of influenza vaccination among at-risk individuals within a number of Richmond, Virginia-based employer groups. A secondary goal was to measure and to evaluate the effect of several factors on the rate of influenza vaccination in a population of individuals with Diabetes Mellitus in order to focus the educational efforts around these core factors.

STUDY DESIGN

The study was designed as a prospective cohort study with a pre/post cross-sectional intervention to be conducted during the 2000-2001 influenza season. The study was conducted in accordance with the principles expressed in the Declaration of Helsinki. Only individuals who completed both the pre and post intervention survey where included in the analysis.

METHODS

Participants were initially provided with a pre-intervention survey numerically encoded with an unique 6-digit identifier during a health screening at their work-site prior to the start of the influenza season in the Richmond, Virginia area. Upon leaving the health screening, all individuals were given a brief follow-up survey (with the same unique 6-digit identifier as the pre-intervention survey) along with a self-addressed envelope and instructions to return the survey to Commonwealth Health Benefits Management (CHBM), Inc. prior to March 1, 2001. In addition, individuals with self-reported DM were also given a brochure produced by the CDC entitled “If You Have Diabetes, a Flu Shot Could Save Your Life.” The brochure describes the importance of receiving an influenza vaccine in individuals with DM.

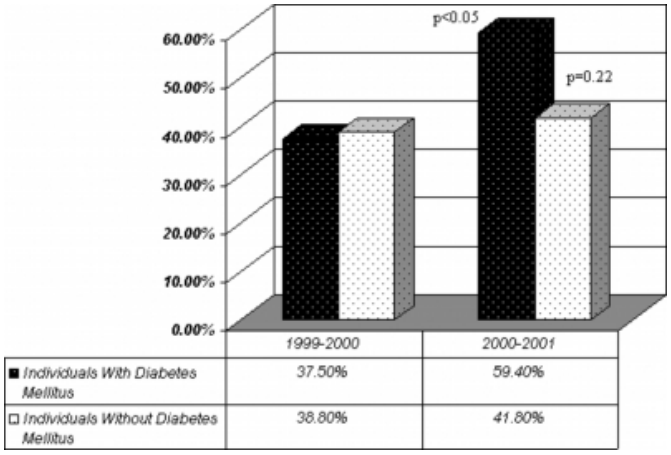
To ensure appropriate follow-up and increase the response rate, the unique 6-digit identifier on the pre-intervention survey for individuals who did not return the post-intervention survey was cross-matched with other demographic material obtained during the health screening. The individual was then contacted via telephone by trained CHBM, Inc. personnel. After verbal consent was obtained, the individual was asked to respond to two (2) questions on the post-intervention survey. The first question asked if the individual had received the influenza vaccine in the current year. If the individual answered “yes” to the first question, the second question asked the individual to choose from a list of multiple choice items the factors that had been most influential in his or her choice to receive the influenza vaccine during the current season.

RESULTS

Data for 306 individuals was included in the analysis. The response rate for completion of both the pre and post survey was 17.3%. Through the use of telephone follow-up for the post-intervention survey, an additional 87 individuals (overall response rate 24.2%) were available for inclusion in the analysis. 32 (10.5%) participants in the study reported having Diabetes Mellitus. Only 37.5% of respondents with Diabetes Mellitus reported receiving an influenza vaccine during the 1999-2000 influenza season (baseline). Following implementation of an educational intervention utilizing a CDC-produced brochure during the 2000-2001 influenza season, the influenza vaccination rate among individuals with diabetes mellitus increased to 59.4% (Figure 1). A McNemar Test9,10 applied to the rate of influenza vaccination before versus after implementation of the educational intervention was significant ($N=32$; $p<0.05$).

Figure 1

Figure 1: Rate of Influenza Vaccination During the 1999-2000 and 2000-2001 Influenza Seasons.



Among individuals with Diabetes Mellitus, the four most common responses (n=23) cited for non-vaccination included “don’t think it helps” (39.1%), “fear of getting the flu” (26.1%), “other” (17.4%), and “fear of pain” (17.4%) (Figure 2). The most common responses (n=217) for non-vaccination within the total population were “don’t think it helps” (38.7%), “other” (21.7%), “too busy” (14.7%), “no risk factors” (12.4%), and “fear of pain” (12.4%) (Figure 2). In addition, during the 1999-2000 influenza season, the three most common responses (n=145) given by individuals within the total population who received the influenza vaccine as to why they received the vaccine were “didn’t want to catch the flu” (68.3%), “other” (19.3%), and “recommended by physician” (3.8%) (Figure 3). Among respondents with Diabetes Mellitus, the three most common responses (n=15) to the same question during the 1999-2000 influenza season were “didn’t want to catch the flu” (66.7%), “recommended by physician” (20.0%), and “other” (13.3%) (Figure 4). Responses to the same question by the same individuals with Diabetes Mellitus during the 2000-2001 vaccination season (post-intervention survey) yielded the following responses (n=26): “didn’t want to catch the flu” (57.7%), “CDC educational brochure” (23.1%), and “other” (19.2%) (Figure 4).

Figure 2

Figure 2: Most Common Reasons Given for Non-Vaccination Among Respondents.

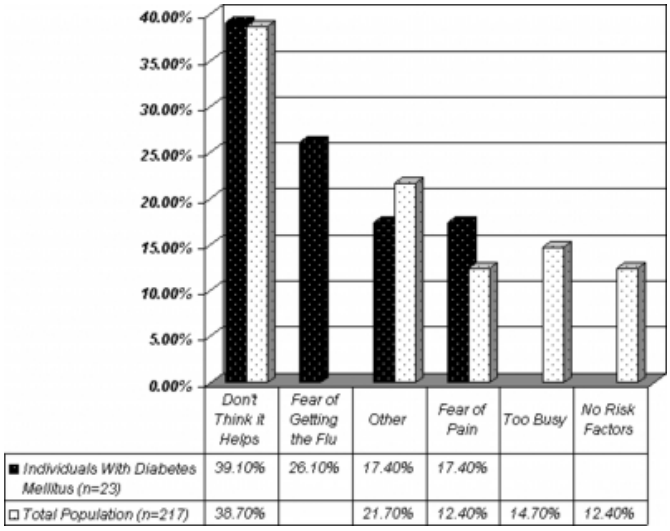


Figure 3

Figure 3: Most Common Reasons to Receive the Influenza Vaccine as Reported by the Total Population.

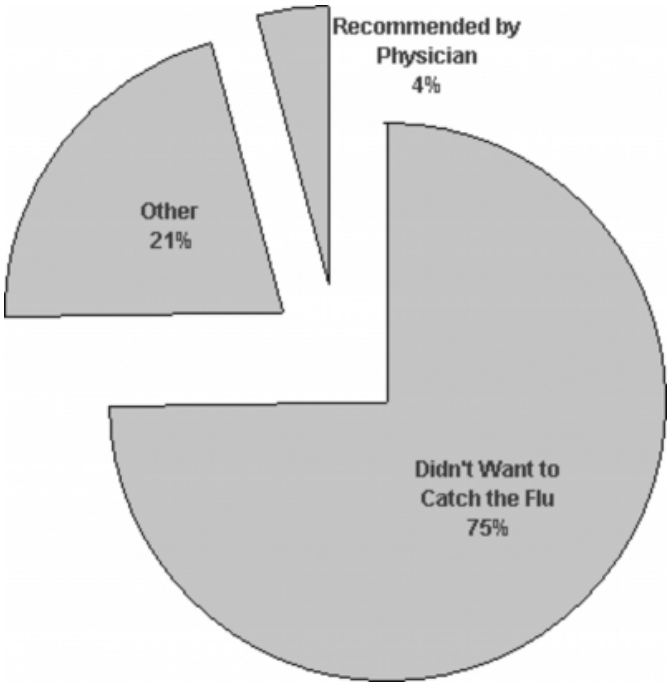
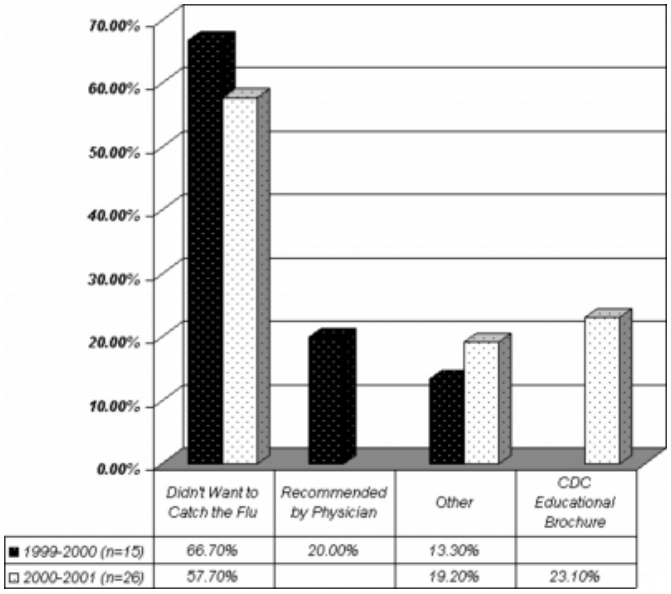


Figure 4

Figure 4: Most Common Reasons to Receive the Influenza Vaccine as Reported by Individuals with Diabetes Mellitus.



STUDY LIMITATIONS

Several factors limit the ability to interpret the results of this study. As with any naturalistic study, a self-selection bias was inevitable. Presumably, for example, that survey respondents tend to be more health conscience and more motivated than non-respondents. Survey respondents, therefore, would be expected to be more likely to receive the influenza vaccine in response to an educational intervention than non-respondents. In order to minimize the effect of this bias on the study results, the investigators deliberately designed the study to be a within-subjects analysis. In addition, follow-up via telephone survey for non-respondents was utilized in an attempt to correct for self-selection bias. By its design, however, a naturalistic study will always suffer the effect (to some extent) of self-selection bias.

Another important confounding variable of this study involves the self-report bias. It is well known, for example, that respondents to self-report surveys often answer questions in a particular manner in order to please the investigator. It is less likely that the study results were affected by this form of "altruistic" bias because such behavior would have resulted in a proportional increase in self-reported vaccination in both the population with Diabetes Mellitus and the population without Diabetes Mellitus had it been present. This was not, however, the case. The increase in influenza vaccination was only significant in the population of individuals with Diabetes Mellitus who received the intervention. The increase was not significant in the population of individuals without Diabetes Mellitus who did not receive the educational intervention. A future study with a control group of individuals with Diabetes Mellitus who do not receive the intervention should be carried out to correct for this bias. In addition, self-report studies may fall prey to another common human trait – lapses in memory. Most people, however, do not easily forget receiving a shot and the time-to-follow-up for this study was short enough to lessen the concern regarding this form of bias.

Finally, the study suffered from a very common problem with many investigations – a small sample size. While the total sample size (n=306) for the study was rather large, the sample size for the population of interest (namely individuals with Diabetes Mellitus) was very small (n=32). A small sample size adversely affects the power of the study (the ability to detect a significant difference in the population when a difference actually exists). As a result, a small sample size would tend to bias the study towards the null hypothesis and away from the study hypothesis. In other words, a small sample size tends to work against the investigators and would not favor a significant result. A future investigation with a larger sample size would be useful to corroborate the results obtained from this study.

CONCLUSIONS

Despite its limitations, this study demonstrated that an educational intervention aimed at increasing awareness regarding the need for influenza vaccination among persons with Diabetes Mellitus (using an educational brochure developed by the CDC) is effective in producing significant increases in the influenza vaccination rate among individuals with diabetes mellitus. This finding is further corroborated by the increase of the influence of the CDC Brochure on self-reported vaccination among individuals with Diabetes Mellitus during the 2000-2001 influenza season.

ACKNOWLEDGEMENTS AND SUPPORT

This study was presented as an abstract entitled, "Implementation of an Educational Intervention Program to Increase Influenza Vaccination Among Persons with Diabetes Mellitus in Richmond, Virginia," at the 2001 CDC Diabetes Translation Conference in Seattle, Washington between April 30 and May 3, 2001.

The authors would like to thank the Centers for Disease

Control and Prevention for providing the Virginia Department of Health's Diabetes Control Project with a sufficient quantity of educational brochures entitled "If You Have Diabetes, a Flu Shot Could Save Your Life."

The authors would also like to thank John D. Ostrosky, PharmD and C. Scott Schoenborn, MBA for their assistance and technical support throughout the study.

This study was supported in part by an unrestricted educational grant from Pfizer Pharmaceuticals.

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