

The Relationship of Health Beliefs and a Postcard Reminder to Influenza Vaccination

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The relationship of certain health beliefs to influenza vaccination and the effect of a postcard reminder on vaccination rates was studied among 232 high-risk patients. In agreement with the Health Belief Model tested, the patients vaccinated believed influenza to be more serious, believed they were more susceptible to influenza, and believed the vaccine to be more efficacious than did patients not vaccinated. Those not vaccinated were less satisfied with their medical care and felt the vaccine was more expensive than those vaccinated.

A postcard reminding patients of influenza vaccination was an effective way to increase the vaccination rate. Patients receiving the card had a 59.7 percent vaccination rate compared to a 30.0 percent rate among those not receiving the postcard.

This study suggests that a reminder postcard is an effective means to promote influenza vaccination and that these beliefs are important determinants of vaccination behavior.

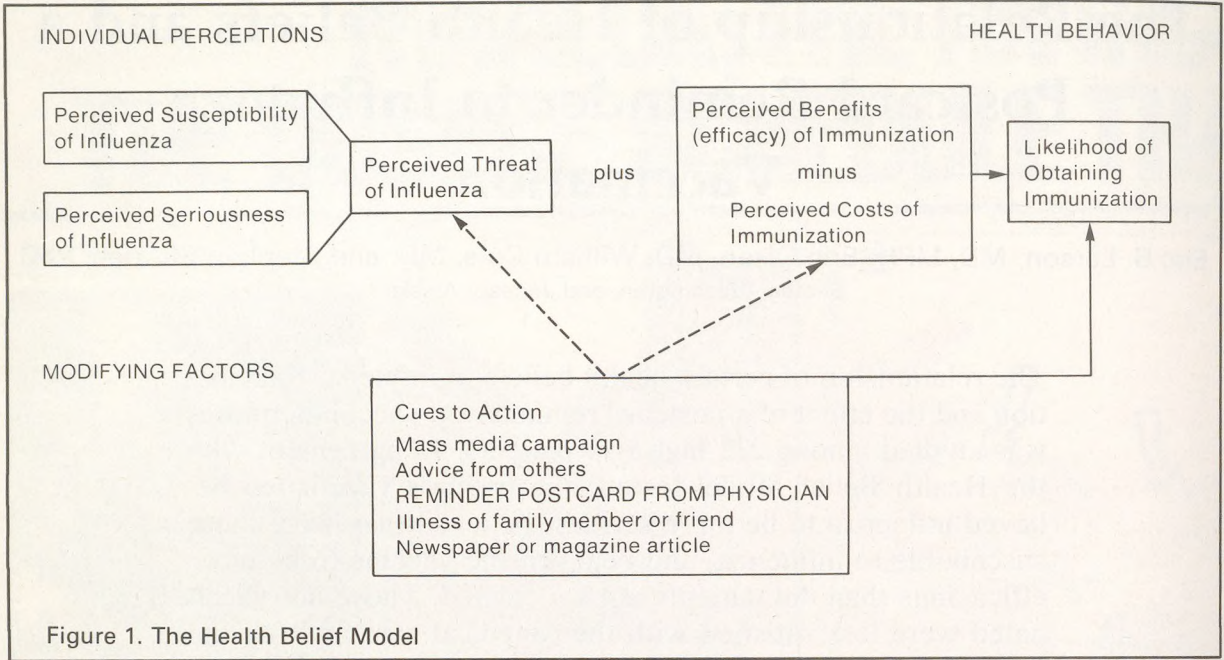
The Center for Disease Control (CDC) had recommended annual influenza vaccination for high-risk patients for a number of years and did so again in 1978.¹ However, overall vaccination rates among high-risk patients have been low, 10 to 15 percent according to the CDC.² Even an "outreach" program, reported in the *Journal of the American Medical Association* in 1975, resulted in only a modestly improved vaccination rate of 28 percent.³ In this context, the questions of what factors might be important in patient deci-

sions to seek influenza vaccination and whether this traditionally low vaccination rate can be improved in the primary care setting are of interest.

Influenza vaccination is an example of what has been called a *health behavior*.^{4,5} In contrast to *illness behavior* in which patients seek care for a symptomatic illness, patients seeking preventive health care, like influenza vaccination, decide to act in the absence of symptoms, hence the term *health behavior*.

The "Health Belief Model" is a social-psychological model developed by Hochbaum, Rosenstock, Becker, and others⁶ to explain such health behavior. The model holds that the likelihood of a patient's taking preventive action depends on individual beliefs regarding the disease and the method of prevention. This study tests a version of the Health Belief Model⁷ shown in Figure 1. The model holds that the likelihood of preventive action is a function of the perceived threat

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a person believes an illness represents. This threat is represented in the model by an individual's perceived susceptibility to the illness being prevented (influenza) and the perceived severity of that illness. In addition, the likelihood of preventive action should relate to the person's estimated value of that action. In the model the estimated value is the perceived benefits or efficacy of immunization minus any barriers or costs associated with immunization. Cues to action, in this study a reminder postcard, act as modifying factors which may interact with these beliefs to increase the likelihood of preventive action occurring.

This study specifically assesses the relationship of health beliefs to influenza vaccination using the model shown in Figure 1, and tests the hypothesis that the Family Medical Center "cue," a reminder postcard recommending influenza vaccination, increased influenza vaccination rates among high-risk patients.

Methods

The Family Medical Center (FMC) is located within the University of Washington Medical Center. As of June 1976, medical care was provided for approximately 6,000 patients at the FMC. In

September 1975, a postcard was mailed to patients identified as being at high risk for serious complications from influenza infection; the postcard recommended immunization by mid-November. The postcards were mailed to all patients over 65 years old and to patients with the following chronic diseases: heart disease, bronchopulmonary disease, renal disease, and diabetes mellitus, as recommended by the Center for Disease Control.²

Data were collected using a self-administered, pretested questionnaire developed by the authors and requiring 10 to 15 minutes to complete. Data retrieved by the questionnaire included: vaccination status; whether or not the patient received the FMC postcard; and patient attitudes regarding susceptibility and severity of influenza, efficacy of influenza vaccine, expense and inconvenience associated with vaccination, and satisfaction with care received at the FMC. Patient attitudes were measured using 5-point Likert scales.

A random sample of 30 patient records was checked against self-reported vaccination and showed no discrepancy in 29 of 30 records. The same patients' recollections of whether or not they received a postcard agreed with FMC records in 28 of 30 instances.

Table 1. Characteristics of Patients Studied

	All Patients	Patients Receiving Cards	Patients Not Receiving Cards
Number of Patients	232	144 (62.1%)	88 (37.9%)
Mean Age (years \pm sd)	62.2 \pm 20.6	61.2 \pm 21.0	63.8 \pm 19.4
Percent Females	59.9%	63.2%	56.8%

Following the Influenza A/Victoria epidemic occurring from mid-January to late March 1976, these questionnaires, with a stamped return envelope were mailed to all patients identified by the FMC computer as being older than 65 years and/or having chronic heart disease, bronchopulmonary disease, renal disease, or diabetes mellitus. More patients received the self-administered questionnaire than the postcard because information stored in the FMC computer had been extensively updated during the interval between the two mailings. Patients not returning the questionnaire within four weeks were telephoned and encouraged to return the questionnaire; a second questionnaire was mailed to nonresponders who had lost the original and who requested another questionnaire. All questionnaires were reviewed for completeness and comprehensibility before keypunching. Data from the questionnaire, in addition to patient age, sex, and payment status, were keypunched and analyzed with a CDC 6400 computer using the Statistical Package for Social Science (SPSS) programming.

The study was performed with the prior approval of the University of Washington Human Subjects Review Committee.

Results

Two hundred forty-one patients returned completed questionnaires, a 75.1 percent response rate. Twenty patients specifically stated, in writing or by telephone, that they were unwilling to participate. No information is available about other nonresponders. Only 232 questionnaires were used in data analysis, because nine questionnaires

could not be interpreted due to extensive incompleteness or uninterpretable responses.

As expected, the population studied was an elderly population. The mean age was 62.2 years (standard deviation-20.6 years). The percent of female patients was 59.9. Some sort of government or third-party health insurance was used by 96.5 percent of the patients.

Table 1 shows that 62.1 percent of all patients reported that they received a postcard from the FMC recommending influenza vaccination. These patients did not differ significantly by age or sex ratio from patients not receiving the postcard. Insurance coverage was similar for these two groups of patients.

One hundred fifteen patients (49.6 percent of all patients) received influenza vaccine. Vaccination was strongly correlated with patient perceptions as predicted by the Health Belief Model (Table 2*). Those patients who obtained vaccination believed influenza to be a more serious disease; believed they were more likely to become infected; and believed the vaccine to be more effective than patients not obtaining vaccination. In addition, patients not receiving vaccination felt that the vaccine was more expensive and were less satisfied with their care at the FMC. Degree of inconvenience encountered in coming to the FMC was not positively or negatively associated with receiving vaccine.

*Because the study variables were measured on ordinal scales (for which parametric statistics are inappropriate), the nonparametric Goodman-Kruskal gamma⁸ was used. As with the Pearson, gamma is a correlation coefficient that varies between -1 (perfect negative association) and +1 (perfect positive association).

Table 2. Association of Patient Attitudes with Vaccination Status (Expressed as Gamma Values)

Patient Attitudes	Vaccination Status
Perceived severity of influenza	.455*
Perceived susceptibility to influenza	.337
Perceived efficacy of vaccine	.530
Perceived expensiveness of vaccine	-.367
Self-reported inconvenience	-.023 (NS)
Satisfaction	.432

*All associations are significant ($P < .05$) except those noted not significant (NS)

Patients receiving the FMC postcard “cue” obtained vaccination at almost twice the rate of those patients not receiving the “cue” postcard (Figure 2). Vaccination rates did not differ by sex or insurance status, but vaccinated patients were older (mean age 68.3 years compared to 55.6 years for non-vaccinated patients, $P < .001$ by t test).

The large differences in observed vaccination rates of patients receiving the postcard and patients not receiving the postcard might have occurred because these two patient groups had different health beliefs. Therefore, perceptions of patients receiving the postcard were compared to perceptions of patients not receiving the postcard. Perceived susceptibility, severity, efficacy, expensiveness of vaccination, and satisfaction with care at the FMC did not differ between patients receiving and those not receiving the postcard.

The relationship of patient beliefs to sex of patient, age of patient, and self-reported occurrence of influenza illness during the 1976 epidemic was also studied. The attitudes listed in Table 2 were compared for males and females, patients over and under 62 years of age, and for patients reporting influenza illness and those not reporting influenza illness. There were no significant differences noted in any of the above comparisons. In

addition, attitudes did not seem to differ for patients with different types of insurance coverage, although small sample sizes limit the reliability of these comparisons.

Finally, discriminant analysis was used to see which variables were most likely to predict vaccination. Perceived severity, receipt of card, perceived efficacy, expensiveness, and satisfaction were entered significantly into the discriminant function in that order. Perceived susceptibility was highly intercorrelated with perceived severity and did not significantly improve the discriminant function.

Discussion

This study was designed to test the Health Belief Model shown in Figure 1. Influenza immunization correlated significantly with elements of the model as predicted by the model. In particular, perceived susceptibility to influenza and perceived severity of influenza correlated with immunization. Perceived efficacy correlated positively while perceived expensiveness correlated negatively with immunization. Satisfaction, which might be considered a negative cost because dissatisfaction is probably a barrier to care, was also positively associated with immunization. Therefore, the Health Belief Model provided a useful and accurate framework for understanding this health behavior.

The Health Belief Model has been reformulated by Becker et al⁹ and applied to compliance with a medical regimen on the part of mothers of sick children. In that study the mothers’ health motivations, perceptions, and attitudes were found to have useful explanatory and predictive value for mothers’ compliance with pediatric medical regimens. That research has been extended to examine medical care obtained by mothers for their children in response to illness.¹⁰ After illness and situational variables had been taken into account, health beliefs concerning illness threat and the efficacy of care were important predictors of utilization of care. Health beliefs are, therefore, important factors in determining not only utilization of preventive health services, but also in compliance with medical regimens and utilization of health care services in the face of illness.

The importance of the FMC postcard as a cue is shown in Figure 2. This result is more striking in the context of reported national immunization

rates of 10 to 15 percent compared to the observed immunization rate of 60 percent for patients receiving the postcard.

The FMC has mailed reminder postcards since 1973 and has consistently had vaccination rates of 50 percent or more. This study does not explain such a consistently high vaccination rate; undoubtedly, many factors are important, including the health beliefs of the patients, the reminder postcard, local media campaigns, demographic characteristics of patients, and staff diligence in further reminding patients who visit the clinic. However, this study certainly suggests that postcard reminders are one effective way to promote influenza vaccination.

A major concern of the FMC was the cost of such a project. The total cost of postcards, secretarial time to mail the cards, printing, vaccine, and nurses' time for injections was compared with actual billings to patients for the injections given.¹¹ The project was able to pay for itself.

The use of "cues" to promote desirable health behavior need not be restricted to postcards. Cues to action can be used to improve medication compliance.

For example, an antihypertensive medication schedule can be timed to coincide with certain daily activities like meals, shaving, etc, which "cue" the patient to take medication on schedule.¹² Physicians can also use mass media to promote behaviors known to improve health.¹³ In this regard, physicians, as Sandman argues, should play a vital role as consultants and critics of the content of the media.¹³

In summary, this study has demonstrated that health beliefs regarding susceptibility, severity, and efficacy are important factors in utilization of influenza vaccine. Furthermore, patients receiving a cue in the form of a reminder postcard had twice the vaccination rate of patients not receiving the postcard. The authors believe that physicians can use the principles of the Health Belief Model in patient care and recommend the use of cues to action to encourage beneficial health-care-related behaviors.

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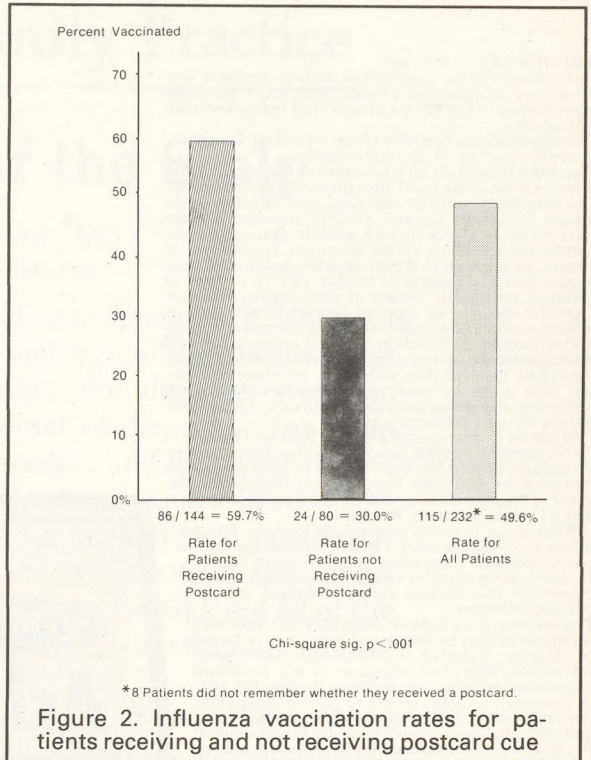


Figure 2. Influenza vaccination rates for patients receiving and not receiving postcard cue

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