Employee Wellness Program Impact on Health Care Costs: Do Participation and Intensity of Participation Matter?

Employees are faced with the decision to support voluntary Employee Wellness Programs (EWP). This study utilizes primary survey and health insurance cost data to assess the impact of EWP participation and intensity of use on health care costs. This study suggests that EWP participants incur higher health care costs than non-participants, however those EWP participants who intensively utilize the program incur lower health care costs than those who use the program less intensively.

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Introduction

Health care costs have grown faster than the overall economy in 28 of the last 30 years (Yen, Edington & Witting, 1994). Provision of health care benefits has put a severe strain on public and private organizations giving them the incentive to examine innovative ways to reduce health care costs. Employees of public and private organizations are faced with the decision to support voluntary and involuntary Employee Wellness Programs (EWP), even though they may choose not to use them. EWP have been adopted by many organizations to prevent illness and injury and subsequently lower health care costs. This study challenges the popular notion, reported in a majority of previous EWP studies, which suggests that EWP participants incur lower health care costs (Pelletier, 1993 and 1996, Shepard, 1996). The purpose of this study is to determine the relationship of work site wellness participation status and the intensity of work site wellness participation with health care costs for a voluntary EWP implemented at a public institution.

Review of Literature

This review will focus on three areas: relationship between health risks and health costs; role of health promotion programs in controlling health care costs; and, methodological challenges related to health care cost analysis.

A radical shift in the causes of death in the United States has occurred within the past century. In 1900, the three leading causes of death were infectious diseases (National Center for Health Statistics, 1990): pneumonia and influenza, tuberculosis and diarrhea and distemper. Today, chronic disease, such as heart disease, cancer, and stroke, accounts for 6 out of the 10 leading causes of death (National Center for Health Statistics, 1990). Consequently, determining what factors contribute to developing these chronic diseases is of great importance. Lifestyle factors consistently account for over 50 percent of the causes of death due to preventable disease. Hence, improving lifestyle practices has a great potential for affecting mortality and morbidity. If lifestyle related disease is prevented or delayed, it is logical to conclude that costs related to treating those diseases will be delayed and possibly lowered. Numerous studies have been conducted in the area of health care cost containment. In a vast number of those investigations, researchers have found that individuals with high health risks are associated with higher health care costs than individuals with low health risks (Bertera, 1991; Brink, 1986; Kingery, Ellsworth, Corbett, Bowden & Brizzolara, 1994; Leigh & Fries, 1992; Yen, et al., 1991,1992,1994; Warner, 1990). The most frequently cited health risk factors are: cigarette smoking, obesity, excessive drinking, high cholesterol level, high blood pressure, lack of regular seat belt use and sedentary lifestyle (Bertera, 1991; Brink; 1986; Kingery et al., 1994; Leigh & Fries, 1992; Yen et al., 1991, 1992, 1994).

There is a growing body of research on the methodological limitations of using mean cost data to compare health care costs of high-risk and low-risk individuals (Dunnagan, Haynes & Noland, 1998; Kingery et al., 1994; Lynch, Teitelbaum & Main, 1991, 1992). In previous studies, researchers have placed individuals into high and low risk groups and then used the average (mean) of each groups' medical claims to compare costs (Bertera, 1991; Bly, Jones & Richardson, 1986; Brink, 1986). This method of reporting cost data does not take into account the highly

skewed nature of medical cost data (Lynch et al., 1991). For this reason researchers need to alter their analysis to lower the potential for exaggerated or misleading results (Lynch et al., 1991, p. 126). Kingery et al. (1994) reported, "the danger of overselling the costs associated with elevated risk is that plan administrators may lose credibility when they fail to deliver predicted cost reductions after investment in health promotion programs" (p. 1346).

Recently, Haynes, Smith and Dunnagan (1998) discussed the potential for adverse selection bias to cause high cost users of health insurance benefits to participate in voluntary work site wellness programming. If adverse selection occurs in EWP, then one would expect program participants to have higher health related costs than non-participants. This study extends previous work by assessing the impact of the intensity of EWP participation on health care costs.

Empirical Considerations

This section summarizes the data and empirical models used. The data used in this study includes a survey of faculty members and health insurance cost data. The empirical models utilize non-linear (Tobit) statistical models to assess the impact of EWP participation and intensity of use on health care costs.

Data

This study utilizes primary data generated from a survey of university faculty and staff and health insurance claims data supplied by Blue Cross Blue Shield and Mutual of Omaha to examine the impact of EWP participation on health care costs. A 48-item questionnaire was developed to answer a variety of research questions. The health related data, demographics, controls for averse selection of high cost users to participate in wellness programming, and intensity of EWP participation were obtained from a questionnaire. Cost data for the investigation from January 1, 1993 through December 31, 1996 were obtained directly from the insurance companies of Blue Cross Blue Shield and Mutual of Omaha.

The sampling frame of this study included 1,940 full-time employees of Montana State University-Bozeman who worked on-campus and were eligible for full health insurance benefits between January 1, 1993 and December 31, 1996. Spouses, dependents, and retirees were excluded from the study. Only employees who worked continuously for the University since January 1, 1993, completed the research questionnaire, and provided their social security number to the researchers were included in the study. The final sample included 841 respondents, including 496 EWP participants and 345 EWP non-participants.

Empirical Model

The amount of health care costs incurred by the individual is affected by many socio-economic and demographic characteristics, health behaviors (e.g., exercise), health status (e.g., blood pressure), previous health care utilization, conversion experiences (e.g., heart attack), as well as participation in work site wellness programming. Consequently, the investigators collected data on these variables to develop the model used in this investigation.

The dependent variable used in this investigation was the log of the dollar value of health insurance claims from January 1, 1996 through December 31, 1996. The log transformation was used to decrease the variance of the cost data and to more normally distribute the dollar amounts.

The set of independent variables included employee wellness classification; intensity of EWP participation; previous utilization of health insurance (1993-1995); identification of employees who have initiated wellness programming due to significant health concerns (adverse selection); behavior classification based upon selected health behaviors; health status classification based upon selected health status indicators; employment classification; education; age; marital status; number of dependents; and, gender.

Employees were considered participants in the EWP if they had participated in health screenings, counseling, nutrition interventions, health education programming, and/or completed registration forms for exercise classes in 1996. The EWP participant variable was set as a zero-one dichotomous variable, which was set equal to 1 if the individual participated in health promotion activities. Previous research would suggest that the expected sign on the coefficient associated with wellness programming to be negative. That is, employee wellness participants have lower health insurance claims than non-wellness participants.

The intensity of EWP participation by the employees was evaluated by asking the respondent to indicate if they had participated in the following EWP activities: activity/exercise classes; health screenings; health education classes/seminars; counseling; stress management programming; nutrition counseling; and, other activities. A measure of EWP participation intensity was developed by summing the number of activities used by each

respondent. Based on previous research, it was anticipated that the EWP participation intensity would be negatively correlated with health insurance costs.

A strong predictor of future health insurance utilization is past health insurance utilization. That is to say, individuals who have been high cost users of health insurance in the past tend to have similar consumption patterns in the future. Consequently, the investigators looked at health insurance costs to classify the employee as being high or low users of medical care services based upon his or her health insurance costs over a 3-year period (1993-1995). The median health care claim amount over the three year period was about $1,800. Those employees who had a 3-year cost-claim of $1,800 or less were classified as "low users." Those individuals who had a 3-year health insurance cost of over $1,800 were classified as "high users."

Control variables were introduced to address the adverse selection of employees who have initiated wellness programming due to significant health risk factors. The investigators asked a series of questions that identified employees who initiated participation in the wellness program because of a major illness/disease, health risk factor (such as high blood pressure and high cholesterol), health professional's recommendation to participate because of a risk for major illness/disease and problematic health screening results.

Four health behaviors were incorporated into the model as independent variables and they are as follows: tobacco use, alcohol use, seatbelt use and exercise. Three health status variables were used in the model as independent variables and they as follows: high blood pressure, high cholesterol and high body mass index. A number of basic demographic variables were also included in the model because these variables may impact the demand for health care services. The control variables included employment classification (faculty, or not), educational status, age, marital status, number of dependents and gender.

General descriptive statistics were used to describe the EWP participants and EWP non-participants. A Tobit regression analysis was used to determine the relationship between EWP participation (and intensity of participation) and health care costs.

Results

This section compares the health costs of EWP participants and non-participants and assesses the association between health costs and the intensity of EWP participation. This section reports the statistical results of this study using simple descriptive statistics and non-linear multivariate statistical models.

Table 1 compares employees who were classified as EWP participants and non-participants. The results suggest that the two groups were essentially the same based upon a number of demographic variables such as age, education and job classification. Using a 10 percent level of significance, the EWP participants were some older and more likely to be female than non-participants.

Table 1 Summary of Personal and Demographic Characteristics for Respondents Participating or Not Participating in the Employee Wellness Program

Characteristic	Not an Employee Wellness Participant	Employee Wellness Participant
Age of the respondent, mean	43.8	45.9*
	(percentage)	
Marital status: married	80.0	78.2
Gender: male	57.6	42.3*
Education: high school graduate or less	25.8	24.4
Education: college graduate	23.8	26.8
Education: college graduate, masters	17.1	18.3
Education: college graduate, doctorate	33.3	30.4
Job classification: faculty	54.5	50.4
Observations	345	496

The EWP participants had similar health status, but more favorable health behavior indicators than EWP non-participants (Table 2). For example, three times as many EWP non-participants reported smoking, over five times as many reported using smokeless tobacco, and over twice as many did not regularly use their seat belts when compared to the EWP participants.

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Table 2 Health Status Comparison between EWP Participants and Non-Participants

Variable	Not an Employee Wellness Participant	Employee Wellness Participant
Health Status		
High Blood Pressure	16.2	19.6
High Cholesterol	22.9	28.4
High BMI (high body fat)	20.6	20.6
Health Behavior		
Cigarette Smoker	12.8	4.2 *
Smokeless Tobacco User	5.8	1.0 *
Seatbelt Non-User (less than 100 %)	15.4	6.5 *
Alcohol User (3 or more drinks per day)	4.6	4.0
Regular Exerciser	75.4	80.8
Observations	345	496

A number of statements were developed by the investigators to identify health risk factors that might facilitate recruitment into health enhancement programming and were also associated with increased health insurance costs. Specifically, the employees were given statements that asked if their recruitment was due to a major illness or disease, health risk factor of concern, referral by a health professional, abnormal health screenings, or depression. The results show that proportionally more of the EWP participants were recruited for these reasons than EWP non-participants. In addition, over 20 percent of the EWP participants sought out additional medical attention due to feedback that they received from EWP related activities. These results suggest that the EWP had a greater proportion of employees who initiated health enhancement programming because of factors that are associated with higher health insurance costs than EWP non-participants.

Tobit regressions were employed to identify the relationship between health insurance costs and wellness participation classification; and between health insurance costs and the intensity of wellness participation. This study uses a 10 percent level of significance. These results suggest that wellness employees have significantly higher costs than non-wellness participants after controlling for important demographic, health risks, and previous utilization variables. That is to say, after statistically controlling for differences between the two groups, EWP participants had higher health costs than non-participants (Table 3). In addition, Table 3 suggests that being classified as a high cost user of health insurance in the past was statistically significant and associated with higher costs.

Table 3 Determinants of the Total Health Insurance Claim Costs for All Respondents
(Tobit Regression, Log of Total Health Insurance Costs Dependent Variable)

Variable[1]	Parameter Estimate	Standard Error	p-value
Intercept	5.7160	1.8194	0.0017 *
EWP participant in 1996	0.3631	0.1996	0.0689 *
Previous health costs	1.8889	0.1971	0.0001 *
Log Likelihood			-1,887

[1] Control variables include the following: self selection, health status, health behavior, faculty status, education, age, marital status, dependents and gender.

Using a sample of EWP participants only, this study examined the intensity of participation in wellness programming through exercise, health screenings, health education, counseling, stress management, and nutrition programming (Table 4). EWP participants who intensively utilize the program were found to have lower health insurance costs than individuals utilizing the program less intensively.

Table 4 Determinants of the Total Health Insurance Claim Costs for EWP Participants Only
(Tobit Regression, Log of Total Health Insurance Costs Dependent Variable)

Variable[1]	Parameter Estimate	Standard Error	p-value
Intercept	5.3373	2.1169	0.0117
EWP participant in 1996	-0.0089	0.0026	0.0006
Previous health costs	1.7080	0.2187	0.0001
Log Likelihood			-1,061

[1] Control variables include the following: self selection, health status, health behavior, faculty status, education, age, marital status, dependents and gender.

Study Limitations and Further Research

This study was limited by a number of factors. First, the investigators used a research design that was observational in nature. Not using true-experimental research designs is a common problem associated with work site health promotion evaluations. This research dilemma is caused by a number of factors such as organizational policy, experimental subjects' sharing information with control subjects, and limited evaluation resources. Nevertheless, the lack of true randomized designs does compromise the validity of the results. Second, the data collected through the survey instrument was self-reported which is not as accurate as direct measures. In addition, the data set was only cross sectional in nature. It would be more revealing to track the dependent and indicator variables used in this investigation over time to more accurately evaluate the costs associated with these variables. However, the costs associated with this type of investigation were cost prohibitive.

Despite these limitations the investigators were able to collect detailed data on over 800 employees.   The results of the simple comparisons demonstrate that the EWP participants have less favorable health status and more favorable health behaviors than EWP non-participants. Furthermore, EWP has a two-times greater chance of recruiting high cost users of health insurance benefits than employees classified as EWP non-participants. However, when these differences are controlled for in the Tobit regression wellness participants still have significantly higher costs than EWP non-participants.

However, it is possible that the current model did not consider all of the variables that differentiate health insurance utilization between the EWP participants and EWP non-participants. For example, variables such as family history for risk factors such as cancer or cardiovascular disease could also be important indicator variables that need to be included in the regression analysis. At the same time it is possible that EWP participants cost more than EWP non-participants and this is the appropriate model for the analysis. In this case it may be that the EWP recruited employees who have higher costs than non-participants. Further investigations are needed to address this important consideration.

Perhaps the most interesting outcome was that health insurance costs were negatively associated with the intensity of EWP participation. Given that EWP participants had a number of factors that would increase health insurance utilization, such as poorer health status than EWP non-participants and problematic health screenings, this outcome would seem significant. However, the intensity variable only measured the number of activities used, not the intensity that each of these activities was employed. Further research is needed to address these limitations. While this study addresses pertinent questions concerning the relationship between EWP participation and health care costs. Further investigation is needed to adequately address the critical question - whether or not wellness programs reduce the health care costs of participants below those costs that they would have incurred in the absence of the program.

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Endnotes

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