



The relationship between participation in the MSU Employee Wellness Program and employee absenteeism
by Nancy Abbett Downing

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Physical Education
Montana State University
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Abstract:

Reducing absenteeism from work has been a priority for organization management for many years. Absent employees have been costly to organizations. Many organizations have instituted programs of health promotion in an attempt to maintain and improve their employees' health status. Employers believed that healthy employees were more productive, had fewer accidents, used fewer health insurance benefits, and had less absence.

Montana State University (MSU) initiated an employee wellness program (EWP) in January of 1985. Decreasing the absence rate of MSU's approximately 2000 employees was an objective of the program. Whether the absence rate decreased for full-time employees who participated in the activity portion of the wellness program was the subject of this study.

The relationship between 1989 absenteeism and total quarters of employee participation in EWP activity classes between January, 1986, and December, 1989, was modeled using multiple linear regression with age, gender and the 1984 pre-program absence rate as covariables. The relationship was modeled separately for each of the three divisions of MSU employees: classified, faculty, and professional.

The data for each employee division were analyzed using SAS, the Statistical Analysis System for Linear Models. In each division, the hours of absence in 1989 did not have a linear relationship to total quarters of participation in the EWP activity classes. Based on the results of the statistical analysis for each employment division, the number of quarters that a classified, faculty, or professional employee participated in EWP activity classes had no relationship to the absence rate of that employee.

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This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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Date April 19, 1993

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ABSTRACT

Reducing absenteeism from work has been a priority for organization management for many years. Absent employees have been costly to organizations. Many organizations have instituted programs of health promotion in an attempt to maintain and improve their employees' health status. Employers believed that healthy employees were more productive, had fewer accidents, used fewer health insurance benefits, and had less absence.

Montana State University (MSU) initiated an employee wellness program (EWP) in January of 1985. Decreasing the absence rate of MSU's approximately 2000 employees was an objective of the program. Whether the absence rate decreased for full-time employees who participated in the activity portion of the wellness program was the subject of this study.

The relationship between 1989 absenteeism and total quarters of employee participation in EWP activity classes between January, 1986, and December, 1989, was modeled using multiple linear regression with age, gender and the 1984 pre-program absence rate as covariables. The relationship was modeled separately for each of the three divisions of MSU employees: classified, faculty, and professional.

The data for each employee division were analyzed using SAS, the Statistical Analysis System for Linear Models. In each division, the hours of absence in 1989 did not have a linear relationship to total quarters of participation in the EWP activity classes. Based on the results of the statistical analysis for each employment division, the number of quarters that a classified, faculty, or professional employee participated in EWP activity classes had no relationship to the absence rate of that employee.

CHAPTER 1

INTRODUCTION

Introduction to the Problem

Reducing absenteeism from work has been a priority for organization management for many years. Absent employees were costly to organizations both directly and indirectly.

Direct costs to an organization included paying an employee while he or she was absent, paying a temporary replacement worker or paying overtime to a regular employee to perform the job of the absent employee, and paying fringe benefits for the absent employee. Indirect costs to an organization included escalating health insurance premiums resulting from increased medical expenditures for treating ill employees, replacement costs for employees who became unable to work or died prior to normal retirement, and rising disability insurance premiums.

When an employee was absent, an organization's productivity was adversely affected immediately by several factors: the reduced efficiency of those who attempted to perform the employee's job, the meetings and decisions that were postponed, the disrupted schedules of those workers who depended on the absent employee, and the deadlines

missed due to the absence. This reduced productivity resulted in indirect costs to the organization which were three to six times greater than the direct costs of an employee's absence (Bowne, Russell, Morgan, Optenberg, & Clarke, 1984). Markowich and Silver (1989) described an additional problem caused by absence. Those employees whose workdays were negatively affected by another employee's absence sometimes rewarded themselves by taking an illegitimate sick day.

In a for-profit organization, the net result of a one percent increase in absenteeism was estimated to be a one percent decrease in profits (Clement & Gibbs, 1983). Thus decreasing an organization's absenteeism directly affected the organization's primary objective: generating a profit.

The Bureau of Labor Statistics estimated that illness and injury were responsible for only two thirds of employee absence (Centers for Disease Control, 1989b). Steers and Rhodes (1984) identified as many as 209 variables that affected absenteeism. In addition to an employee's physical health status, mental, social, and emotional factors affected an employee's motivation to attend work. These factors included job satisfaction, job involvement, commitment to the organization, and kinship responsibility (Brooke, 1986). Thus absence was related to the physical health of employees and to their mental, social and emotional health as well.

Over the past two decades, many organizations instituted programs of health promotion in an attempt to maintain and improve their employees' health status. Employees who adopted and maintained healthy lifestyles reduced their risk of illness and disability from heart disease, cancer and stroke, the primary health problems in this country, and thus tended to have long, worthwhile careers (Brennan, 1982). Employers believed that the healthy employee was more productive, had fewer accidents, and used fewer sick days and health insurance benefits (O'Donnell & Ainsworth, 1984).

Other than health care, costs related to absenteeism were difficult to determine (Fitness and Lifestyle, 1988). Health care costs, however, were well documented. Nationwide, health care costs rose from \$26.9 billion in 1960, representing 5.3% of the gross national product (GNP), to \$496.6 billion in 1987, representing 11% of the GNP (Wood, Olmstead, & Craig, 1989). Estimates in 1992 by the U.S. Department of Commerce indicated that health care costs had risen to 14% of the GNP (Dougherty, 1992).

To encourage employees to adopt and maintain healthy lifestyles, many business organizations offered health promotion programs at the worksite. These programs included health risk assessment, clinical examination, an activity component, and/or various health education components such as nutrition, smoking cessation, stress

management, and low back care (O'Donnell & Ainsworth, 1984).

The worksite provided exceptional potential for the offering of such health promotion programs. Employees spent at least half of their waking hours during the workweek at the worksite. Attending a health promotion program while at work eliminated additional commuting and travel costs. The convenience of scheduling a nonwork activity at the worksite meant the removal of a psychological barrier that prevented participation in the activity (Brennan, 1982). This convenience of scheduling also promoted an improved frequency of work attendance for some employees (Falkenberg, 1987).

Exercising while at work lessened stress on the job for those who participated (Falkenberg, 1987). Fellow workers provided a support system to keep the employee motivated in his/her lifestyle improvement effort (Bell, 1986; O'Donnell & Ainsworth, 1984). Some employees increased their commitment to an employer who provided them with the advantage of a health promotion program (Cox, Shephard, & Corey, 1981). Consequently, health promotion programs offered at the worksite benefitted both the employer and the employees.

According to Collios (Fitness and Lifestyle, 1988), a physical activity component provided the keystone of a balanced health promotion program. Physiological,

psychological and social benefits began to accrue almost immediately for the exercise participant as did economic benefits for the employer. Physical activity was easier for the employer to promote because, unlike lifestyle modification programs such as smoking cessation and nutritional changes, exercise was a positive quantity: something that was added rather than subtracted from one's lifestyle (Fitness and Lifestyle, 1988).

The authors of several recent research studies indicated a positive relationship between fitness and reduced risk of death from cardiovascular disease (Blair, Kohl, Paffenbarger, Clark, Cooper, & Gibbons, 1989; Ekelund, Haskell, Johnson, Whaley, Criqui, & Sheps, 1988; Paffenbarger, Hyde, Wing, & Steinmetz, 1984). This positive relationship remained after adjustment for other known risk factors, such as hypertension, smoking, and elevated cholesterol levels. Blair et al. (1989) reported that only a moderate level of fitness was needed to provide protection against early death from cardiovascular disease and cancer.

In addition to these long-term physical health benefits, an exercise component within a health promotion program seemed to affect the employee's mental, emotional and social health. Although little scientific evidence existed to support such claims, employee exercise participants gave credit to their activity program for

feelings of improved self-image and well-being, decreased fatigue, enhanced morale, improved work performance, and increased job satisfaction (Bell, 1986; O'Donnell & Ainsworth, 1984). Cox, Shephard, and Corey (1981) stated that increased cardiorespiratory fitness can influence fatigue and elevate mood, and may improve the employee's ability to work through minor illnesses.

With work absence related to the employee's wellness state and with an exercise component of a worksite health promotion program positively affecting the employee's wellness state, management anticipated an inverse relationship between absence and improved fitness. Indeed, most organizations listed reduced absence as a major objective for establishing a worksite health promotion program.

Montana State University (MSU), a public institution with approximately 10,000 graduate and undergraduate students located in Bozeman, Montana, initiated an employee wellness program (EWP) in January of 1985. Although controlling rapidly rising health care costs was the initial impetus for the program, decreasing the absentee rate among MSU's approximately 2000 employees was an objective of the program (Evans, Harris, McNeill, & McKenzie, 1989). Whether the absentee rate decreased for employees who participated in the wellness program was the subject of this study.

Statement of the Problem

The general purpose of this study was to analyze the relationship between participation by full-time employees in the MSU Employee Wellness Program activity classes and employee absenteeism.

Sub Problems

MSU had three divisions of employees: faculty, administrator/professional, and classified. Each division functioned under a different set of unwritten expectations regarding attendance behavior. Faculty could choose to perform some of their work at home during the work week. Administrators were expected to be on the MSU campus during regular work hours, but were granted some flexibility in scheduling their time to allow for off-campus meetings and other professional responsibilities. Classified employees were expected to work at their jobs during regular work hours and had little or no flexibility in scheduling their work time. These variations in attendance expectations may have affected the recording of sick leave hours.

The following sub problems were established to address the potential variations in sick leave recording:

1. What was the relationship between participation in the EWP activity classes by full-time classified

employees at MSU and the absence rate of those employees?

2. What was the relationship between participation in the EWP activity classes by full-time faculty members at MSU and the absence rate of those employees?

3. What was the relationship between participation in the EWP activity classes by full-time professional staff at MSU and the absence rate of those employees?

Justification of the Study

The effectiveness of health promotion programs has not been adequately studied. Several authors have criticized organizations for claiming benefits, such as decreased health care costs, improved productivity, and reduced absenteeism, from health promotion programs that have not been systematically evaluated (Aberth, 1986; Bowne, Russell, Morgan, Optenberg, & Clarke, 1984; Dishman, 1988; Eddy & Beltz, 1989; Eddy, Gold, & Zimmerli, 1989; Katzman & Smith, 1989).

Katzman and Smith (1989) received information from 98 businesses with health promotion programs. Fewer than half were conducting evaluations of their programs with only seven evaluating the relationship between the exercise component of their programs and absenteeism.

Most studies which evaluated the relationship between exercise and absenteeism were only six months to one year

in length. Frequently these studies indicated reduced absenteeism for the exercisers. However, Falkenberg (1987) noted that short-term studies often suffer from the "halo" effect: the frequent attention the exercisers received from the researchers was positive reinforcement that could increase the exercisers' motivation to attend work during the period of the study.

Pyle (1979) stated that, although some factors influencing absenteeism can be affected in the short-term, only long-term studies over three to five years will give a true evaluation of the effectiveness of the exercise component. Horowitz (1987) recommended a five to ten year longitudinal study to truly determine the influence of a wellness program on absenteeism. The authors who found short term absenteeism benefits associated with Johnson and Johnson's Live for Life wellness program stressed the importance of continuing the study to determine if the benefits could be sustained over time (Jones, Bly, & Richardson, 1990). Baun, Bernacki, and Tsai (1986) stated that long-term evidence of the beneficial effects of exercise on absenteeism was difficult to obtain because of the high dropout rate among participants. They anticipated that the beneficial effects of a worksite exercise program would be realized by only a few employees.

The National Wellness Institute at Stevens Point, Wisconsin reported in 1986 that 20% of the institutions of

higher education in the United States had health promotion programs (McMillen, 1986). The research literature, however, was nearly devoid of reports of the effectiveness of health promotion programs in colleges and universities.

A composite report of 811 MSU employees who completed a health risk assessment questionnaire during 1987-1988 indicated that the average number of days absent for these employees was 3.8 days. The national average for institutions of higher education in 1985 was 5.5 days. Those MSU employees whose aerobic training programs were poor or very poor were absent an average of one tenth of a day less than those employees whose training programs were good or very good (MSU Employee Wellness, 1988-1989). Based on this self-reported data, MSU officials wondered if the exercise component of the wellness program was meeting one of the initial program objectives: that of decreasing the employee absentee rate (G.F. Evans, personal communication, January, 1990).

MSU had an extensive investment in its employees. Employees were recruited, received training and education, gained experience that cannot easily be replaced, and received vacation, sick leave and retirement benefits. Maintaining those employees in a healthy operating condition via a health promotion program may protect this investment. However, evaluation procedures should be ongoing so that the cost-effectiveness of the program can

be determined. This study evaluated the absenteeism of personnel who were employed by MSU for a minimum of 6.5 years and who were participants in the exercise component of the EWP.

Delimitations

The target population was delimited to MSU personnel who were designated as full-time employees so that hours of absence could be compared equitably. The target population was delimited to long-term employees so that the relationship between EWP activity class participation and absenteeism could be studied over a several year period.

The absence study period was delimited to 10 months of the years examined for classified and professional employees to equalize the absence data for employees on 10 and 12 month contracts. The months of July and August were not utilized. Faculty were on either 12 month or academic year appointment, which included the time period from the latter half of September through the first half of June. The absence study period for faculty was delimited to the months October through May to equalize the absence data.

Limitations

The recording of EWP activity class data was a limiting factor. Prior to winter quarter, 1990, no attendance records were kept by class instructors.

Participation was determined by registration records and verified by a recall survey sent to participants. (See Appendix A).

The availability of absence data was another limiting factor. For the study year 1989, a computerized list of the total hours of sick leave used by each employee was obtained. To deduct the hours used during the months not included in the study, the files containing each month's employee time cards were consulted, the hours recorded and subtracted from the total hours. For the study year 1984, the sick leave data for the months used was recorded directly from each month's time card. Thus gathering absence data for each subject was a several step process with the possibility of calculation errors.

Residing in Montana was perhaps a limiting factor. The authors of the 1987 Behavioral Risk Factor Surveillance System, which surveyed the leisure time activity patterns of people in 32 states, reported that Montana had the lowest percentage of sedentary persons. Of those Montanans surveyed, only 47.2% were designated as sedentary, participating in less than 20 minutes of leisure time activity a minimum of three times a week. In contrast to Montana, New York had the highest percentage with 73.5% of the surveyed population designated as sedentary (Centers for Disease Control, 1989a).

Residing in Bozeman was possibly a limiting factor. Bozeman was located close to the sites of many outdoor activities. Skiing, fishing, hiking, climbing, biking, backpacking, and walking/jogging were popular leisure time sports in the Bozeman area. Choosing to reside in Bozeman perhaps indicated that MSU employees tended to have a higher initial level of wellness that would not be significantly impacted by a wellness activity program .

Definition of Terms

1. Absenteeism: hours recorded on the monthly time and attendance report and verified by the employee's supervisor as sick leave hours taken. Sick leave hours may be used for employee illness or injury, or for kinship responsibilities.
2. Activity classes: aerobic and anaerobic classes offered either two or three days a week during the academic quarter by the MSU-EWP. Classes included high and low impact aerobics, basic conditioning, cross country skiing and ski conditioning, racquetball, stationary cycling, swimming, volleyball, walking/jogging, water exercise and weight training.
3. Classified employees: employees whose job titles and descriptions were included in the Montana State Classified System (State of Montana, 1985).

4. EWP: employee wellness program. The health promotion program for employees at MSU, initiated in January of 1985.
5. Faculty: members of the teaching staff who had the rank of instructor or higher and whose contracts were approved by the Board of Regents, and other staff members so designated by the President of MSU (Montana State, 1984).
6. Full-time MSU employees: personnel who were on either 10 or 12 month contracts or academic year appointment, and who were designated as full-time employees by the MSU Personnel Office. Three classifications of employees were included in this definition: faculty, professional, and classified.
7. MSU: Montana State University. A public institution with approximately 10,000 graduate and undergraduate students and 2000 employees located in Bozeman, Montana.
8. Participation: participating in a minimum of one activity class per week throughout most of a quarter.
9. Professional employees: employees who were directors and administrators, appointed for either a 10 or a 12 month period, and whose contracts were approved by the Board of Regents (Recruitment and Hiring, 1987).

10. Rate of participation: the number of quarters an employee participated in EWP activity classes during the four year period 1986-1989. Maximum rate of participation was 12 quarters.

11. SAS: a statistical analysis system for linear models (Freund, Littell, & Spector, 1986).

12. Sick leave benefit: eight hours of paid sick leave accrued by full-time employees per month. At retirement or employment termination after a minimum of 90 days of employment, 25% of the unused hours were reimbursed at the most recent rate of pay (Collective Bargaining, 1991).

13. Target population: full-time MSU employees whose employment began at least by January of 1984 and continued through at least December of 1989.

14. VMS: virtual memory system, the mainframe computer operating system used by the Systems and Computing Services Department, MSU.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Introduction

Organization management realized the importance of improving and preserving their human resources (Gebhardt & Crump, 1990). Employees living adverse lifestyles, characterized by sedentary living patterns, high-fat diets, and chronic stress, were costly to organizations (O'Donnell & Ainsworth, 1984). Rising health insurance premiums, premature death and disability of employees, and increased absentee rates reduced profits. These factors were the incentive to many organizations for the establishment of worksite health promotion programs.

Reduction of absenteeism was a goal of these health promotion programs. As Piserchia and Hartwell (1985) noted, employee illness was a heavy burden on the employer. Clement and Gibbs (1983) noted that an absent employee not only received payment for work not accomplished, but also continued to receive fringe benefit payments. The employer paid overtime to another employee or wages and benefits to a temporary replacement employee to perform the absent employee's job. Efficiency was reduced with an

inexperienced replacement, postponed meetings and decisions, and disrupted schedules. Sometimes employees who were negatively affected by another employee's absence rewarded themselves by taking a day off from work (Markowich & Silver, 1989).

Many organization managers believed that worksite health promotion programs encouraged the development of healthier employees who had fewer absences from work (O'Donnell & Ainsworth, 1984). Organizations were criticized, however, for investing in these programs, including the spending of large sums on fitness classes and equipment, merely on the belief that improved employee health and reduced absenteeism would result (Bowne, Russell, Morgan, Optenberg, & Clarke, 1984). However, as Brennan (1982) indicated, the cost of program evaluation was considerable. Managers were often unwilling to spend the capital required. Cox, Gotts, Boot, & Kerr (1988) found the same situation in their sample of major British and Dutch firms which offered employee exercise programs. All of these firms attributed several positive outcomes to their programs; however, few had attempted evaluation.

The results of a national study of the health promotion program evaluation practices of a sample of corporations found that only 42% of the corporations were conducting any type of evaluation to determine whether their investment in employee health promotion was cost-

effective (Katzman & Smith, 1989). Those organizations not engaged in evaluation cited cost constraints, low management priority, and difficulties in designing appropriate evaluative methodologies as reasons for not evaluating their programs. In addition, Kelly (1985) reported that evaluation techniques may compromise employee relations, that evaluation may require a substantial time commitment, and that the expertise to conduct evaluation may not be available. Only seven of the 41 organizations found by Katzman and Smith (1989) to be engaged in program evaluation were studying the relationship between physical fitness and reduced absence from work.

Researchers who attempted evaluation of the relationship between participation in worksite health promotion programs and reduced absenteeism from work studied programs of varying types (Gebhardt & Crump, 1990). Each of the programs studied included one or more of the following components: health risk assessment, health examination, health risk reduction seminars, fitness testing and prescription, exercise classes, supervised or unsupervised use of fitness facilities, recreational activities, financial assistance to exercise at a private health club, encouragement to exercise in the home environment, and/or submittal of activity records.

Twenty eight studies of the relationship between participation in employee health promotion programs and

employee absence were found in the literature. Changes in absenteeism were studied for time periods ranging from six months to seven years. Twelve researchers demonstrated a significant, inverse relationship between health promotion program participation and reduced absenteeism. Three researchers demonstrated no relationship and thirteen reported data with no statistical treatment applied. The validity of many of the studies was questionable due to problems with research design (Aberth, 1986; Eddy et al., 1989; Falkenberg, 1987; Pyle, 1979).

Problems in Health Promotion Program Evaluation

According to Falkenberg (1987), the validity of many studies was questionable because the participating employees were aware that they were part of a research study. Such awareness may have caused the subjects to behave in ways they believed were expected of them. This "Hawthorne effect" was first discovered during experiments at the Hawthorne plant of the Western Electric Company where researchers were testing the effect of different variables on employee productivity (Rubinson & Neutens, 1987). When employee productivity increased regardless of the manipulation of the variables, researchers concluded that the added attention the employees were receiving led to the increased productivity.

In studies which compared health promotion program participation and absenteeism, employees often knew that they were a part of a research project. Even without this realization, the added attention participating employees received from contacts with health promotion administrators within their organizations may have positively influenced their work attendance (Falkenberg, 1987).

Other critiques of studies which reported improved work attendance following participation in an employee health promotion program centered on the selection of the comparison groups (Eddy et al., 1989). To conclude that a health promotion program improved the work attendance of employee participants, a comparison group of nonparticipants should be included in the study (Piserchia & Hartwell, 1985). This comparison group must resemble the participation group as closely as possible except for not taking part in the health promotion program (Johnson, 1977). A.W. McNeill (personal communication, February, 1990) noted that employees who chose to participate in health promotion were not comparable to employees within the same organization who did not choose to participate. Eddy and Beltz (1989) stated that the motivation of these self-selected employees to change lifestyle behaviors clearly distinguished them from employees who did not choose to participate. As Piserchia and Hartwell (1985) recommended, a comparison group must be composed of

employees who have not been offered the health promotion program. Hoffman and Hobson (1984) listed both employee self-selection and the lack of appropriate control groups as common research problems. Thus the validity of any study which used non-participating employees from the same organization as the comparison group was questionable.

Some researchers found that employees who self-selected to join health promotion programs had better work attendance records prior to joining the program than did those employees who were nonparticipants (Baun, Bernacki, & Tsai, 1986; Bowne, Russell, Morgan, Optenberg, & Clarke, 1984; Lynch, Golaszewski, Clearie, Snow, & Vickery, 1990; Wood, Olmstead, & Craig, 1989). In several of the reported studies, differences in absence between employee participants and nonparticipants were compared only once during the existence of the health promotion program. Failure to examine these differences prior to the onset of the program appeared to affect the validity of these studies. Lynch et al. (1990) noted that pre-program differences in absenteeism must be controlled to separate the effects of the employee's personality and the effects of the health promotion program. Piserchia and Hartwell (1985) labeled this method of examining data at only one point in time as "extremely weak".

Another research problem, discussed by Pyle (1979), was the use of short-term study periods to assess the

effect of a health promotion program. Permanent health improvement reduced absence due to illness. However, such improvement for employees occurred over a period of years rather than months. Several studies examined differences in employee absence after only one year of participation in a health promotion program. Pyle praised the Kimberly Clark Corporation for postponing the cost-benefit analysis of health promotion for five years.

Soviet and European Studies Relating Exercise
and Employee Absence

Researchers in the Soviet Union and Europe have been studying the relationship between employee fitness and absenteeism for many years (Donoghue, 1977). At the Pre-Olympic Scientific Congress held in Quebec in 1976, Pravosudov of the Soviet Union reported the results of several studies completed in that country where employee fitness programs have existed since 1930. Workers who were not physically active were ill five to eight times more frequently than active workers. In 1965, Smirnov reported that only 22.5% of active workers were absent compared to 60% of inactive workers and that inactive workers had four times more physician visits than did active workers. Workers who exercised were absent due to illness or accidents three to five days less per year than workers who did not exercise. Workplace accidents were two to three

times less prevalent among exercising workers (Donoghue, 1977).

European researchers also reported an inverse relationship between participation in worker fitness programs and absenteeism. West German workers with symptoms of cardiovascular disease reduced their absenteeism by 68.6% following participation in a cardiac conditioning program. Absenteeism decreased nearly 50% at the Goodyear Company in Norrkoping, Sweden, after an employee fitness program was introduced (Donoghue, 1977).

North American Studies Relating Exercise and Employee Absence

The effect of participation in organization-sponsored exercise programs on employee absenteeism was studied by several researchers in the United States and Canada for time periods ranging from six months to seven years. Some researchers compared pre and post-exercise program participation absence rates of an employee participation group only. Other researchers compared these rates for both a comparison group and a participation group, while still others compared the absence rates of a participation group and a comparison group only after a program was initiated.

Comparison of Existing Exercise Behaviors
and Employee Absence

Some studies were designed to examine the effect of existing exercise behaviors on work attendance. Zroback (1989) surveyed the exercise and recreation habits of employees of the Metropolitan Corporation in Toronto, Ontario, in 1983. Employees with an absence rate of less than six days per year were more active than employees with an absence rate of over 12 days per year. When participation in specific activities was examined, employees with an absence rate of less than six days reported participating more frequently than did those employees with an absence rate of more than 12 days. No statistical measures of these differences were reported.

Control Data Corporation of Minneapolis surveyed the lifestyle practices of 5787 employees (Jose & Anderson, 1986). Employee absenteeism was then compared with the number of risk factors the employees reported, including the exercise habits of those employees. Virtually no difference was apparent. Fifteen percent of the exercisers compared to 18% of the non-exercisers were absent more than five days annually. No statistical comparison of the absence rates was indicated.

Kuhn (1987) also found no relationship between exercise behavior and absenteeism when he studied 179 employees of a research facility in Texas. The Graves

Lifestyle Practices Questionnaire was used to gather information on the frequency and duration of employee participation in aerobic and non-aerobic exercise as well as in activity associated with daily living patterns. When absence for a six month period was correlated with activity scores, the relationship was not significant.

However, in a Canadian study designed to examine the effects of physical activity on absence rates, a significant, inverse relationship was found between a high level of physical activity and absence (Hendricks & Czujko, 1986). The results of a survey reporting the exercise patterns of 370 randomly selected employees at Oshawa General Hospital indicated that 65% of the employees exercised at least periodically while 35% were considered sedentary. Employees who exercised one to three hours per week were absent from work an average of 5.4 days during the year studied. Those who exercised four to six hours per week were absent an average of 5.7 days, and those who exercised seven to twelve hours per week were absent an average of 3.82 days. Sedentary employees were absent more frequently than any group of exercisers, with an annual average of 6.3 days of work missed.

Both the levels of physical activity and cardiovascular fitness of 734 law enforcement officers in Austin, Texas were compared with the officers' absenteeism (Steinhardt, Greenhow, & Stewart, 1991). As in the Oshawa

General Hospital study cited above, sedentary male and female officers were absent significantly more often than those who engaged in either occasional activity or regular activity at least three times per week. When fitness levels were correlated with absence, male officers whose cardiovascular fitness level was at or above the 50th percentile (according to national norms for the Bruce protocol for treadmill testing) were absent significantly less often than those whose fitness was below this level. For females, however, no relationship existed between fitness level and absenteeism.

Believing that objectively measured cardiovascular fitness levels were a more valid indication of exercise habits than subjectively assessed physical activity levels, Tucker, Aldana, and Friedman (1990) related fitness levels measured by the Kasch three-minute step test with absenteeism for 8301 employees of 35 different corporations. Unlike Steinhardt, Greenhow, and Stewart (1991), a significant relationship was found between the level of cardiovascular fitness and absenteeism for both males and females. The relationship remained when the potential confounders of age, income, smoking and body fat levels were controlled.

A survey of absence rates and exercise habits at one university yielded unexpected results. At Montana State University in Bozeman, a group report based on

self-reported data of 811 employees indicated that employees whose aerobic exercise programs were rated poor or very poor were absent one tenth of a day less than those employees whose aerobic exercise programs were rated good or very good (MSU Employee Wellness, 1988-1989). The overall self-reported absence rate for these employees was low compared with the national average for educational institutions: 3.8 days versus a national average of 5.5 days. However, this self-reported absence data should be viewed with caution. Research on employee absence indicated a poor match between self-reported absence and organizational records of absence (Mueller, C.W., Wakefield, D.S., Price, J.L., Curry, J.P., & McCloskey, J.C., 1987).

Thus, of the seven studies which compared the existing exercise behaviors of employees with their absence rates, the authors of three reported significantly lower absence rates for the exercisers. The Montana State University study (1988-89) demonstrated no difference in self-reported absences for exercisers and non-exercisers, while the authors of the remaining three studies reported no relationship between exercise behaviors and absenteeism (Jose & Anderson, 1986; Kuhn, 1987; Zroback, 1989).

Participation in On-Site Corporate-Sponsored Programs and Employee Absence

The Travelers in Hartford, Connecticut, provided employees with an on-site fitness facility for use during the employees' free time (Lynch, Golaszewski, Clearie, Snow, & Vickery, 1990). In 1987, 2232 employees self-selected to join the The Travelers' Taking Care Center while 5837 employees remained nonmembers. To examine the relationship between participation in the on-site fitness program and absence from work, researchers compared the absenteeism of members with that of nonmembers both in the year prior to the opening of the center and in the second year of the center's operation. No minimum level of participation was required to be considered a member.

Those employees of The Travelers who self-selected to join the fitness center had a history of fewer absences than did other employees. Female members averaged 5.97 days of absence in 1986, the year preceding the fitness program, .93 day less than female nonmembers. Male members averaged 2.96 days of absence in 1986, .63 day less than male nonmembers (Lynch et al, 1990). While nonmembers experienced no significant change in absence between 1986 and 1988, both male and female members had significant reductions in absence rates. Absences for female members decreased one day, and absences for male members decreased .42 day.

To determine the influence of program membership on 1988 work absence, linear regression was used, with gender, age, and the pre-program 1986 absence history included as covariates to control for the differences between members and nonmembers. By controlling for these differences, 1.2 fewer days of absence in 1988 could be expected from program members as compared to nonmembers. The rate of participation was found to affect the absence rate, with members who participated regularly experiencing greater reduction in absence than did those who participated occasionally (Lynch et al., 1990).

The Adolf Coors Company of Golden, Colorado, credited the Coors Wellness Center with saving the company \$138,000 in 1984 in reduced insurance claims and absenteeism (Callahan, 1986). A random sampling of 495 employees indicated that 20% of Coors' 10,000 employees used the Wellness Center regularly. No pre-program absence data was recorded; however regular users of the facility were absent an average of 1.96 days per year while nonparticipating employees were absent an average of 3.08 days per year (Callahan, 1986).

White (1987-88) studied a large industry in the midwest with an existing employee fitness program to determine if participating employees experienced reduced absenteeism when compared to nonparticipating employees. Because the author was also studying the relationship

between participation in the employee fitness program and reduced medical costs, men between the ages of 50-59, who had the highest incidence of medical claims, were selected as subjects. The participants were a sample of 70 male employees who were known to exercise three or more times a week for 30 minutes in the employee fitness program, and who were selected by the recreational and medical personnel. The comparison group, randomly selected from 1686 men 50 to 59 years old, numbered 108.

Although no specific data on absence rates was given, the author reported a statistically significant difference between the absence rates of the participation group and the comparison group for both the years 1982 and 1983 (White, 1987-88). Whether this difference existed between the two groups prior to the initiation of the employee fitness program was not determined. Thus the effect the program may have had on the absence rates of those employees who self-selected to participate was not known.

Horowitz (1987) studied the effect of participation in a comprehensive employee wellness program on the pre and post-program absenteeism of 42 employees of the Federal Highway Administration. Following health risk appraisal and medical screening, employees participated for the year 1986 in one or more of a variety of wellness education classes, including physical fitness sessions. Pre-program absence for these employees was compared to post-program

absence. Mean absenteeism in 1985, the pre-program year, was 55.8 hours while in 1986, the post-program year, mean absenteeism was 41.1 hours. This decrease in absenteeism was statistically significant. Administrators of the organization calculated a \$10,645 savings in improved employee attendance. Results of this study should be viewed with caution, however, because of the short duration of the program and the small sample size.

Participation in Off-Site Corporate-Sponsored Programs and Employee Absence

Several researchers studied reduction in absenteeism and employee participation in off-site fitness programs. Blue Shield of California established a health risk assessment and prescription program for employees in 1986 (Harrington, 1987). Following assessment in a variety of wellness areas including exercise, employees were encouraged to begin a self-directed program to improve wellness behaviors. Progress was evaluated via a repeated assessment every six months. Of the 1600 eligible employees, 70% chose to participate in the program. During the first six months of the program, sick days for all employees at Blue Shield decreased .63 day per year, saving the corporation an estimated \$67,200. Pre and post-program absence rates for program participants were not reported.

A similar program of assessment and self-directed improvement, offered by the Personnel Department of The Municipality of Metropolitan Toronto, Ontario, also yielded a reduction in absenteeism (Zroback, 1989). As ambulance personnel, the participating employees suffered frequent low back and other occupational injuries. Following an assessment of wellness behaviors, each of the 134 self-selected employees received an individualized exercise prescription. Financial incentive was offered for physical fitness improvement: a maximum of \$100 could be earned for improvement in three fitness areas following a six month period. During the six month period studied, participating employees were absent an average of .25 day per year less than they were prior to the program, while nonparticipating employees increased their average absence by 3.1 days per year, yielding an effective reduction of 3.35 days per participant.

Like the Municipality of Toronto employees, field sales employees who participated in the General Mills Corporation's voluntary, self-directed wellness program demonstrated an improved rate of attendance when compared with nonparticipating employees (Wood et al., 1989). The 688 participating employees completed a lifestyle appraisal prior to beginning the program in 1985. Every three months for a two year period, each employee submitted an activity record sheet to the company, noting behaviors in several

areas of wellness, including exercise. General Mills offered gift incentives to encourage compliance, a practice common among a variety of businesses throughout the country, according to Yenney (1986). While the mean days absent before and during the study remained at approximately 2.5 days annually for the participant group, the mean days absent for the nonparticipant group of 387 employees increased 1.18 days in 1985 and 1.45 days in 1986 beyond their pre-program absence rate of 2.87 days per year. Thus when participants were compared with nonparticipants, a significant difference in absenteeism existed after two years of the program.

With the frequent contact the General Mills participants had with health promotion administrators via required reporting every three months and with gift incentives to encourage compliance, the failure of the absence rate to drop among participants appeared to be an unexpected occurrence. However, when compared to the absence rates of other business organizations, 2.5 days annually was one of the lower rates reported by any organization. Only the Adolf Coors Company reported a lower rate than General Mills: 1.96 days annually (Callahan, 1986). Jones, Bly, and Richardson (1990) stated that a significant reduction in absenteeism could not be anticipated when annual absence rates were as low as 3.5 days.

General Electric Company of Cincinnati, Ohio, provided their employees with a unique choice of programs. Shinew and Crossley (1988) reported on the relationship between employee absenteeism and employee participation in the General Electric Fitness Center and the General Electric Employee Activity Association, a recreation program. Five hundred thirteen randomly selected employees were studied. The employees were divided into four groups and their average annual absence rates recorded for the study year: nonparticipants, 8.93 days; recreation participants, 5.28 days; fitness participants, 4.95 days; and dual participants, 4.83 days. A significant difference in absence was reported between the nonparticipating employees and each of the other three groups. No significant differences were found among the three participation groups. As other authors noted in their studies, those employees who were the most active, participating in the General Electric study a minimum of three times per week in the fitness program and once per week in the recreation program, had the lowest level of absence.

No pre-program absence data was reported for the General Electric employees. Thus the absence differences between the nonparticipating employees and those employees who self-selected to participate in either or both of the programs may have existed prior to the initiation of the programs.

Participation in Combination Corporate-Sponsored Programs and Employee Absence

Prudential Insurance in Houston was one of the corporations studied that sponsored a combination program, providing employees with an on-site exercise facility but also encouraging exercise away from the worksite (Bowne, Russell, Morgan, Optenberg, & Clarke, 1984). Following a medical examination, fitness test, and counseling, each self-selected employee received a personalized exercise prescription. The employee pledged to exercise aerobically a minimum of three times per week for 20 minutes either at the on-site facility or elsewhere. Improvement was discussed with the participants every two months. After one year in this program, the average annual absence rate of the 184 participating employees dropped .84 day from an average of 4.19 days during the year prior to the beginning of the program to 3.35 days during the year of participation.

The pre-program absence rate for the employees who self-selected to participate in this corporate-sponsored program was lower than the rate for all employees combined. The pre-program absence rate for the 19.1% of the office population who participated in the program was 3.16 days less than the absence rate of 7.35 days for the entire office population. Thus employees who had the best

pre-program work attendance records were the ones who self-selected to participate in the program. The .84 day per year gained by these employees was perhaps the result of a Hawthorne effect created by the bimonthly progress discussion held between each participant and a member of the health promotion staff. Management calculated that \$91.24 per participant, \$16,800 for all participants, was saved during the study year in reduced sick leave use (Bowne et al., 1984).

Bowne et al. (1984) found a significant inverse relationship between disability absence and cardiorespiratory fitness in the Prudential fitness participants. When the 184 participating employees were divided into five categories by fitness level, both the pre-program and the post-program absence rates paralleled the fitness categories, with the exception of the fifth (least fit) category. Post-program absences ranged from .63 day per year for the first category to 3.84 days for the fourth category. Thus the more fit the employee the fewer disability absences taken both before and after the employee fitness program.

Corporate executives for Mesa Petroleum of Amarillo, Texas, estimated that the personalized program of exercise prescription provided for each of their self-selected employees saved their company two million dollars during the two year period 1982-1983 (Gettman, 1986). In 1979,

Mesa Petroleum instituted an employee fitness program with an extensive exercise facility built at the home office in Amarillo, annual health club memberships purchased for employees in the field and divisional offices, and personalized exercise prescriptions provided for employees who did not have access to a fitness facility. As did General Mills, Mesa Petroleum required periodic activity record submittal. The mode, intensity and duration of each submittal was entered into a computer software program along with the employee's body weight to compute the caloric expenditure for each exercise session.

Unlike General Mills, Mesa did not offer compliance incentives. Nevertheless, participating employees were absent fewer hours per year than nonparticipants during the two years of the study. The 453 participants in 1982 averaged 29 hours of absence, and the 442 participants in 1983 averaged 20 hours of absence, while 41 hours of absence was averaged each year by the 325 nonparticipants in 1982 and the 265 nonparticipants in 1983. The differences between the two groups were statistically significant in both of the study years, although when Gettman (1986) divided the participation and nonparticipation groups by gender, he found that only the male exercisers and nonexercisers were significantly different in absence rates. No significant difference between the female exercisers and nonexercisers was found.

Whether a difference in hours of absence existed between the exercisers and nonexercisers prior to the initiation of the employee fitness program was not reported.

As in the Metropolitan Corporation, Oshawa General Hospital, The Travelers, and General Electric studies, Mesa Petroleum employees who exercised most frequently had the best work attendance. Participating employees were divided into four groups based on kilocalorie expenditure for activity per week. The largest and least active of the groups reduced their average hours of absence from 35 in 1982 to 21 in 1983, while the smallest and most active of the groups reduced their average hours of absence from 14 in 1982 to nine in 1983. Similar trends were found in the two middle groups (Gettman, 1986). A Hawthorne effect may have prevailed during this study. Submitting a record of one's physical activity to the employer every month and receiving a computerized report of one's progress in return were inordinate interactions between employer and employee, and perhaps encouraged some employees to become more committed to their employer by improving their work attendance. No pre-program absence rates were reported for participating or nonparticipating employees, so whether a difference existed between absence rates in the pre-program years and 1982 was unknown. However, a downward trend in the participants' absence rates did exist between 1982 and

1983, a trend which Gettman (1986) stated seemed to negate a potential Hawthorne effect.

The Tenneco Corporation in Houston began a health promotion program for employees in 1982, providing employees with exercise facilities and classes (Baun, Bernacki, & Tsai, 1986). Following a health and fitness screening and exercise prescription, employees self-selected to participate in the program. As did Mesa Petroleum employees, Tenneco employees recorded the mode, duration and intensity of physical activities performed both in and away from the exercise center. This information was entered on computer terminals which were programmed to convert the activities into kilocalories of energy expenditure per exercise session. With over 40% of employees recording exercise in any given month, the Tenneco program enjoyed double the average employee participation in a worksite health promotion program, which Warner et al. (1988) reported to be 15 to 20%. After the first year of operation, a study was made comparing the absence rates of a one-fifth random sample of 517 exercise participants and nonparticipants, divided by gender.

The authors of the study found a trend for male exercisers to have less absence hours than male nonexercisers (25 versus 30 hours) and a significant difference between female exercisers and nonexercisers (47 versus 69 hours) (Baun et al., 1986). These findings were

opposite those of Gettman (1986) who found a significant difference between male rather than female exercisers and nonexercisers at Mesa Petroleum.

To compare the pre and post program absence hours for the entire corporation, 741 randomly selected fitness participants and nonparticipants, divided by gender, were studied. When each of the four groups was compared with itself, no significant difference was found in absenteeism prior to and after the initiation of the health promotion program (Baun et al., 1986).

The authors discussed that their work and the work of other researchers seemed to indicate that differences in personality traits, such as self-motivation, may be more related to the lower absence rates of exercising employees than the actual exercise itself. They suggested that the benefit of worksite health promotion programs may be in the ability of the organization to attract and retain employees who already have adopted positive work habits and health behaviors (Baun et al., 1986).

Participation in Educational Institution-Sponsored Programs and Employee Absence

Schools, colleges and universities had an advantage over business organizations in establishing and operating employee health promotion programs because the facilities and resource personnel were already available. Several educational institutions have capitalized on these

resources and introduced health promotion programs for their employees.

School district officials in Dallas, Texas, estimated that \$149,578 in payment for substitute teachers was saved when 2546 teachers who participated in a district-sponsored health promotion program were absent 1.25 days less than 8290 nonparticipating teachers during the 1982-83 school year (Blair, Smith, Collingwood, Reynolds, Prentice, & Sterling, 1986). These participants began the program with .35 days less absence than the nonparticipants. The program involved a pre-testing phase which included psychological, sociological, medical and physical fitness screening and exercise prescription; a 10 week intervention phase which included group exercise and education classes as well as weekly consultation regarding individual progress; a maintenance phase during which teachers were encouraged to continue to attend exercise and education classes; and a post-testing phase.

Although the authors of this study reported a significant difference between the absence rates of participating and nonparticipating teachers during the year of the program, a Hawthorne effect may have contributed to this difference. Each participant had a minimum of 12 contacts with the administrators of the program during the study year plus frequent contacts with their exercise and

education class teachers. The savings claimed by officials of the Dallas school district may have been reduced substantially if the cost of this extensive health promotion program had been considered.

Participation in another school district health promotion program was related to a decrease in overall teacher absenteeism. In Bellevue, Washington, a program of aerobic exercise classes, blood pressure screening, and wellness education was initiated for teachers (Oxrieder, 1987). For the three years preceding the program, the average absence rate for all Bellevue teachers was 4.19 days annually. During the year of the program, this overall absence rate dropped to 3.56 days annually. The number of program participants and the pre and post program absence rates for those participants were not reported.

The absence rates of health promotion participants and nonparticipants were compared on two university campuses. At Southern Methodist University in Dallas, Texas, 220 employees participating in the wellness program were found to use 28% fewer hours of sick leave than a comparison group after the first year (McMillen, 1986). No pre-program absence rates were reported for the participating group, however, so whether a behavior change actually occurred among participants was not known.

At Montana State University in Bozeman, Montana, absenteeism was compared between 16 female and 32 male

faculty and administrative employees who had participated in at least one health promotion class per quarter for a minimum of three out of five academic quarters and their matched pairs of nonparticipating employees (Brigham, 1987). Absence rates for the time of the study and for one year following the study were used for the comparison. No significant difference in absence was found between the participants and nonparticipants. Both groups of females averaged 3.23 days of absence per year while the participating males averaged 1.13 days and the nonparticipating males averaged 2.14 days. According to Jones, Bly, and Richardson (1990), expecting a significant decrease in an absence rate of less than 3.5 days annually was unreasonable.

Participation in Long-Term Programs and Employee Absence

One criticism that was made of studies relating worksite health promotion programs and absenteeism reduction was the short duration of the study period (Pyle, 1979). Usually the effects of a program were examined for periods ranging from six months to two years. At Canada Life Assurance Company, the effects of an employee exercise program were examined after 18 months of operation in 1979 and again after seven years (Leatt, Hattin, West, & Shephard, 1988; Song, Shephard, & Cox, 1982).

The original participants were 280 male and 355 female self-selected volunteers from 1281 employees of the Canada Life Assurance Company (Song et al., 1982). The study began with a comparison group from a similar company without an employee fitness program, as recommended by Piserchia and Hartwell (1985). However, that company began such a program shortly after the study was initiated and was thus lost as a suitable comparison group. Participants were assessed for physical fitness and given a personalized exercise prescription to be performed at the worksite under the supervision of a professional physical educator. Participants were categorized according to average attendance in the program. Those who averaged two or more sessions per week were classified as high adherents; those who averaged less than two sessions per week were classified as low adherents; those who began the program but dropped out were classified as drop-outs; and those who originally indicated an interest in the program but never participated were classified as nonparticipants. The high adherent group originally contained 172 of the 431 employees who completed the first six-month period. However, at the end of 18 months, only 52 high adherents remained, with 58 converting to low adherents and 62 dropping out of the program.

When the average absence rate of the 52 high adherents was compared to the average rate for the other three

classifications of participants, the rates were similar for October, December and February, the first three of the five months used to provide absence data for the year studied. For the months of April and June, however, the absence rate for the high adherents dropped significantly lower than the rate for the other three classifications, with the high adherent rates at 0 and .05 days per month and the others at .3 and .4 days per month (Song et al., 1982).

The Canada Life Assurance employee fitness program was again evaluated in 1985, seven years following the initiation of the program (Leatt et al., 1988). A total of 511 employees, representing 40% of the entire staff, returned a questionnaire which included information regarding participation in the employee fitness program and absenteeism. Employees indicating that they had participated in the fitness program at some time during the seven years numbered 392, with 147 of these employees participating since the beginning of the program, 75 joining the program at some time following its initiation, and 170 dropping out of the program.

The authors compared the absence rates of the entire group of 511 respondents with those 170 respondents identified as drop-outs. Of the group of 511 respondents, 53% reported two days or less of absence during the previous year, while 48.5% of the 170 drop-outs reported two days or less. Ten days of absence were reported by

3.4% of the group of 511 respondents, while 6.7% of the drop-outs reported this higher rate of sick leave (Leatt et al., 1988). No statistical measure of these differences was reported.

Several types of data regarding the Canada Life Assurance Company's employee fitness program were sought with the seven-year evaluation questionnaire. The only absence data obtained was self-reported, and no comparison was made between employees who were long-term program participants and employees who had dropped out of the program. The authors noted that the self-reported absence rate of the 511 employees who returned the questionnaire was low, with a median value of about two days per year for both participants and drop-outs, indicating that this group may have been a particularly conscientious portion of the entire staff (Leatt et al., 1988).

The Bakery Division of Safeway Stores in Clackamas, Oregon, established an on-site employee fitness center in 1979 in response to the high rate of employee absence, tardiness, and turnover (Yenney, 1986). Nearly 70% of the division's 130 employees used the facility regularly after completing the required health screening. No explanation was available for the high rate of participation at Safeway. Most corporations only averaged 15-20% employee participation (Warner, Wickizer, Wolfe, Schildroth, & Samuelson, 1988). However, allowing the

families of employees to use the center and providing child care may have been contributing factors.

Considerable reduction in unfilled work shifts was reported six years following the establishment of the fitness center. In 1972, an average of eight out of every 100 work shifts was unfilled. By 1985, an average of only .2 of every 100 shifts was unfilled (Yenney, 1986). These rates reflected the absence of all employees; differences between fitness center members and nonmembers were not reported, and differences between pre and post-program absence rates for members were also not reported.

Utah Power and Light Company encouraged their employees to become involved in fitness activities by sponsoring employee memberships at community fitness facilities (Timmins & Middleton, 1986). When the 580 participating employees were surveyed, the researchers found that 66% of the employees would not have joined the gym or spa of their choice without company support. Over the three-year period of the study, a comparison group of nonparticipating employees averaged 18.61 days of absence while the participating employees averaged 15.98 days of absence. The company determined that \$125 in savings was realized for each \$64 spent on fitness sponsorship. This 2:1 net return on investment was questionable, however, because no pre-program sick leave rates were reported for the participating employees, and several authors have

reported pre-existing differences in work attendance between exercising and sedentary employees (Baun et al., 1986; Bowne et al., 1984; Lynch et al., 1990; Wood et al., 1989).

Jones, Bly, and Richardson (1990) studied absenteeism in relationship to employee participation in Johnson & Johnson's Live For Life health promotion program. This study was the only one reviewed that used a valid comparison group, as described by Piserchia and Hartwell (1985). Employees at four company sites with the Live For Life program were compared with employees at five company sites without the program.

Each self-selected employee at the four participating sites received a health screen and participated in one or more aspects of a lifestyle improvement program which included fitness during 1980 and 1981. No attempt was made to determine the degree or type of participation by each employee. For comparison, separate regressions were used for salaried and wage employees with gender, age and pre-program 1979 absence history included as covariates to control for these differences (Jones et al., 1990).

The adjusted mean absence hours for the 735 participating and 197 nonparticipating wage employees were similar for 1980 (61.5 vs. 61.9 hours annually). However, in 1981, the mean absence rate for participating employees

was significantly lower than the rate for nonparticipants (56.5 vs. 76.5 hours annually). The difference in adjusted mean absence hours for the 671 participating and 290 nonparticipating salaried employees were nonsignificant for both 1980 and 1981. The authors noted that, because the absence rate for salaried personnel was approximately half that of wage employees, a significant reduction for the salaried personnel was not anticipated (Jones et al., 1990).

Six years of absenteeism for a small group of corporate executives was reviewed for a master's degree thesis by Shoenhair (1987). The absence rate of 11 executives who had participated in a corporate fitness program for at least 10 years was compared to the absence rate of a comparison group of 17 sedentary executives in the same company. The average kilocalorie expenditure for activity in the participation group was 2861 per week while the sedentary group averaged 480. When the mean hours of absence for each group was compared for the six year study period, a significant difference was not found. The participation group averaged 17.75 hours of absence per year while the sedentary group averaged 20.52 hours per year. The absence rates of both groups of executives were low in comparison to the rates of other business organizations studied. Only participating employees of the

Adolf Coors Company were reported to have a lower rate of 1.96 days per year (Callahan, 1986).

In the organization studied by Shoenhair (1987), executive employees earned one day per month of sick leave. Sick leave days accumulated until the employee resigned or retired from the organization at which time the employee was compensated for all accumulated sick leave at the current salary level. Thus, accumulating rather than using sick leave was to the financial advantage of the employee. When the sick leave reporting pattern of the participants and the nonparticipants was examined for the six year study period, an average of 9.3 of the 11 participants and 5.8 of the 17 controls were found to have reported no absence during a given year (Shoenhair, 1987). Although no statistical comparison was performed on this difference in reporting pattern, 85% of the exercising executives never missed work while only 34% of the sedentary executives were never absent.

Summary

Most every study reviewed of the relationship between employee absence and participation in a worksite health promotion program can be criticized. Some researchers compared the absenteeism of employees who self-selected to participate with the absenteeism of a noncomparable comparison group (Eddy et al., 1987; Eddy & Beltz, 1989;

Hoffman & Hobson, 1984; Johnson, 1977; McNeill, personal communication, February, 1990). In other studies, the pre-participation absence rate of employees was ignored (Lynch et al., 1990; Piserchia & Hartwell, 1985). The administrators of some programs created a Hawthorne effect with the inordinate amount of attention given to participants (Falkenberg, 1987). Other studies were of short duration (Pyle, 1979).

Horowitz (1987), White (1987-88), and Jones et al. (1990) recommended longitudinal study of the effect health promotion participation may have on employee absence. Several authors noted less absence among employees with higher rates of weekly participation in worksite exercise programs (Gettman, 1986; Hendricks & Czujko, 1986; Lynch et al., 1990; Shiness & Crossley, 1988; Zroback, 1989). A longitudinal study designed to examine the relationship between higher rates of consistent participation in worksite exercise programs and employee absenteeism was not found in the related literature review. This study examined such a relationship for employees at an educational institution.

CHAPTER 3

METHODOLOGY

Introduction

This study was designed to analyze the relationship between participation in the MSU Employee Wellness Program (EWP) activity classes and employee absenteeism. Most of the studies found in the research literature examined relatively brief periods of participation. At MSU, the four-year period from January, 1986 to December, 1989 was studied. Each year included three academic quarters of activity classes with summer quarter excluded. The methodology used was designed to determine if the number of quarters of participation in the EWP activity classes was inversely related to the employee absence rate.

Target Population

To determine this relationship, the pre-participation absence rate needed to be established. The EWP activity classes began in January of 1985. Thus, a target population was required whose absence rate for the year 1984 could be determined.

A computerized list of employees whose initial date of employment was December 31, 1983, or earlier was obtained from the MSU Personnel Office. This list included each employee's date of employment, birthdate, gender, employment classification (classified, faculty, or professional), and contract length (10 or 12 month). These employees were the target population (Table 1).

Table 1. Target population.

CLASSIFIED	N = 395	FEMALES = 233	MALES = 162
FACULTY	N = 452	FEMALES = 81	MALES = 371
PROFESSIONAL	N = 48	FEMALES = 13	MALES = 35

The target population totalled 895 employees. The 1989 employment population of MSU was 1951 employees ("Montana University System Employee Statistics", 1989). Thus the target population represented 46% of the 1989 employment population. Divided by employment classification, the target population represented the following percentages of the total 1989 employment population: classified, 40%; faculty, 57%; and professional, 27%.

Participant Selection

Registration records for all EWP activity classes offered January, 1986, through December, 1989, were obtained from the EWP office. Activity classes and

quarters of registration for members of the target population were entered into a data base computer program. Of the 895 employees in the target population, 323 (36%) registered for activity classes in one or more of the 12 quarters studied. The total number of quarters for which each participant registered for at least one activity class was determined. These registration record totals are listed by employment classification and gender in Table 2.

Table 2. Registration record of quarters of participation by employment classification and gender.

QUARTERS TOTAL	EMPLOYEE TOTAL	CLASSIFIED		FACULTY		PROFESSIONAL	
		M	F	M	F	M	F
12	27	2	19	1	3	1	1
11	16	0	7	8	1	0	0
10	15	0	7	7	1	0	0
9	23	1	11	6	4	0	1
8	19	0	9	5	5	0	0
7	20	0	13	4	3	0	0
6	14	0	5	6	2	0	1
5	21	2	12	4	2	0	1
4	20	0	6	9	4	1	0
3	31	1	11	15	2	0	2
2	40	2	17	15	1	4	1
1	77	11	24	35	3	0	4
TOTALS	323	19	141	115	31	6	11

Because attendance records were not kept in the activity classes until winter quarter, 1990, a means of determining if employees actually participated in the classes for which they registered was needed. A survey to verify participation was developed which listed by quarter the classes for which the employee registered. The employee chose one of three responses for each class: 1) participated at least once a week throughout most of the quarter; 2) participated infrequently or dropped out by mid-quarter; 3) did not participate. Only response number one was deemed sufficient to retain the employee as a participant for the class and the quarter in which the class was offered. A sample survey and the accompanying explanatory letter sent to the participating employees are included in Appendix A.

Two hundred forty three surveys were returned which represented 75% of the 323 sent to participating employees. Survey information for fifty one employees whose returns were not received by a week following the deadline date was obtained by phone. Eight additional employees were on leave, or had retired or resigned. The remaining twenty one employees could not be contacted and were sent follow-up letters and survey forms (see Appendix A). Six of these 21 surveys were returned.

Following verification of activity class participation, the actual total number of quarters for

which each participant registered for at least one activity class was determined. In addition to the 15 employees who did not respond to the follow-up survey and the eight employees who had retired, resigned or were on leave, 41 employees were dropped from the study because they had not regularly participated in at least one EWP activity class. The verified record of quarters of participation are listed in Table 3 by employment classification and gender.

Table 3. Verified record of quarters of participation by employment classification and gender.

QUARTERS TOTAL	EMPLOYEE TOTAL	CLASSIFIED		FACULTY		PROFESSIONAL	
		M	F	M	F	M	F
12	15	1	11	1	1	0	1
11	17	1	9	4	3	0	0
10	16	1	7	6	1	1	0
9	11	0	4	5	2	0	0
8	21	0	10	6	4	0	1
7	15	0	8	3	4	0	0
6	19	0	11	5	2	0	1
5	19	1	9	6	3	0	0
4	19	0	8	8	2	0	1
3	20	2	6	10	2	0	0
2	36	1	18	14	1	2	0
1	51	2	17	27	3	1	1
TOTALS	259	9	118	95	28	4	5

Absence Data

Regular, full-time employees of MSU earned one day of sick leave credit for each month of service from the first month of employment. Sick leave may be used for illness, injury, disability, maternity needs, or medical appointments for the employee or the employee's immediate family. Sick leave may also be used in the event of the death of a family member or friend. An unlimited amount of sick leave may be accrued by an employee. Upon retirement, resignation or termination, the employee was entitled to a cash payment for one quarter of the unused sick leave (Montana State University, 1988).

Classified and professional employees earned either 10 or 12 days per year, depending upon whether the employee was on a 10 or a 12 month contract. Faculty on 12 month appointments earned 12 days per year. Faculty on academic year appointments earned nine days per year, with half a day earned in June and September and none in July and August (Montana State University, 1988).

To equalize the absence data for 10 and 12 month classified and professional employee participants, sick leave hours recorded for the months of July and August by employees on 12 month contract were subtracted from their totals. With the exception of four female classified employee participants who were deleted from the study, 10

month employees did not work during the months of July and August.

Faculty listed by the personnel office as 10 month employees were actually on academic year appointment, accruing nine days of sick leave per year with one half day assigned during both the months of June and September. To equalize the absence data for faculty on academic year and 12 month appointments, sick leave hours recorded for the months of June, July, August, and September by 12 month faculty employee participants were subtracted from their totals. Sick leave hours recorded for the half months of June and September by faculty on academic year appointment were subtracted from their totals.

For the purpose of this study, sick leave hours for the years 1984 and 1989 were used. To obtain the absence records for 1984, the employee participant's Time and Attendance Report for each month to be used was checked for sick leave hours recorded. The hours recorded for each month by a participant were entered beside his/her name on a computerized list of employees. When all the hours to be recorded were entered, each participant's hours were totaled on a calculator with a reference tape which was then checked for the accuracy of the data entry.

To obtain the absence data for 1989, a computerized list of the total hours of sick leave recorded for 1989 was provided by the Personnel Office for employees in the

target population. Each employee participant's Time and Attendance Report for the months not to be included in the study was checked for sick leave hours recorded, and those hours were noted beside the participant's name. For classified and professional employees on 12 month contract, the months used were July and August. For faculty on 12 month appointment, the months used were June, July, August and September. For faculty on academic year appointment, the months used were June and September.

The sick leave hours recorded for the months not to be included in the study were then totaled on a calculator with reference tape, and that sum was subtracted from the total number of hours recorded for the year 1989. The reference tape was then checked for accuracy of data entry.

Data Analysis

The relationship between 1989 absenteeism and participation in EWP activity classes was modeled using multiple linear regression. The Statistical Consulting Services Division of the Department of Mathematical Sciences at MSU recommended linear regression to provide a way to estimate the relationship of interest within each employment classification while reducing the variation due to age, gender, and the 1984 pre-EWP absence rate. The Statistical Analysis System for Linear Models (Freund et al., 1986), running under the Virtual Memory System (the

mainframe computer operating system used by MSU's Systems and Computing Services Department), was used for data analysis.

Initially, scatterplots were made with the number of quarters of participation on the horizontal axis and 1989 absenteeism on the vertical axis. Plots were constructed for each employee classification by gender. The scatterplots were used to suggest whether the nature of the relationship between 1989 absences and EWP activity class participation was linear. (See Appendix B).

The method of least squares was then used to determine the model equation that best represented the data. The model used for each classification group was:

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4T$$

The variables represented in the formula include:

Y = the dependent variable, 1989 absenteeism

x_1 = the covariable 1, 1984 absenteeism

x_2 = the covariable 2, gender

x_3 = the covariable 3, age

T = the independent variable, quarters of EWP activity class participation

The parameters included in the formula were:

b_0 = the intercept of regression

b_1, b_2, b_3 = the regression coefficients for x_1, x_2, x_3

b_4 = the regression coefficient for T

To be included in the model, each variable was tested for contribution to the model at the .05 level of significance. The adjusted R squared was used to judge the variability explained by the model. The residuals were plotted against the fitted values of Y to assess their random distribution around the regression line.

CHAPTER 4

RESULTS

The general purpose of this study was to analyze the relationship between participation by full-time employees in the MSU Employee Wellness Program (EWP) activity classes and employee absenteeism. Was the number of quarters of participation in EWP activity classes during the four year study period inversely related to absenteeism in 1989, the final year of the study?

The relationship between 1989 absenteeism and total quarters of employee participation in EWP activity classes was modeled using multiple linear regression, as recommended by the Statistical Consulting Services Division of the Department of Mathematical Sciences at MSU. Differences in absence recording patterns among the three divisions of MSU employees were anticipated. Jones et al. (1990) found that wage employees who were participants in Johnson and Johnson's Live for Life program recorded approximately twice the annual hours of absence (56.5 hours) as salaried employee participants (31.5 hours). At MSU differences were even greater. The mean absence hours in 1989, adjusted to reflect a 12 month period, for

