

THE RELATIONSHIP OF AN EMPLOYEE
FITNESS PROGRAM TO COST-
CONTAINMENT VARIABLES
OF ABSENTEEISM AND
MEDICAL COSTS

By

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PREFACE

This study was concerned with examining cost-containment variables of absenteeism and medical costs in relation to an employee fitness program. It was hypothesized that there would not be a significant difference between a group of exercisers and a control group regarding the above variables at the .05 level of confidence. Employees consisted of men between the ages of 50-59 at a large industry in the Midwest.

Absenteeism in the exercise group was found to be significant at the .05 level of confidence utilizing the left-tailed Z test. Medical costs were not found to be significant between the two groups at the .05 level of confidence using the left-tailed Z test. However, there was a difference in medical costs in favor of the exercisers.

I wish to express my sincere gratitude to all who assisted me in this work and during my stay at Oklahoma State University. In particular, I am especially indebted to my major adviser, Dr. Robert Kamm, and my dissertation adviser, Dr. Mac McCrory, for their intelligent guidance, concern and invaluable help.

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CHAPTER I

INTRODUCTION

The American population has become increasingly interested in optimum health or high-level wellness. American industry has lead the nation in a quest for wellness by establishing wellness programs for their employees. This research has been conducted to survey models of wellness programs as well as to relate fitness programs to cost-containment variables of absenteeism and medical costs.

Herbert Dunn (1961) first coined the term high-level wellness in 1959. Since that time health professionals, industry and the average consumer have been interested in high-level wellness. According to Dunn, wellness is "an integrated method of functioning which is oriented toward maximizing the potential of which the individual is capable, within the environment where he is functioning" (Dunn, 1961, p. 5,6). Knipple has defined wellness as "a way of life which an individual designs to enjoy the highest level of health and well-being possible during the years he has to live" (Knipple, 1982, p. 28). Ardell defined wellness as "a state of physical and mental, and social well-being, and not just the absence of disease. It is more than being well; it is having a good attitude about one's

self and others. It is accepting the fact that life has problems. Wellness health is not an end in itself; it is a quality through which goals and dreams may be achieved." The five dimensions of high-level wellness includes self responsibility, nutritional awareness, stress, stress management, physical fitness and environmental sensitivity (Ardell, 1979, p. 17).

Travis (1975) believed that wellness is a dynamic state in which an individual cares for physical, mental, emotional, social, and spiritual self. Each individual has the capacity to enhance his wellness or state of being. Wellness is on a continuum going up with self-discipline; going down with self-indulgence and lethargy.

The Wellness Movement

Americans have become aware of wellness and fitness; health spas are big business in the United States. Joggers are frequently seen jogging along highways and biways of the country, and high-level wellness is promoted for all age groups. The federal government has enacted laws which effect wellness. These laws include: 1) the Health Maintenance Organization Act of 1972 regarding preventive educational service; 2) Public Health Law 94-317, which formed the Office of Health Information and health Promotion in 1976; 3) Title V of Public Law 95-626, which then expanded the Office of Health Promotion; and 4) establishment of the School Health Project in 1978 (Tulloch and Healy, 1982).

Health care is big business in the United States. Medical costs took nearly one out of every ten dollars that Americans spent in 1980. Employers are realizing the impact of life style related diseases in terms of absenteeism, productivity, workers' compensation, health insurance, employee turnover, retraining, and lowered morale of their employees. Wellness programs, exercise facilities, and incentives to stay healthy are just a few of the ways that employers have begun to solve these costly problems. Research is beginning to document the cost-effectiveness of these approaches. The economic benefits of exercise have already been documented in Russia (Cruse, Hamrick, and Rosato, 1979).

Alternate approaches to health care have sprung up across the country in the form of self help groups, reconditioning centers and institutes, and life styling with a wellness focus. One such center is Yuchi Pines which is located at Seale, Alabama.

History of Fitness Programs in Industry

Industries with a history of fitness programs include: the Pullman Company, 1879; Johnson Company, 1886; Eastern Kodax Company, 1914; Goodyear Tire and Rubber Company; and Metropolitan Insurance Company, 1871. Studies indicate that those taking part in regular exercise were in better general health, more productive on the job, and accrued less absences, according to Tuthill (1979) and Brennan

(1982b).

John Patterson, founder of the national Cash Register Company is considered the father of corporate fitness. Spurred on by Dr. John Harvey Kellogg of Battle Creek, Michigan, in 1890 Patterson launched a simplistic fitness program for his employees. Included in the fitness program were "Health hints" related to fresh air, exercise, clean living, and nutrition. Patterson also is noted for instituting the first coffee break. Four hundred employees enrolled in a "Vital Center Physical Culture course" supposedly geared to improve digestion (Dunn's Review, 1980).

Fitness Defined

According to Fall, (1980, p. 1) fitness is "participation in exercise that is geared toward improving one's quality of living." Components of fitness include: cardiovascular function, body composition, strength, and flexibility. Cox (1982) stresses cardiovascular fitness, with the belief that an individual who is fit can exercise vigorously without fatigue and respond to sudden emotional and physical demands with only minimal rises in blood pressure. A fit individual experiences greater endurance with less strain on his/her cardiovascular system.

Industry and Fitness

Industrial corporations particularly interested in fitness include Blue Cross, Xerox, Kimberly Clark, American

Can, Johnson and Johnson, International Business Machines, Control Data, Boeing, Union Carbide, Adolph Coors, Trans World Airlines, APPLE Computer, International Harvester, Campbell Soup, Anheuser-Busch, Phillips Petroleum, Pepsi-co, Ford Motor, Atlantic Richfield, and Exxon (Kaplan, 1983). These companies hire qualified fitness directors who earn up to \$35,000 annually. Programs provide fitness testing, monitoring, exercise equipment, gyms and specific wellness programs for each employee with selected exercises (Levy, 1980).

The main components of the fitness programs in industry include: weight control plans; exercise programs with adequate facilities and recreational resources; chemical control or monitoring intake of drugs, alcohol, and coffee; stress control programs; confidential health risk profiles; positive nutrition; and health education information and life styling programs. The programs are very comprehensive and expensive at some companies, while at others they function with limited funding (Levy, 1980; Kaplan, 1983).

According to Levy (1980), in 1973 there were 75 industrial fitness programs which by 1980 had increased to 750 programs. Industrial programs of the seventies increased four times that of the sixties. There will be even more rapid growth in the eighties as more companies realize the cost-effectiveness of programs that make both executives and employees healthier, happier, and more productive people.

An industrial company's cost-containment refers to efforts a company makes to decrease its costs for producing its products. Costs are increased by losses to the company. Losses include such things as payments to employees for sick time, and insurance payments. Losses may also include employee absences which may hinder production for that day or necessitate another person being called into work in the place of the absent employee.

Statement of Purpose

One purpose of this study was to describe models of wellness and fitness programs. Another purpose of the study was to analyze cost-containment variables of absenteeism and medical costs for employees on a fitness program compared to employees not on a fitness program.

Need for the Study

Research of literature regarding fitness programs and industry indicated that further studies were needed to validate the theory that fitness programs are related to cost-containment for industry (Cox, 1982).

The following null hypotheses were tested in this study:

1. There was no significant difference between employees who are on a fitness program to employees who are not on a fitness program in regard to absenteeism.

2. There was no significant difference between em-

ployees who are on a fitness program and employees not on a fitness program in regard to medical costs.

Delimitations

1. The study was limited to a two-year period including 1982 and 1983.

2. The study limited cost-containment variables to absences and medical costs.

3. Data were collected from one large industry in the Midwest with a known fitness program.

4. Male employees between the ages of 50-59 were used in the experimental group and the control group as this age group had the highest incidence of medical claims particularly in the area of cardiovascular disease.

Limitations

1. The inability to control fitness participation at other settings by the control group may be a limiting factor.

2. This study is also limited by an ex post facto analysis of the data.

3. The study is limited to a random selection of the control group in the 50-59 year age group of males without matching of other demographic data.

4. The study was limited to white collar workers.

Definition of Terms

Unavoidable Absences - absences due to health reasons.

Cost-Containment - measures used by a company to reduce cost of production.

Fitness Program - human resources participate in a maintenance program- a significant method for preventative medicine and maintaining personnel in proper operating condition through structured exercise classes, advocating proper fluids and nutrition, rest and relaxation, weight control, and stress control.

Fitness - an optimum state of physical well being as attained by adequate physical exercise, nutrition, fluids, rest and sleep, and freedom from stress and harmful substances.

Medical Costs - expenses incurred due to illness and disease.

Productivity - a measure of the output of goods and services for a company.

Wellness - optimum functioning of an individual in all aspects of the human experience including the social, spiritual, emotional, intellectual and physical areas.

Wellness Program - an individual life style designed to maintain optimum health for each employee. A program designed to promote health of body, mind and spirit, which has as its underlying principle self responsibility for one's well being.

Basic Assumptions

1. Records of the industrial firms will be accurate and up to date.
2. Fitness has a measurable impact on industrial cost-containment.
3. Industry has a vested interest in fitness programs.
4. Employees are motivated to participate in fitness programs.

Significance of the Study

Given the spiralling medical costs of today's economy, industry has led the nation in promoting fitness and wellness programs as one method of containing costs. If it can be demonstrated that fitness programs are related to cost-containment in industry as well as more productive and healthy employees, models can be developed, which will totally revamp the health care delivery system.

Method of the Study

The study was analyzed by a left-tailed Z test to measure variables. Since sample sizes were greater than thirty and the mean was greater than thirty, the use of the Z test was justified to estimate the difference between the two means. The .05 level of confidence was established as sufficient evidence to reject or not reject the null hypotheses.

CHAPTER II

REVIEW OF LITERATURE

Health Care Costs

In 1980 the nation spent \$223 billion on illness care. Business pays \$25 billion annually for premature deaths of employees and another \$3 billion for illness. In 1980 two percent of the nation's health expenditure was for preventive care, and less than one half of one percent was used for health education (Pyle, 1980). In 1969 the nation's total health care costs were \$60.6 billion; by 1979 this had increased to \$212.2 billion indicating a 350 percent increase in ten years (Brennan, 1981). The total corporate cost of health insurance in 1980 was \$50 billion, double that of just five years earlier (Perham, 1980). In 1983, the total corporation cost of health insurance was \$70 billion and predictably will keep growing (Daniel, 1982).

Alternate Approaches to Health Care Costs

Businesses are banding together to combat the high cost of health care by finding an economical means of providing remedies and also by working at prevention. Pyle (1980; Kaplan, 1983) says fitness programs are yielding a variety of desirable results such as, cutting absentee-

ism in half, alleviating stress, promoting weight control, changes in life styling, improved self image and improving relations among coworkers and employees.

Some companies still hesitate to institute fitness programs due to lack of scientific data proving a positive relationship between fitness programs and productivity or medical benefit cost savings. Those companies instituting a fitness program usually start with health assessment and screening to identify risky life style behavior, specific health ailments, and the individual's fitness level. Companies need to set specific goals for their commitment to employee fitness in terms of absenteeism, health costs, general morale, physiological measures, and desirable behavioral changes (Pyle, 1980).

Regarding health promotion in industry, business managers are asking, "How does it effect the bottom line?" Hard data are still needed to indicate that health promotion programs improve morale, increase productivity, reduce absenteeism and turnover, promote more appropriate use of medical services, and decrease disability and premature death claims due to life styles adverse to good health (Brennan, 1982b).

However, studies currently being conducted at major corporations such as Borden's, New York Telephone Company, Campbell Soup Company, Control Data, Johnson and Johnson, and Metropolitan Life demonstrate that a positive cost effective relationship probably exists between worksite

health promotion and critical factors such as absenteeism, productivity, disability claims, medical utilization patterns and overall morbidity and mortality experience (Brennan, 1982b; Kaplan, 1983).

Companies With Physical Fitness Programs

Kimberly-Clark Corporation

Kimberly-Clark Corporation's health promotion is an example of the comprehensive approach to health promotion. When this program began in 1977 at corporate headquarters, it was described as one of the most extensive programs of illness prevention ever conducted in a company's own facilities. The entire cost of the Kimberly-Clark health promotion activities is paid by the firm. Each employee gets an evaluation of his or her health risks and is given a "Health prescription" to reduce those risks. Special exercise programs, access to the company physical fitness facility, counseling and after-work seminars are part of the activities. Also, follow-up is offered to program participants in the form of regular physical examinations and multiphasic screenings. The company's goal is to "maintain or improve health, to halt the onset of illness" (Novelli and Ziska, 1982, p. 23).

Xerox Company

One of the largest corporate fitness programs is operated by Xerox which started its first program in 1967

for the benefit of 12,000 employees. Today, there are ten Xerox fitness facilities in the United States and three others in Europe (Cunningham, 1982). According to Wright (1982, p. 965) characteristics of the program include:

1. Management by a full-time exempt employee who has a Masters of Science degree in Exercise Physiology.
2. Physiological evaluation of individuals entering the program for the purpose of establishing individualized exercise prescription.
3. Aerobic exercise regimens built around the use of motorized treadmills, stationary bicycle ergometers, cross country ski simulators, rowing machines and free weights.
4. Adjustments of each individual's exercise prescription as indicated by his or her immediate postexercise heart rate.
5. Emphasis on the importance of performing 30-minute periods of exercise at least three times each week.

Metropolitan Life Insurance Company

Brennan (1982a) traces the history of health promotion at Metropolitan Life Insurance which began back in 1871 with a series of health and safety messages in company periodicals. The company's Welfare Division began in 1909 with a visiting nurse service. The world's largest fitness program started in 1925 with the exercise classes beamed over the radio.

Features of the health program included: presentation of health topics such as, cholesterol reduction and nutrition, period health appraisal programs, counseling evaluation and treatment for certain illnesses, a fitness program and a computerized health hazard appraisal.

In 1979, Metropolitan Life Insurance set in place its unique Center for Health Help for its home office employees. Its program is its most recent link seeking to encourage employees to assume more active roles in taking care of themselves and their families.

International Business Machines

IBM sponsors a dynamic health education program. The components of this program include: 1) health education; 2) voluntary multiphasic screening; 3) substance abuse assistance; 4) recreational/fitness facilities at major locations; 5) nutritional guidelines for cafeteria managers; 6) comprehensive medical, psychiatric, and dental benefits; and 7) comprehensive occupational health monitoring and safety programs (Dickerson and Mandelblit, 1983).

Control Data Corporation

Control Data Corporation offers a comprehensive wellness program for employees and staff called, Staywell. The program is offered to 63,000 people in 40 United States cities. The Staywell concept, according to project director Murray P. Nadlich, is to promote good health and work

habits. Components of the Staywell program include employer orientation to the program, health screening for major diseases, education and behavior modification courses, support groups to assist employees in changing health habits, and employee task forces to create a healthy worksite environment (Kaplan, 1983).

Components of Fitness in the Workplace

Chen (1982, p. 14) lists six components of fitness frequently addressed at the workplace which include: "fitness; hypertension control; smoking cessation; chemical dependency; stress management; nutrition education; and weight control." He further describes these components in terms of their: "1) rationale; 2) lessons learned from successful programs; selected exemplary companies; and 4) resources for instituting programs."

Chen (1982) further relates that healthier employees increase productivity due to:

1. Fitness promotion in the workplace usually contributes to existing corporate occupational health and safety efforts thus improving compliance with state and federal occupational health and safety regulations.

2. Fitness promotion in the workplace through health educational programs may be expected to lead to increased knowledge of health risks.

3. Fitness promotion in the workplace greatly enhances corporate images and demonstrates corporate commitments

to employee health. R. Keith Fogle, past President of the American Association of Fitness Directors in Business and Industry believes that a fitness facility in the workplace can be a definite recruitment advantage.

4. Other probable though not fully substantiated effects of wellness promotion activities may include improved employee morale and more cooperative employer-employee relations.

5. In an era when annual health care costs almost consistently have risen faster than yearly inflation rates, some wellness programs in the workplace appear to be cost-effective.

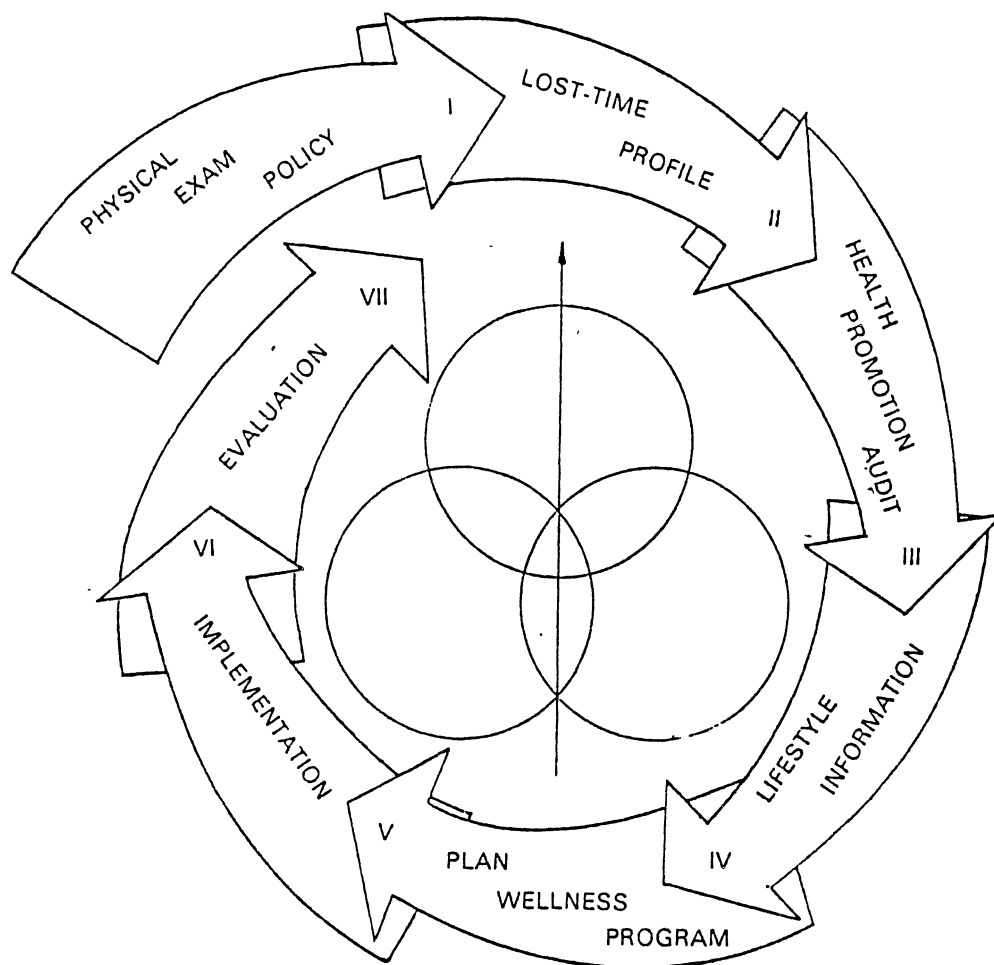
Laughlin's Seven-Step Approach to Achieving Wellness at Work

Laughlin (1982) presents statistics regarding illness and wellness care such as two percent of current health expenditures being spent on disease prevention. Also, she adds that 9.7 percent of the Gross National Product or spending on health care costs for 1983 would be \$332.8 billion.

Laughlin's program consists of periodic examinations or health appraisals and a lost time profile. The lost time profiles are utilized to evaluate existing health and safety programs, monitor employee insurance utilization and costs, and ascertain cost/benefit information.

Laughlin (1982) presents the following seven-step

model for achieving wellness at work:



Source: J. A. Laughlin, "From Wellness at Work: A Seven-Step 'Dollars and Sense' Approach," Occupational Health Nurse (p. 11, Nov. 1982)

Figure 1. Laughlin's Seven-Step Approach to Achieving Wellness at Work

As demonstrated below, Laughlin also presents an example of an action plan for specific wellness procedures giving the Who, What, When, Where and Resources:

GOAL: Monitor blood pressure of all employees over 40 years of age in XYZ Division of BIG CORPORATION on an annual basis

OBJECTIVE I: Screen salaried employees during first six months of 1983.

WHO	WHAT	WHEN	WHERE	RESOURCES
Division Manager, Salaried Staff Committee, Occupational Health R.N.	Meeting to get support for screening program	By Dec. 15, 1982	Division Conference Room	a) One hour of time for people involved in meeting b) Six booklets on "Your BP and Your Health" @ 50¢ each c) Borrow film from Heart Association
Occupational Health R.N. and Representative of Heart Association	To determine agreement between XYZ and Heart Association regarding staffing at screening clinic	By Dec. 21, 1982	Heart Association Office	a) List of available equipment for BP screening b) Number of salaried employees over 40 years of age and how many per shift
Occupational Health Team	Develop logistics for actual screening: times, dates, staff, setting	By Jan. 15, 1983	Staff Conference Room	a) Occupational Health Team staff time for two hours b) Logistics flow sheets

Source: Laughlin, Occupational Health Nurse (p. 12, Nov. 1982)

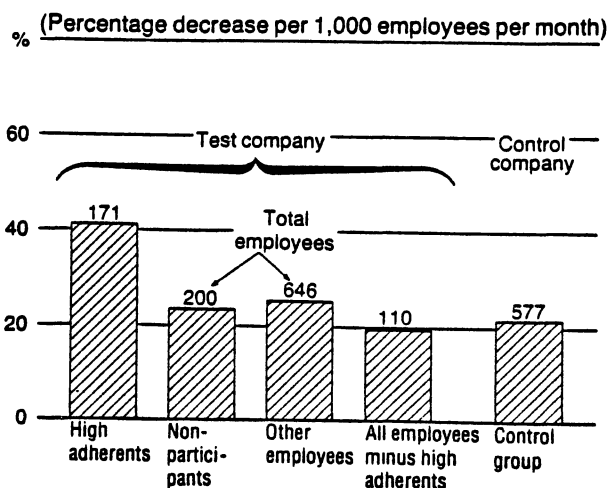
Figure 2. Example of an Action Plan

Finally Laughlin (1982) recommends a thorough evaluation of the wellness plan providing an opportunity to update the data base, analyze the data, set priorities, plan, implement, and again evaluate.

Research Regarding Fitness Programs and Industry

Cox, Shephard and Corey (1981) conducted a controlled study of a six-month worksite aerobic fitness program in a Toronto insurance company with 1125 volunteers (both male and female) recruited from a test and a closely matched control company. Evaluations covered three months prior to and six months after introduction of the program, with 534 subjects participating consistently in the research. The study revealed that approximately 12 percent who constituted the high adherent group (two or more exercise classes per week) showed a 42 percent decrease in average monthly absenteeism (utilizing the chi square test at the $P < .01$ and $P < .001$ level of confidence) during the post intervention period compared to a 20 percent decline in both the test company overall and a control insurance company at ($P < .001$) also in Toronto, Canada.

In 1978, Cox (1981) initiated the world's first controlled demonstration study on employee fitness. Canada Life and North American Life Assurance companies in Toronto were used as the experimental and control site. The benefits accrued to corporate business included a 20 percent net reduction in absenteeism among high adherents to the program as compared with control company employees. Canada Life personnel estimated the annual savings would be over \$200 thousand if all employees had the same absentee rate as the high adherers (Figure 3).



Source: M. Cox, R. J. Shephard, and P. Corey, "Influence of an Employee Fitness Program Upon Fitness, Productivity and Absenteeism, Ergonomics, (1981).

Figure 3. Decreases in Absenteeism

Since absenteeism has been gaining more attention due to its cost to industry, and if it can be said that fitness may reduce absenteeism, particularly frequent one or two day absences, then possibly one can conclude absenteeism may be the most meaningful variable as an actual measure of improved productivity or company profitability (Cox, 1982).

In Cox's study, overall hospital utilization, greater in the test company during the year prior to initiation of the fitness program, decreased in the test company from 1.09 to 0.27 hospital days/employee/yr while the control

company showed an increase from 0.13 to 0.51 hospital days/employee/yr at the $P < 0.02$ level of confidence. While the study done by Cox in Canada represents the best attempt to date to assess effects of a worksite fitness program regarding productivity and related health costs, the need still exists for well controlled studies with good baseline data, inclusion of individuals as their own controls as one assessment of efforts over time, and several year follow-up periods (Fielding, 1982).

A pilot program at Metropolitan Life compared 100 participants with a control group of 100 employees stratified for age and sex. The control group had, on the average, lower job groupings, higher cholesterol levels, higher percentage of cigarette smokers (56% vs. 38%), lower baseline exercise levels and a 5.6 days/yr absenteeism compared with 6.3 days/yr for the intervention group. Over two years the absenteeism rate for the exercise group decreased to 4.9 days/yr while the control group climbed to 7.0 days/yr (Fielding, 1982).

At the present, insufficient evidence has appeared to assert dollar benefits from the effect of worksite physical fitness programs on frequency of illness (as distinct from absenteeism), utilization of health care services, health care costs, or rate of rise of health and disability insurance premiums. Direct measurements of increased productivity secondary to worksite exercise programs, have not been

reported in the North American literature. Also lacking are controlled studies on the effect of such programs on employee turnover despite the hope that programs will lead to decreased turnover (Fielding, 1982).

The rate of discontinuance of exercise programs appears to correlate directly with the frequency and intensity of the recommended or self-defined regimen. Of 110 "active" participants in a supervised onsite circuit training program for Exxon executives, after one year (11%) were exercising less than one-half session per week, 27 (24%) used the facility an average of once per week, 59 (54%) twice a week and 12 (11%) three times a week. Good analysis of costs and cost-effectiveness of corporate fitness programs have not yet appeared in the literature, and standardized methodology for assessing the costs associated with these programs is lacking (Fielding, 1982).

Several studies done in Europe support the premise that the physically fit employee is absent less frequently from work than the unfit employee. Goodyear introduced an employee fitness program in Norrkoping, Sweden which caused a decrease in absenteeism of nearly 50 percent over a year period at the $P < .01$ level of significance (Donoghue, 1977).

Pravosudov (1979) of the Union of Soviet Socialist Republics has investigated the effect of physical exercise on health and economic efficiency. His investigation indicated that, other things being equal, exercisers had a higher

working capacity, rate of output, standard being 2-5 percent, and at times 10-15 percent higher than nonexercisers. He found that persons taking part in sports activities consulted doctors four times less than those not engaged in exercise or sports activities; also, their sick rate with temporary losing ability to work made up only 22.5 percent of doctor consultations as against 50-60 percent of the second group. When working people are involved in physical exercise, losses of sick days were decreased on an average of 3-5 days/yr/worker.

Pauly, Palmer, Wright, and Pfeiffer (1982) conducted a 14-week study at Xerox Fitness Center to determine the effects of a structured employee exercise program on blood lipid profiles and some selected physiological and psychological parameters. Specific analysis dealt with the effects of exercise on total cholesterol, high density lipo-proteins, total triglycerides, trait anxiety, self concept, oxygen uptake, weight, body fat percentage and resting heart rate and blood pressure. From 120 volunteers, 73 male and female employees were randomly selected. These employees ranged in age from 18-59 years, with a mean age of 36. For the duration of the study they exercised as often as they chose using activities such as running and cycling to raise heart rates to a target level for twenty-minute sessions. At the conclusion of the study, subjects were grouped by frequency of exercise to determine overall effects of the program and possible intergroup variations. Significant improvements

overall were found in self-concept (physical, personal, and social), trait anxiety, resting heart rate and systolic blood pressure, total triglycerides and total cholesterol. Significant improvements overall and differences among the attendance groups were found in absolute and relative predicted maximum oxygen uptake. These improvements related directly to frequency of exercise.

Corrigan (1979) studied the effects of habitual exercisers related to unhabitually active to sedentary subjects. The study was conducted at Purdue University over a four year period (1971-75). The sample population consisted of 45 male adults divided into two groups. There were 29 habitually active subjects, and 16 inactive subjects before 1971. The study revealed that there was no significant difference between the two groups in terms of frequency of claims at $P < .05$. However, there was a significant difference in the amount of claims between the two groups. The amount of claims for the sedentary group was two times as much as the artificially active group at $P < .05$.

A five-year study of a compulsory fitness program for Los Angeles City Fire Fighters showed a significant decline in diastolic blood pressure (B/P) and a significant reduction in serum cholesterol but no change in body weight. Other studies have shown that regular participation in voluntary employee exercise programs can lead to statistically significant reductions in weight, systolic and diastolic B/P and skin fold

thickness (Barnard and Anthony, 1980).

Yarvote, McDonagh, Goldman, and Zuckerman (1974) conducted a six month and one year evaluation of Exxon's physical fitness programs in New York City where 422 men were invited to participate in the study and 309 (73%) did participate in a wellness and fitness program. One hundred and thirteen men participated in the control group. The researchers were particularly interested in producing desirable physiological changes that are favorable modifications in coronary risk factors and should in theory lead to less heart disease in employees as well as improve their sense of well being. The researchers utilized the T test at $\leq .001$ level of probability as the statistical instrument. At the conclusion of the study the exercisers realized lower pulse rates at rest, improved grip strength, and decreased body fat than the non-participants. In addition, 75 percent of the participants indicated an increased sense of well being; 90 percent noted some improvement in their capacity for sustained physical effort and 27 percent of the smokers either stopped or decreased their tobacco consumption.

New York Telephone Company estimates it saves \$2.7 million a year on the nine wellness programs it offers its 80,000 employees. The United States Postal Service Employee Assistance Program which consists of drug, alcohol abuse and psychological counseling programs, estimates more than \$2 million yearly savings (Daniel, 1982).

According to Simpson (1979) the most frequent and ser-

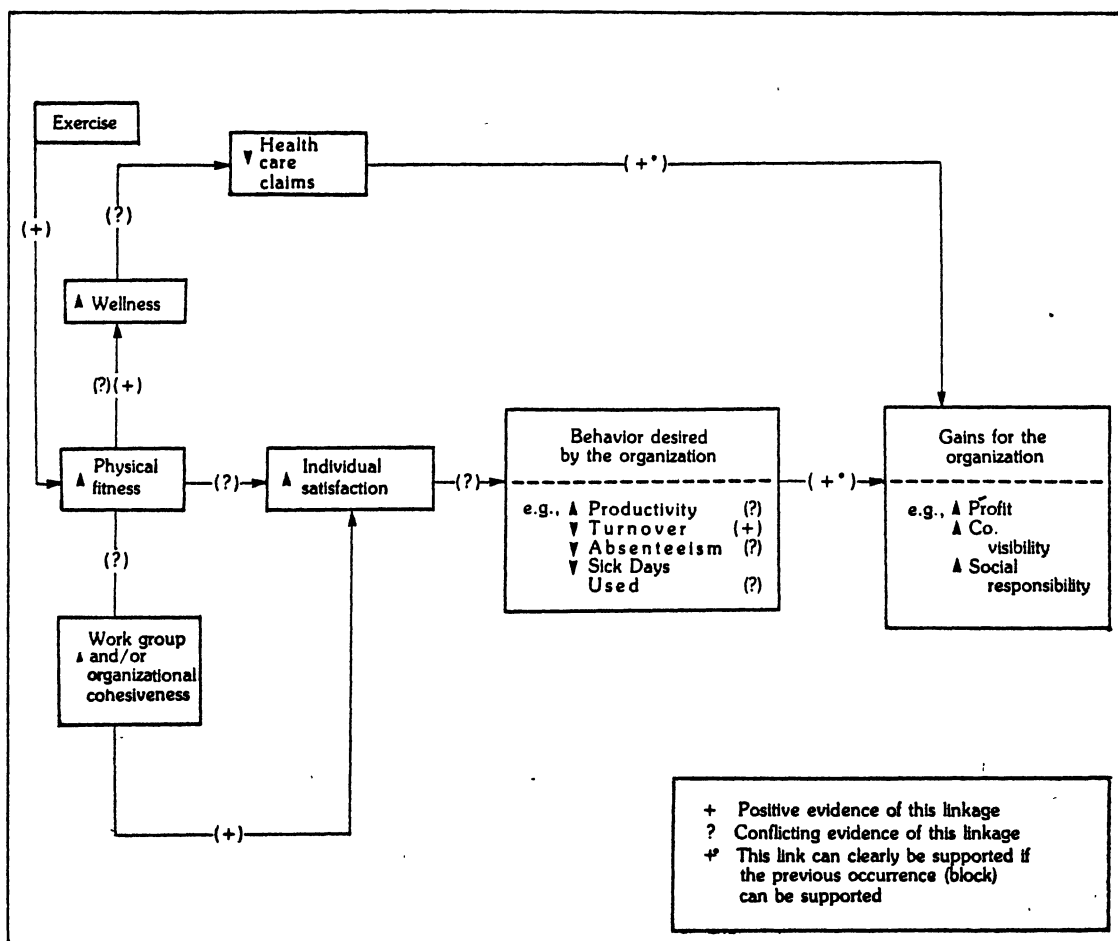
ious problems in large Canadian companies are absenteeism and turnover. His research indicates that every Canadian worker misses 12 days/yr and he estimates that 50 percent are preventable. The third major corporate labor problem is health care cost. Atherosclerotic heart disease caused workers to lose an average of 98 days one year, topping the list of twenty common causes of unavoidable absenteeism. However, casual absence which was the last on the list (days lost/incident) became the largest cause of lost days when expressed relative to total days lost per category. As much as 50 percent of casual absence is not sickness but sick of work syndrome. Job satisfaction holds the key to absenteeism and turnover.

In a program of heart disease intervention for public employees Bjurstrom and Alexion (1978) reveal that a behavior modification program implemented for characteristically sedentary state employees, helped in reducing risk factors associated with cardiovascular disease. The program is available to employees regardless of age, sex, salary or health status. It was initiated with a formal 15-week primary intervention plan consisting of a progressive physical conditioning program (1 hr/day, 3 days/wk complemented by 8-1 hour seminars). A five year experiment involving 847 employees resulted in a favorable modification in risk factors, amelioration of health problems and reductions in employee unavoidable absences.

In West Germany a chemical firm, BASF AG conducted research on their executives regarding exercise, nutrition and relaxation techniques. An important part of each day was a holy hour of rest. Everyone had his own mileage meter. Types of exercise were varied as also was the diet. Later there was a 22 percent drop in absenteeism, labor turnover dropped considerably, and productivity rose three percent. Forty-seven percent enjoyed their work more (Fielding, 1982).

Driver and Ratliff's Model of Managers' Perception
of Exercise Program Benefits

The following model indicates that management projects an increase in productivity and decrease in turnover, unavoidable absences, and sick days used will combine with decrease in health care claims to increase the organization's profits from an employee physical fitness program:



Source: R. W. Driver and R. A. Ratliff, "From Employers' Perceptions of Benefits Accrued from Physical Fitness Programs," Personnel Administrator (p. 22, Aug., 1982)

Figure 4. Driver and Ratliff's Interpretation of Managers' Perceptions of Exercise Program Benefits

Evaluating Fitness Programs

According to Pyle (1979a) fitness programs must be

managed well to succeed in their intent. They must relate to organizational goals. Specific operational objectives should be identified which are measurable over time. Short term goals are of value to the participant in terms of enhanced wellness; and long term goals are important to the organization in terms of productivity and health care costs.

Pyle presents information in the following figure

Short-term (3-4 months): Primary value is to individual participants
(It's working, it's working!!")

physiological measures

coronary risk factor score

health hazard appraisal (lifestyle questionnaire)

Intermediate (a year): Primary value is to the management of the department level involved.

absenteeism level

attitude and morale of group

self-confidence and self-image of individuals

plus, longer-termed effect upon the short-term measures above

Long-term (minimum 3 to 5 years): Primary value to corporate management (long enough to impact upon statistics of health, costs, etc.)

cost benefit analysis (cost containment)

productivity

organizational effectiveness

Source: R. L. Pyle, "From Performance Measures for a Corporate Fitness Program," Training and Development Journal (p. 33, July, 1979)

Figure 5. Measures for Evaluating Fitness Programs

Stressing Measures for Evaluating Fitness Programs.

Pyle (1979a, p. 34) further states the overall objectives for corporate involvement in fitness is "to evaluate the health and vitality of the firms' human resources."

Subordinate objectives would include:

1. Increase effectiveness of health fringe dollars expended by reducing costs or increasing fringes at the same cost.
2. Stimulate participants' initiation into a personal fitness program and educate personnel on the How and Why of fitness...to get on to a self-monitored independent program following a reasonable introductory period (three to six months).
3. Improve work attendance records through reduction of general illness incidents or particular recurring ailments (i.e., lower back pain).
4. Provide an in-house program with emphasis on high-level personnel to monitor a safe but sustained fitness program. This promotes the opportunity for those people whose responsibilities would otherwise discourage the time devoted to this priority.
5. By developing a consciousness within managers and personnel "taking care of themselves," improves general perspective the company people have of their jobs. This highlights a common concern by the firm and the employee for the employee's well-being (Pyle, 1979a, p. 34).

Important features of fitness programs in the 80's will include:

1. Be clear about what is expected from a program - it then will be possible to develop performance measures
2. Fitness programs should be handled by corporate personnel
3. The major emphasis will be on management fitness
4. Company wide programs will follow, but will differ in form and scope
5. Resources for fitness will increase
6. Training resources should be provided to educate personnel about the meaning and effect of physical fitness
7. Management must support fitness personnel (Pyle, 1979b, pp. 62, 63).

Fitness programs will focus on: 1) matching programs to participants' needs; and 2) establishing a base level.

Objectives of the fitness program are tied to corporate goals: 1) fitness must be a corporate benefit; 2) the fitness director must stick to corporate objectives; and 3) the fitness facility must report on the human resources function.

Pyle also presents a corporate fitness program for the 80's:

Profile 1980--A Corporate Fitness Program

Programs will be created to accomplish specific objectives for all employees.

A broad variety of resources will be provided to accommodate the various levels of programs and to be consistent with justified budgeting.

Programs will be directed toward total fitness.

Objectives will be clarified and related to broader corporate goals.

A thorough analysis will continue in the direction of how to maintain human resources more effectively.

Source: R. L. Pyle, "From Corporate Fitness Programs - How Do They Shape Up?," Personnel (p. 63, Jan/Feb, 1979b)

Figure 6. Profile 1980--A Corporate Fitness Program

Companywide programs will emerge more slowly as the emphasis on employee health increases, then more and more employees will be included in these programs. This will result as follows:

1. Eligibility of all employees will evolve in the 1980's
2. Aggressive promotion of employees health may be anticipated
3. MBO (management by objectives) fits the purpose of employee fitness

4. Employee-wide fitness programs need more options (Pyle, 1979b, pp. 66, 67).

The mutual benefits to individuals and organizations are irrefutable evidence for encouraging employers to get involved in a corporate fitness program. With the wide range of methods for promoting employee fitness, a corporate program is realistic and worthwhile for all organizations. The plan must be goal oriented, properly designed for the various participant groups, and cost justified. Alternative possibilities to these requirements are developing rapidly, and management has a number of successful models to take advantage of (Pyle, 1979b, p. 67).

Responsibility of Hospitals for Wellness

Care According to Cunningham

Wellness and fitness programs in business and industry are making a real commitment to health and fitness programs. Benefits of such programs include improved morale, increased productivity and decreased absenteeism. However, there remains a need for more longitudinal research to validate these benefits.

Cunningham (1982) stresses that hospitals need to be in the business of fitness programs for communities and businesses. A policy statement of the American Hospital Association states that:

The hospital has a responsibility to work with others in the community to assess the health status of the community, to identify target areas and population groups for hospital-based and cooperative health promotion programs, develop programs to help upgrade health in those target areas, ensure that persons who are apparently healthy have access to information about how to stay well and prevent disease, provide appropriate health education programs to aid those persons who choose to alter their personal health behavior or to develop a more healthful lifestyle, and establish the hospital as an institution in the community that is concerned about good health in addition to one concerned about treating illness (Cunningham, 1982,p. 84).

Need for Further Study

Much of the material reviewed by the author indicated a need for further research data to substantiate the need for fitness programs in industry.

Summary

This chapter has reviewed related literature on fitness and wellness programs related to cost-containment variables in industry. A summary of five companies with a fitness program was presented. They were Kimberly-Clark Corporation, Xerox Company, Metropolitan Life Insurance Comany, Control Data Corporation, and International Business Machines. Thirteen research projects on fitness and cost-containment were reviewed and summarized for the reader.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this study was to: 1) determine if employees on a fitness program facilitated cost-containment for industry when compared to employees not participating on a fitness program; 2) to determine if employees on a fitness program experience reduced absenteeism due to health reasons and reduced medical costs compared to employees not participating in a fitness program; and 3) to describe models of wellness and fitness programs as they relate to cost-containment variables in industry.

Setting of the Study

The sample for this study was drawn from employees at a large industry in the Midwest in the age group of 50-59. The experimental group consisted of 70 employees selected by the recreation and medical staffs and represented men who were known to have a regular exercise program. The control group was a sample of 108 men who were selected at random from the balance of the 1,686 men in the total population of the age group just indicated. The 50-59 age group was selected as the company experienced its greatest medi-

cal costs in this age group, particularly costs related to cardiovascular illness. (See Appendix A for cost per employee in selected age categories).

Statistical Treatment of Data

The data were compiled from employee records. The researcher examined the number of unavoidable absences and medical costs occurring for each employee. Once the data were collected, they were analyzed by the researcher to determine if employees on a fitness program facilitated cost-containment for industry and if there is a difference between employees in the two groups with regard to unavoidable absenteeism and medical costs.

The research method involved the left-tailed Z test with the .05 level of confidence selected to reject or not reject the null hypotheses. Data were collected on an experimental group and a control group regarding cost-containment variables measured by number of absences due to health reasons and the cost of medical care.

The dependent variable was the degree of cost-containment and the independent variable was the fitness program. Cost-containment variables included absences due to health reasons and the amount of medical costs per employee. These variables were analyzed utilizing the left-tailed Z test as the statistical instrument.

Population

The control group was selected at random through the company computer from the balance of the 1,686 men in the total population for the 50-59 age group. There were 108 men in the control group and 70 men in the exercise group regarding the variable for absenteeism. For medical costs there were 106 men in the control group and 69 men in the exercise group. The difference in the numbers of employees for absences and medical costs occurred because individuals with medical costs beyond the 2.5 standard deviation from the mean were eliminated from the number of individuals utilized to compare medical costs between the exercisers and the control group.

Summary

This chapter described the methodology utilized to analyze the data collected regarding the influence of an employee fitness program on cost-containment variables of medical costs and illness caused absences.

The left-tailed Z test was utilized as the statistical treatment method, with the .05 level of confidence selected to reject or not reject the null hypotheses: 1) there is no significant difference between employees who are on a fitness program in regard to absences due to health reasons; and 2) there is no significant difference

between employees who are on a fitness program to employees not on a fitness program relative to medical costs.

CHAPTER IV

ANALYSIS AND DISCUSSION

This chapter contains an analysis and discussion of the data collected regarding the difference in cost of medical care and illness caused absences between regular exercisers and a control group. The data were analyzed using the left-tailed Z test as indicated in the previous chapter.

To conduct the test, two samples of male employees, ages 50-59 were used. The first sample of 70 was selected by the recreation and medical staffs from participants on a regular exercise program. A regular exercise program consisted of active exercise three or more times a week for at least 30 minutes each time. The second group was a sample of 108 men who were selected at random from the balance of the 1,686 men in the age group specified. The randomization was done through the computer utilizing a method of randomization according to Steel and Torrie (1980).

Analysis of the data indicated a significant difference between the exercise group and the control group regarding absenteeism at the .05 level of confidence. Thus, the null hypotheses was rejected regarding a decrease in illness caused absences for the exercise group. The null

hypotheses was not rejected regarding a difference in cost related to medical claims for the exercisers versus the control group as the Z test was not significant at the .05 level of confidence.

The medical costs in both groups were exclusively confined to employees. In addition, further analysis of the data has revealed that the company paid less money in insurance claims to the exercise group for the two year period. The combined average claim for the exercise group was \$222.14 while the combined average claim for the control group was \$309.23. See Table below:

TABLE I

AVERAGE MEDICAL CLAIMS FOR 1982 AND 1983

<u>Year</u>	<u>Exercise Group</u>	<u>Control Group</u>	<u>Percent Difference</u>
	N = 69	N = 106	
1982	\$132.04	\$254.23	+93%
1983	90.10	55.00	-39%
Combined Years			
1982 & 1983	222.14	309.23	+39%

The difference in medical claims for the year 1983 was partly explained by a flu epidemic in the plant. This epi-

demic increased the medical costs of the exercise group.

Combined Hours of Unavoidable Absences
for 1982 and 1983

Analysis of the data revealed a statistical difference in the number of unavoidable absences at the .05 level of confidence between the experimental group and the control group for the combined years of 1982 and 1983.

TABLE II

UNAVOIDABLE ABSENCES FOR BOTH 1982 AND 1983

<u>Experimental Group</u>	<u>Control Group</u>
No. = 70	No. = 108
Mean = 20.23 hrs	Mean = 46.69 hrs
Standard Deviation = 1672.76	Standard Deviation = 7899.15
Z = -2.686	P = .0036

Analysis of the data for 1982 and 1983 of unavoidable absences did indicate a significance at .05 level of significance which gave sufficient evidence to reject the null hypotheses for unavoidable absences for both groups for the the two year period. See Figure below:

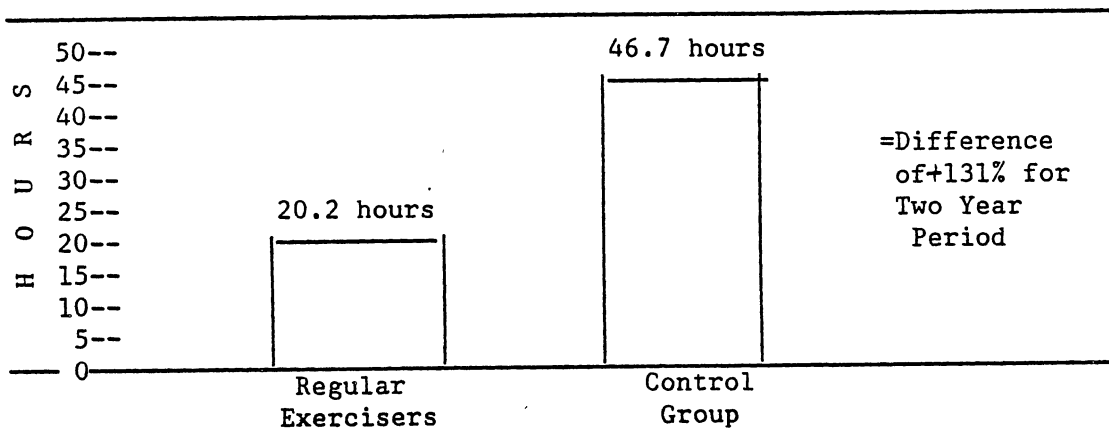


Figure 7. Hours of Absenteeism for 1982-1983

Analysis of the data for the 1982 period did not indicate a statistical difference in the number of absences at the .05 level of confidence between the experimental group and the control group.

TABLE III

UNAVOIDABLE ABSENCES FOR 1982

<u>Experimental Group</u>	<u>Control Group</u>
No. = 70	No. = 108
Mean = 10.74	Mean = 18.41
Standard Deviation = 836.43	Standard Deviation = 1134.04
Z = 1.619 P = .0530	

The data in Table III is not significant at the .05 level of confidence which did not give sufficient evidence to reject the null hypotheses for unavoidable absences for the year 1982 as seen in the above figure. The mean for the experimental group was 10.74, while the mean for the control group was 18.41. The standard deviation for the experimental group was 836.43, while the standard deviation for the control group was 1134.04. The Z probability was .0530 which is slightly over the .05 level of significance. However, as can be seen by Table III there still is a difference in unavoidable absences between the two groups in favor of the exercise group. This table is significant in validating the importance of exercise as a method of cost-containment regarding employee absenteeism. Employees at the plant were on the whole faithful in keeping their work appointments. This could also contribute to the lower level of absenteeism in the control group.

Comparison of Regular Exercisers to Random Group Regarding
Absenteeism At a Large Mid West Industry
1982

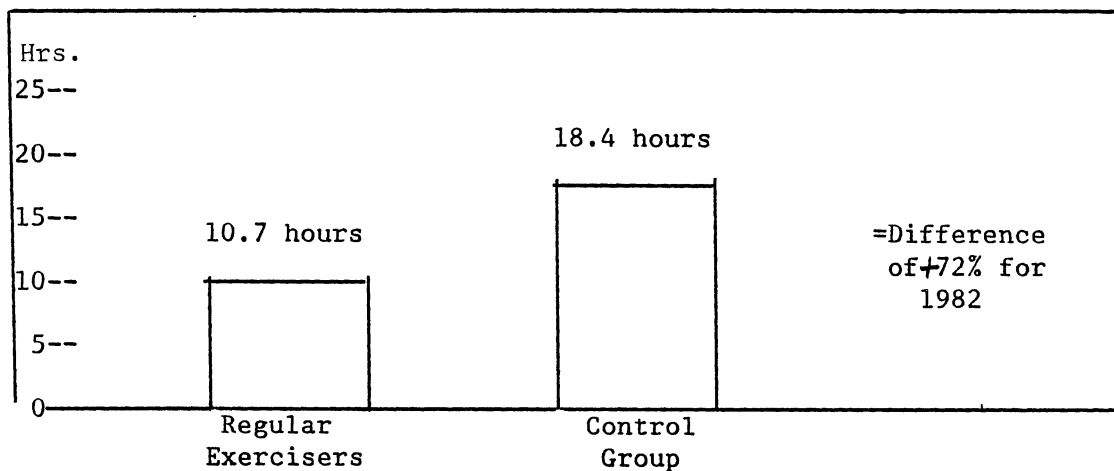


Figure 8. Hours of Absenteeism

Unavoidable Absences for 1983

An analysis of the data for 1983 of unavoidable absences did indicate a statistical difference in the number of unavoidable absences at the .05 level of confidence between the experimental group and the control group for the year 1983.

TABLE IV.

UNAVOIDABLE ABSENCES FOR 1983

<u>Experimental Group</u>	<u>Control Group</u>
No. = 70	No. = 108
Mean = 9.44	Mean = 28.28
Standard Deviation = 688.78	Standard Deviation = 4791.42
Z = 2.55 P = .0053	

The data in Table V is significant at the .05 level of confidence which gives sufficient evidence to reject the null hypotheses for unavoidable absences for the year 1983. See figure 9 below:

Comparison of Regular Exercisers to Random Group Regarding
Absenteeism At Large Midwest Industry
1983

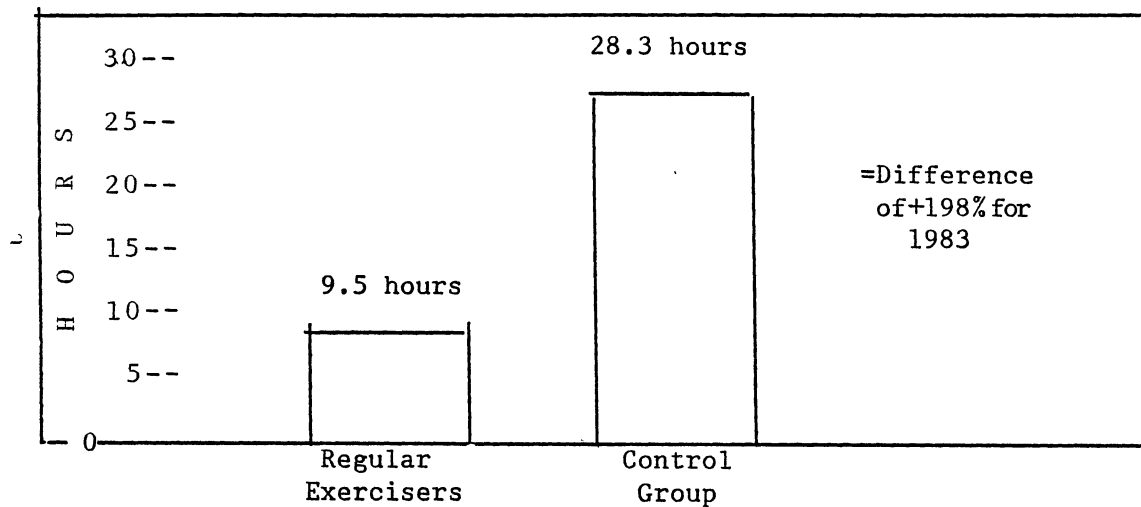


Figure 9. Hours of Absenteeism 1983

Analysis of Medical Costs in 1982 for Both Groups

Utilizing the left-tailed Z test at the .05 level of confidence regarding medical costs between the two groups, it did not reveal a significant difference between the two groups to reject the null hypotheses See table below:

TABLE V
MEDICAL COSTS FOR 1982

<u>Experimental Group</u>	<u>Control Group</u>
No. = 69	No. = 106
Mean = 132.04	Mean = 254.23
Standard Deviation = 121950.94	Standard Deviation = 896064.77
Z = 1.209 P = .1170	

Even though the null hypotheses was not rejected there was some difference in medical costs as indicated by Figure 10 below:

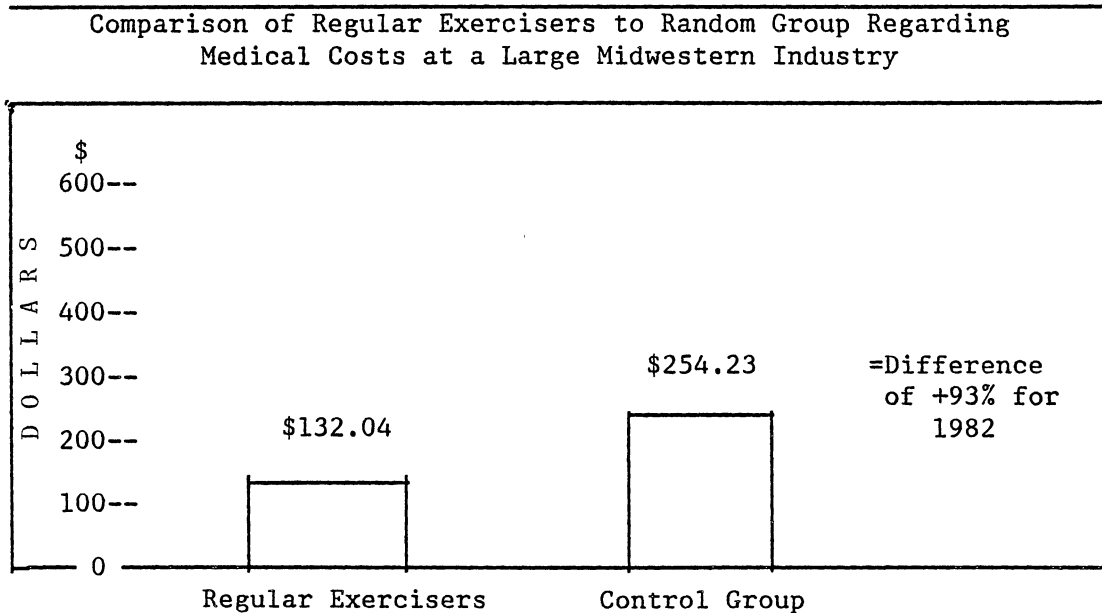


Figure 10. 1982 Mean Average Paid Claims Per Employee

Analysis of Medical Costs of Both Groups for 1983

Medical costs of both groups for 1983 were not statistically significant. There was not sufficient evidence to reject the null hypotheses at the .05 level of confidence. Note Table VI below:

TABLE VI

ANALYSIS OF MEDICAL COSTS FOR BOTH GROUPS FOR 1983

<u>Experimental Group</u>	<u>Control Group</u>	
No. = 69	No. = 106	
Mean = 90.10	Mean = 55.00	
Standard Deviation = 174749.30	Standard Deviation = 34535.15	=Difference of -39% for 1983
Z = 0.561	P = .2578	

The medical costs for the exercise group were more than the control group for the year 1983. The following figure makes clear that the average claims for the exercise group for a two year period was \$222.14 while the average claims for the control group was \$309.23.

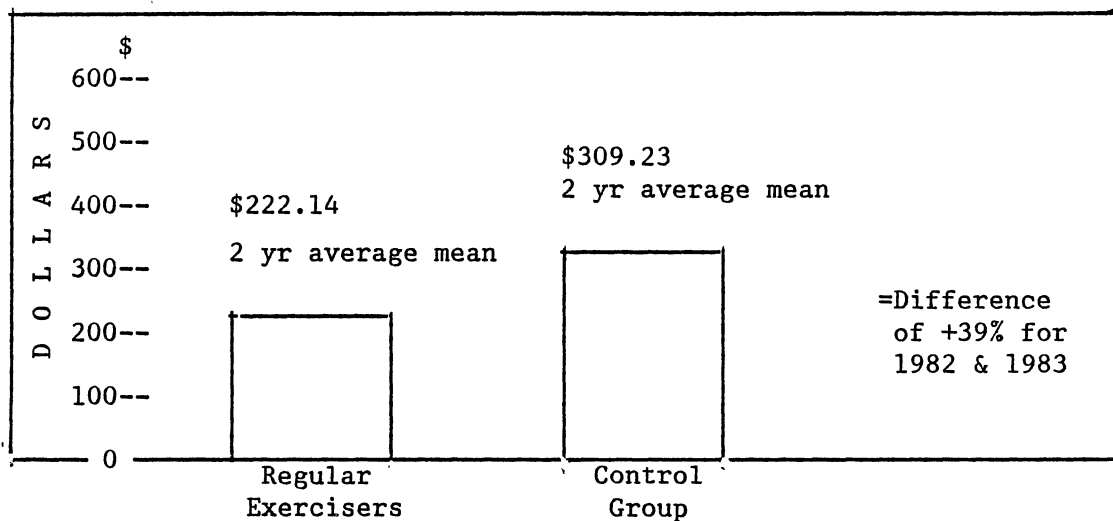


Figure 11. Mean Average Paid Claims for 1982 and 1983

The medical claims for the exercise group for 1982 ranged from 0 to \$2064.80 with the exception of one claim that was eliminated because it was beyond the 2.5 standard deviations from the mean. For the year 1983 claims ranged from 0 to \$2516.68 for the exercise group.

For the control group for 1982 the claims ranged from 0 to \$2664.10. For the year 1983 the claims for this group ranged from 0 to \$5891.70. (See Appendix C)

For the year 1982 the experimental group had 15 claims while the control group had 23 claims. For the year 1983 the experimental group had 8 claims and the control group had 19 claims. For both years the experimental group had

a total of 23 claims while the control group had 42 claims.

For the year 1982 the experimental group had a claims total dollar amount of \$9111.00 and for the year 1983 this group had a claims total dollar figure of \$20,286.57. For the year 1982 the control group had a claims total dollar amount of \$26,948.10 and for the year 1983 this group had \$28,894.91 in total claims.

In the exercise group for the year 1982 there were 16 persons with medical claims processed out of 69 exercisers; and for the year 1983, there were 8 persons with claims processed. In the control group for 1982, 25 individuals out of 108 persons had claims processed, while in the year 1983, 19 individuals in the control group had claims processed.

Discussion

The study indicated that employees on an exercise program have less absenteeism than employees not on an exercise program. Also, medical costs were less for the group of exercisers as opposed to the non-exercise group. In addition, descriptive models of wellness and fitness programs presented in Chapter II have implications for replication by various groups in a given community. Health practitioners in various disciplines are becoming increasingly interested in wellness care and health promotion and replicating wellness models from industry to the citizenry at large.

It is the author's opinion that the study was worthwhile for cost-containment directors of industry and health care workers specializing in wellness care. Since absences were significantly reduced in the exercise group the merits of fitness and wellness programs in industry are rewarding.

Further testing of medical costs is encouraged as longitudinal studies over time to provide further documentation of the value of a fitness program as a measure of cost-containment related to medical costs. Even though medical costs for the exercise group was not significant at the .05 level of confidence, there still was a difference in the medical costs between the two groups in favor of the exercisers. Given this impact of cost-containment for the exercise group provides information favorable to the promotion and continuation of the fitness and wellness program at the selected industry for this study as well as in other industrial plants.

In an age of cost-containment resulting from government cutbacks in such programs as Medicare, Medicaid and education, the time is ripe for the nation to focus on wellness care and health promotion. In the past, two percent of total medical costs were dedicated to wellness care; the balance was spent on illness care (Laughlin (1982). In an attempt to promote cost-containment, as well as productivity, and physically fit employees, industry has pioneered in health promotion and fitness care for the nation.

This study was conducted because of the author's interest in wellness care and health promotion, as well as to seek better methods of integrating wellness care into the nursing curriculum.

Health educators, physicians, nurses, and other allied health professionals are in the unique position to band together to promote wellness and fitness programs nationwide, including industry, local communities, schools, voluntary agencies, and churches. The author suggests that independent health practitioners set up practices that emphasize wellness and health promotion. With an open health care system a client could seek the services of a particular health care worker, as a health educator, nurse, and dietitian without the authorization of a physician.

The author concurs with Welch's suggestion that insurance carriers provide premium discounts for the services of health care workers operating independent of physician orders. New York State is providing insurance coverage for nurses in an independent role with certain restrictions, as care outside the institution and for group policies only (Welch, 1985).

Hoffman (1973), an eminent nutritionist, was sent to Hunza land by the United States Government to determine why the natives of this country lived to be 120 to 140 years old. Also, why they did not die of degenerative diseases such as heart disease, cancer and arthritis. His findings included: a diet primarily consisting of fruits

and vegetables of a high alkaline quality, fresh water from the mountain streams containing many minerals; vigorous exercise on the terraced land to raise crops; fresh air free of insects; regular sleep from sundown to sunup; and freedom from worry and tension that plagues western society.

From his research Hoffman learned that the body assimilates 100 percent of the nutrition from pure wheat, whereas it assimilates five percent nutrition from the beef steak after the cow has digested the wheat. He further discovered that many of the disease processes associated with western society have their roots in poor nutrition.

With an open health care delivery system, health care workers could promote a wellness focus of care instead of focussing on illness care. As client advocates, health care workers could be promoting wellness and wholeness for the client. The physician by the very nature of his discipline must focus on disease processes and diagnostic known skills. The health educator and professional nurse are taught assessment skills dealing with every aspect of the client's life including fitness, nutritional, social, mental, physical and spiritual aspects. With this broad assessment healthful principles could be included into the so-called well client's life.

With current cutbacks in Medicare and Medicaid programs, home health care is again becoming a popular concept in the United States as it was at the turn of the 20th century. Nurse educators in company with the author are

looking at new ways to integrate home health care, wellness and fitness concepts into the nursing curriculum. Nurses are in an excellent position to advocate health promotion and wellness care. With both the prospective of the illness and wellness continuum through the age groups, nurses can market plans to promote optimum wellness programs for all age groups. As independent practitioners, nurses can carry a client load, teaching and role modeling principles of health and fitness, such as the eight natural remedies advocated by Ellen White (1974) as fresh air, sunshine, exercise, adequate nutrition, soft water, rest, and sleep and trust in divine power.

Since industry has pioneered the way with fitness programs as one method of cost-containment, health educators and nurses can work with and learn from industry to prepare future practitioners with a wellness orientation that branches out from the hospital into the communities, schools, churches and homes with a health promotion philosophy and product that will be marketable to the public and provide jobs for health care workers in the future. Wellness care can be meaningful and worth purchasing for the general public as is illness care.

Research is extremely important to nurse educators as framers of the nursing curriculum. The nurses comprise the largest number of workers in the health care delivery system and desire a voice in the direction of health care of our citizens. With its wellness philosophy, nursing

has much to offer the American citizen in his quest for wellness and fitness. Jacox (1983) suggests that this can best be accomplished in an open health care system with nurses maintaining autonomy over its practice.

Florence Nightingale envisioned nursing's social mission as the employment of knowledge wisely, skillfully and humanely in ministrations to assist human beings to attain and regain their greatest potentials and to ensure them a dignified and peaceful death. She identified the profession's fundamental research goal to be that of discovering nature's laws governing human health (Scholfeldt, 1985).

As a nurse educator, the author has become increasingly interested in wellness and fitness care and new ways of implementing these concepts into the nursing education curriculum. Therefore this study was undertaken as one method of validating the importance of wellness and fitness care and programs. Research of the literature regarding wellness and fitness care pointed to industry as the forerunners in this care. Also, health educators were identified as leaders in promoting and advocating wellness and fitness as a more sound method of promoting health care for the nation's citizenry.

Of necessity the study limited cost-containment variables of fitness to medical costs and unavoidable absences. The study confined itself to one large industry in the Midwest with a known fitness program, and to a male population of 50-59 years of age. (See next two figures below)

Admissions

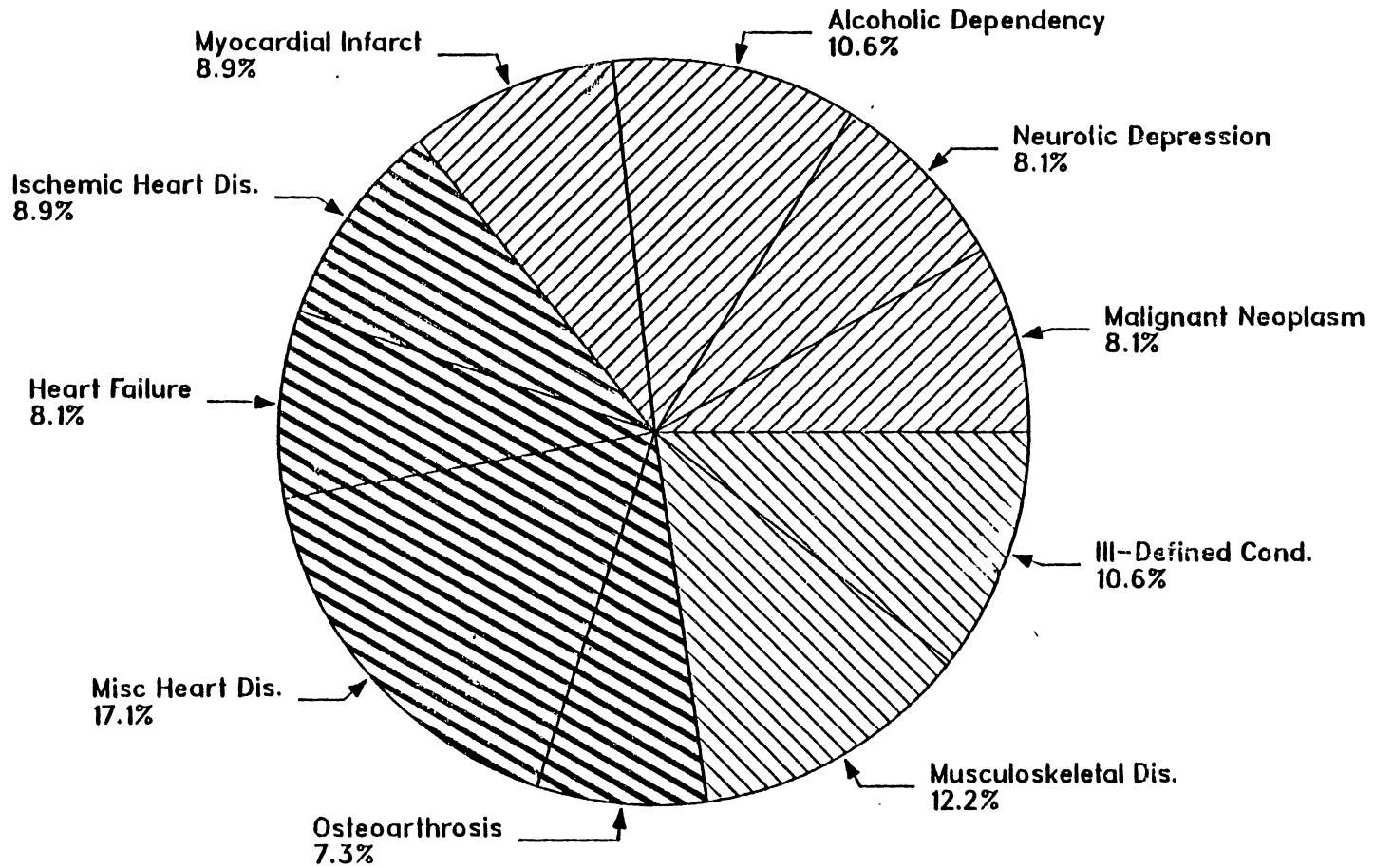


Figure 12. Top 10 Diagnosis Each Admission Having \$10,000 or More in Charges 1983 Data

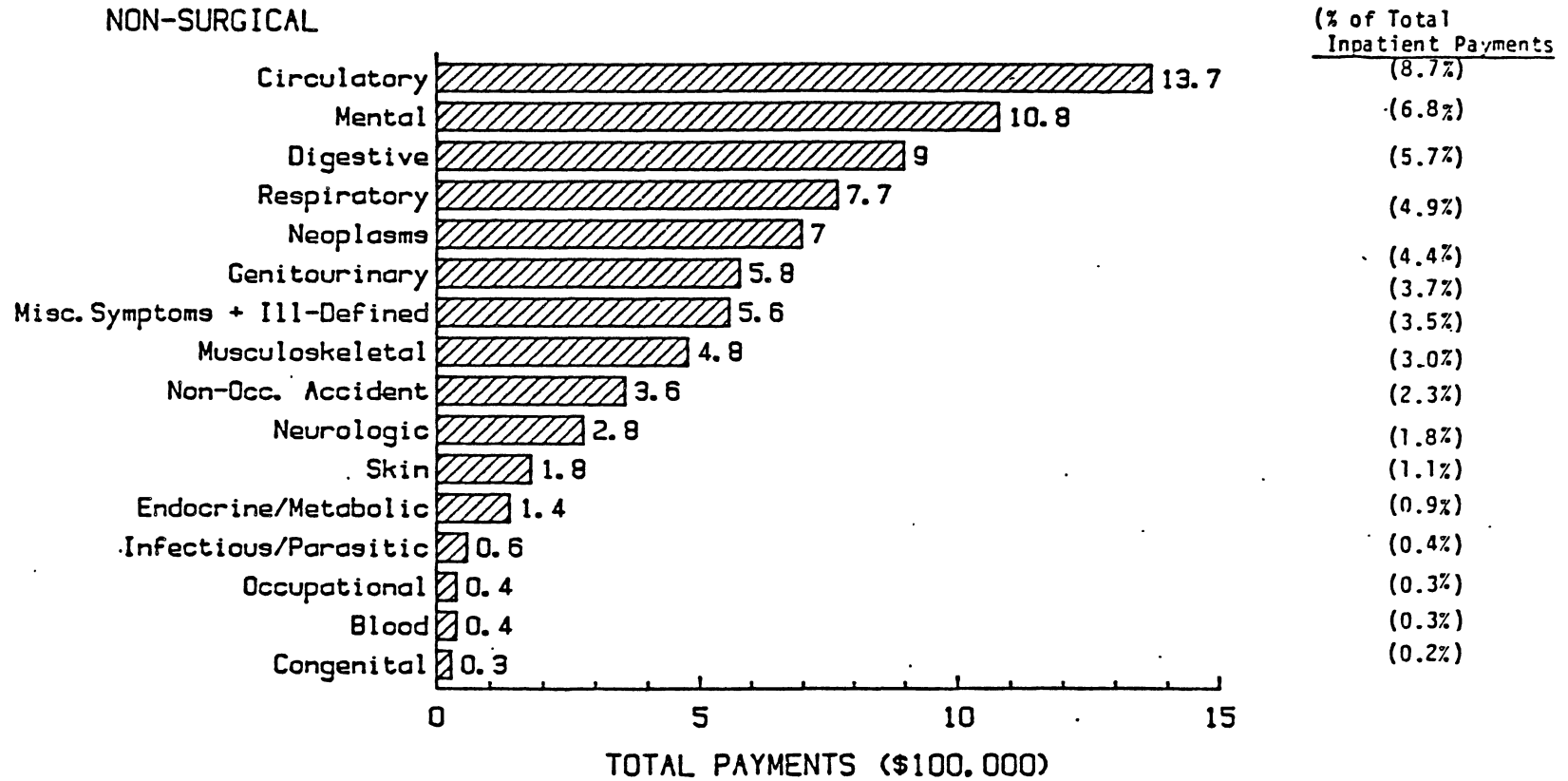


Figure 13. Distribution of Total Inpatient Payments By Diagnostic Category

Although fitness was measured utilizing indirect variables of unavoidable absences and medical costs, the author believes that the study was worthwhile in verifying to a limited degree the effect of an employee fitness program on cost-containment variables and has implications for promoting a concept of wellness and fitness that will produce more productive healthy employees who are able to be present and more productive at work, have a zest for work, living, and respect for the human organism with a desire to maximize the use of this organism.

This study has implications for health care workers in various fields related to educational curriculum, entrepreneurship and health and well being of the general populace. With an open health care delivery system, health care workers can market their skills more effectively, with the prospect of reimbursement from insurance companies and impact the health and well being of American citizens.

Summary

This chapter analyzed the data collected over a two year period of time regarding differences in unavoidable absences and medical costs for a group of employees on a regular exercise program and another control group. The population consisted of men between the ages of 50-59 years of age. The mean age of the exercisers was 55.3, while the mean age of the random control group was 55.8.

The null hypotheses was rejected regarding the number of unavoidable absences between the control group and the experimental group for the combined years of 1982 and 1983. The regular exercisers experienced 20.2 hours of unavoidable absences while the control group experienced 46.7 hours of unavoidable absences. According to the left-tailed Z test these figures were significant at the .05 level of confidence which gave sufficient evidence to reject the null hypotheses for unavoidable absences for both groups for the two year period of 1982 and 1983.

The null hypotheses was not rejected regarding medical costs of both groups. The left-tailed Z test at the .05 level of confidence did not reveal sufficient evidence to reject the null hypotheses. However, examination of medical claims paid to both groups did reveal a difference in favor of the exercise group.

The average medical claim for the exercise group was \$132.04 for the year 1982, while the average claim for the control group was \$254.23. The combined average medical claims for the exercise group for both years was \$222.14, while the combined average claims for the control group for the two years was \$309.23. Individuals with extreme costs beyond the 2.5 standard deviations were eliminated from the study, therefore the number of participants in the experimental group for medical costs was limited to 69 and the number of individuals in the control group was limited to 106, which was different from the total number of participants

with unavoidable absences. As can be recalled there were 70 original participants in the experimental group and 108 original participants in the control group.

Fifty-three percent of the regular exercisers had unavoidable absences (absent due to health reasons) during the two year period, while sixty-five percent of the participants in the control group had unavoidable absences. There was a 13 percent difference favoring the exercise group.

During the two year period 34 percent of the participants in the exercise group had medical claims, while 38 percent of the participants in the control group had medical claims. These claims were exclusively confined to the employees. Since this information is confidential, it is difficult to secure. It is the author's opinion that it would be worthwhile to develop a more detailed investigation over a longer period of time. Other variables to consider would include blood pressure means, pulse means, blood lipid means, as well as aerobic points accumulated per week by each group.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of Study

The purposes of this study were: 1) to ascertain whether there was a difference in unavoidable absences between a group of regular exercisers and a control group; and 2) to determine if there was a difference in medical costs between a group of regular exercisers and a control group.

It was hypothesized that there was not a significant difference between medical costs and unavoidable absences of a selected group of regular exercisers and a random group.

Literature was reviewed regarding fitness programs in industry. The history of fitness programs in industry was traced starting with the program implemented in the national Cash Register Company sponsored by John Patterson, the father of fitness programs (Tuthill, 1979).

A fitness program was defined as "human resources participating in maintenance program" - a significant method for preventative medicine and maintaining personnel in proper operating condition through structured exercise classes, advocating proper fluids and nutrition, rest, and relaxation, weight control, and stress control.

The statistical treatment utilized was the stand-

ard left-tailed Z test to measure the variables of medical costs and unavoidable absences. The .05 level of confidence was selected as sufficient evidence to reject or not reject the null hypotheses. The investigation obtained data from a large industry in the Midwest.

Men between the ages of 50-59 were used for both the experimental and control groups. The experimental group for unavoidable absences consisted of 70 regular exercisers who utilized the company's exercise facilities on a regular basis over a two year period. The control group for unavoidable absences consisted of 108 male employees between the same ages, 50-59 and drawn at random from 1,686 men using the company's computer with a random number for selection in the age group specified above.

There were 69 men in the experimental group for medical costs and the 106 men in the control group between the ages of 50-59. The figures for medical costs are lower than the figures for unavoidable absences as excessive medical costs beyond 2.5 standard deviations from the mean were eliminated from the study.

Men between the ages of 50-59 were selected since the men in this age group accrued the greatest costs to the company, particularly those costs due to treatment of cardiovascular disease. Men were selected as subjects since they comprised the largest group of employees at the company and data were more readily available for this population.

Conclusion

Hypthesis #1 for the study stated, "There was no significant difference between employees who are on a fitness program to employees who are not on a fitness program in regard to absenteeism." The null hypotheses was rejected in this instance as there was sufficient evidence at the .05 level of confidence with the left-tailed Z test to reject the null hypothesis.

Hypothesis #2 for the study read, "There was no significant difference between employees who are on a fitness program and employees not on a fitness program in regard to medical costs." The null hypotheses was not rejected using the left-tailed Z test as there was not sufficient evidence at .05 level of confidence to reject the null hypotheses. However, there was a difference in medical costs between the experimental group and the control group. For the year 1982 the average medical claim for the experimental group was \$132.04, while the average medical claim for the control group was \$254.23. There was a 68 percent difference in favor of the exerciser group.

In 1983 the average medical cost for the exercisers was \$90.10 and the average medical cost for the control group was \$55.00. This mean was a -40 percent difference in favor of the control group. This cost difference could be explained by a flu epidemic during 1983. The combined average medical costs for the two years was \$222.14 for the

experimental group and \$309.23 for the control group. This was a +58 percent difference in favor of the exercise group.

Recommendations

Based on the findings of this study, it is recommended that the following occur:

1. Further studies are indicated regarding fitness programs and other variables as mean blood pressure, mean pulse, mean blood lipids and mean aerobic points accrued.

2. Nurse educators are in a position to reevaluate the nursing curriculum with a goal of providing more wellness experience for students.

3. Longitudinal studies need to be conducted on the effects of an employee fitness program. Longer term evaluations will allow for: 1) full impact of the employee fitness program upon the variables considered; and 2) also make it easier to separate the effect of the program from the effect of fitness improvement.

4. As many occupations require only minimal physical fitness, more research needs to be conducted on the relationship between physical fitness and mental fatigue as it pertains to the job situation.

5. Further research is indicated to identify factors which would motivate a larger proportion of the population to attend an employee fitness program.

6. Longitudinal study to investigate fitness, lifestyle characteristics and job performance variables once employees who were program adherers withdraw from program participation and/or when the company terminates the program, may be indicated.

7. Further research could be conducted regarding the impact of Diagnostic Related Groups (DRG's) on home health care focussing on wellness and fitness concepts.

8. Nurse researchers and health education researchers can work with industry to further document the value of a balanced fitness and wellness program for employees.

9. Health educators along with physicians and nurses have the opportunity to lead the nation in fitness and wellness through example, teaching, counseling and research.

10. Wellness and fitness programs can be produced and marketed for industry and the general public.

The author thoroughly enjoyed this investigation as it was an opportunity to examine wellness care as opposed to illness care. It also exposed the writer to literature available in industry and business related to wellness care which would otherwise not have been experienced. Through the research and the assistance of health educators regarding wellness and fitness care the author became more aware of the value of this group of health care workers.

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APPENDIX A

AVERAGE MEDICAL COSTS ACCRUED BY EMPLOYEE
ACCORDING TO AGE RANGE AND NUMBER OF
DAYS IN THE HOSPITAL

TABLE VII

AVERAGE MEDICAL COSTS ACCRUED BY EMPLOYEE
ACCORDING TO AGE RANGE AND NUMBER OF
DAYS IN THE HOSPITAL

	Age in Years	Average Cost of Claim	Average Absences
1.	15 - 24	\$780.00	5.6 days
*2.	25 - 34	1269.00	4.6
3.	35 - 44	690.00	5.4
4.	45 - 54	843.00	6.1
5.	55 - 64	1400.26	7.1

*Item Number Two Is Explained
as Maternity Claims Primarily
for Dependent Spouse.

APPENDIX B

HUGULEY HOSPITAL OPENS NEW
HEALTH FITNESS CENTER

APPENDIX B

HUGULEY HOSPITAL
OPENS NEW HEALTH
FITNESS CENTER

The opening of a newly constructed \$4 million fitness Center by Huguley Memorial SDA Medical Center in Fort Worth, Texas may be heralding a trend for the nation.

In a letter, President Reagan congratulated those who made the center possible and said, "To cure sickness is a noble thing, but to prevent it is better."

Speaking before nearly 600 people attending the Center's grand opening on February 18, Texas commissioner of health, Robert Bernstein heartily commended the hospital's active commitment to health education and wished the Center's planned health-ed. curriculum would expand "into the schools, where America's youth are learning to develop their own lifestyles."

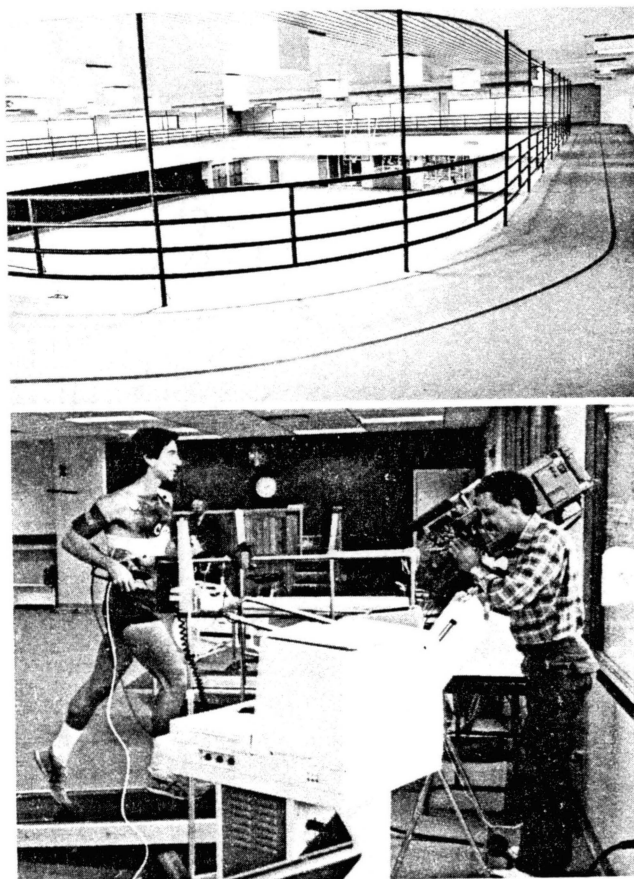
The new 41,000 square foot Center, according to Robert S. Peterson, director, will serve as a nucleus for almost everything local residents will need for their health education and fitness.

In area of health education, classes will vary from weight management, grief recovery, and parenting, to nutrition and breadmaking.

According to Peterson, many of the planned classes and seminars have already been offered by Huguley Hospital since it began offering health education classes to the public in 1977.

From an initial five classes, with nearly 750 participants, the hospital's health-education program has continued to grow with a total of more than 20,000 people participating.

Besides the variety of health-education classes planned, the new Center will also offer a full array of equipment and facilities for health fitness training. Participants will use the full-size gymnasium, pneumatic-resistance workout equipment, exercise bicycles, rowing machines, and they will jog on the outdoor and the indoor elevated tracks that encircle the gym. (The Adventist Review, p. 16,17, April 4, 1985)



Top, an indoor elevated jogging track encircles the full-size gymnasium to be used for group exercise activities and community events. Bottom, the exercise physiology laboratory is equipped with state-of-the-art computerized physical assessment tools. Opening day brought many TV stations to the center.

APPENDIX C

EXERCISE AND CONTROL GROUP MEDICAL CLAIMS

FOR 1982 AND 1983

TABLE VIII

No.	EXERCISE GROUP MEDICAL CLAIMS FOR 1982 AND 1983		
	1982	1983	Total
1	0	2153.87	2153.87
2	547.70	0	547.70
3	507.70	0	507.70
4	1057.20	0	1057.20
5	0	2516.68	2516.68
6	202.50	0	202.50
7	581.30	0	581.30
8	0	285.60	285.60
9	2064.80	0	2064.80
10	40.00	0	40.00
11	0	44.01	44.01
12	436.80	0	436.80
13	0	6198.73	6198.73
14	114.30	0	114.30
<u>15</u>	<u>12914.00</u>	0	12914.00
16	257.00	0	257.00
17	668.20	0	668.20
18	0	1096.80	1096.80
19	473.90	0	473.90
20	0	29.60	29.60
21	1155.20	0	1155.20
22	57.00	0	57.00
23	0	7961.28	7961.28
24	947.40	0	947.40
25 - 70	0	0	0

Note: No. 15 was deleted from the computations because its amount was more than 2.5 standard deviations above the mean.

TABLE IX

TOTAL REPORTING CLAIMS FOR 1982 AND 1983			
	1982	1983	Total Both Years
Experimental Group	15	8	23
Control Group	23	19	42

TOTAL CLAIMS REPORTED IN DOLLARS FOR 1982 AND 1983			
	1982	1983	Total Both Years
Experimental Group	9111.00	20286.57	29397.57
Control Group	26948.10	28894.91	55843.01

AMOUNT REPORTED BUT NOT FIGURED IN GROUP COMPUTATIONS BECAUSE
CLAIM WAS ABOVE 2.5 STANDARD DEVIATIONS FROM MEAN

	1982	1983	Total Both Years
Experimental Group	12914.00 (1 clm)	0	12914.00
Control Group	40039.90 (2 clms)	0	40039.90

clm = claim (s)

TABLE X

CONTROL GROUP MEDICAL CLAIMS FOR 1982 AND 1983			
No.	1982	1983	Total
71	41.20	0	41.20
72	397.00	0	397.00
73	0	244.80	244.80
74	599.40	0	599.40
75	512.20	0	512.20
76	320.60	0	320.60
77	0	161.60	161.60
78	39.50	0	39.50
79	0	1282.43	1282.43
80	84.00	0	84.00
81	108.50	0	108.50
82	0	365.64	365.64
83	0	221.60	221.60
84	2664.10	5848.23	8512.33
85	0	40.00	40.00
86	0	137.39	137.39
87	0	201.60	201.60
88	1164.30	0	1164.30
89	0	265.20	265.20
90	0	48.00	48.00
91	1653.10	0	1653.10
92	0	5643.84	5643.84
93	0	5791.26	5791.26
<u>94</u>	<u>25202.00</u>	0	25202.00
95	0	491.00	491.00
96	3806.60	0	3806.60
97	7753.70	0	7753.70
98	259.30	0	259.30
99	3178.00	0	3178.00
100	1455.10	0	1455.10
101	12.00	0	12.00
<u>102</u>	<u>14837.90</u>	0	14837.90
103	92.00	379.60	471.60
104	0	710.54	710.54
105	0	5891.70	5891.70
106	233.60	0	233.60
107	800.10	0	800.10
108	746.00	231.84	977.84
109	226.30	0	226.30
110	0	938.44	938.44
111	801.50	0	801.50
112 - 178	0	0	0

Note: Nos. 94 and 102 were deleted from the computations because their amounts were more the 2.5 standard deviation points above the mean.

VITA 

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