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Evaluation of a Peer-Education Program on Heart Disease Prevention with Older Adults

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Abstract This investigation evaluated the effect of a peer-education program on preventing cardiovascular disease in older persons. Peer leaders at two urban senior housing residences were provided with training on cardiovascular disease and its risk factors, strategies to reduce the risk factors, and communication skills. Baseline and follow-up data were collected on residents at the two intervention and two control sites. The dependent variables were knowledge of cardiovascular disease risk factors; perceived self-efficacy to reduce calories, dietary fat and salt intake, to lose weight, to stop smoking, and to exercise regularly; and self-reported cardiovascular risk behaviors. Analysis of individual change scores between baseline and follow-up surveys showed a statistically significant increase in overall knowledge of heart disease, dietary self-efficacy, and exercise self-efficacy for the intervention group compared with the control group. This program appeared to benefit the individuals who lived in housing residences where the peer educators also resided.

The older population has been increasing at a far more rapid rate than the rest of the population for most of this century. At the beginning of this century 4% of the total population or about 3.1 million persons, was age 65 years and over. By the year 2000 it is estimated that 13% will be over 65. This age group is expected to increase by 2% per year compared with 1% per year for the younger population (U.S. Department of Health and Human Services [USDHHS], 1990). The trend toward an aging America promises to continue, which magnifies the already existing need for health professionals to investigate ways to improve the health and quality of life of older individuals.

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Past research on older persons tended to deal with accumulation of disease or the absence of health. Activities aimed at preventing disease in the elderly were viewed as impractical and of little benefit (Benson & McDevitt, 1989). Recently, more research has begun to appear on health promotion and prevention of illnesses with these individuals, but much more is needed (USDHHS, 1990).

Coronary heart disease, stroke, peripheral artery disease, and congestive heart failure occur with increased frequency after age 65 for both men and women. Cardiovascular disease accounts for 38% of mortality, is the cause of the largest percentage of days spent in the hospital, and is a major cause of restricted activities of daily living among older persons (USDHHS, 1990). The Framingham epidemiologic study reported specific heart disease prevention measures that may be of value, including controlling and preventing hypertension, avoiding cigarettes, reducing weight, controlling cholesterol level, and encouraging physical activity (Kannel et al., 1987).

Despite evidence indicating the value of preventing cardiovascular disease, Rimer et al. (1986) in a review of health education programs, found a limited number of age-tailored programs for this indication. A report to Congress on the health needs of the elderly identified greater attention paid by health professionals in the areas of health promotion and disease prevention. They suggested using older persons as leaders in these programs (USDHHS, 1987).

LITERATURE REVIEW

Peer-led programs among older adults demonstrate positive results. Lay educators provided workshops in the community on arthritis education, with participants

demonstrating significant increases in activity and decreases in pain (Lorig, 1987). Peer-led classes on nutrition and dietary fiber resulted in a significant increase in nutrition knowledge on the part of attenders (Ho et al., 1987).

Trained facilitators provided stroke education sessions and informal support and information to their peers at a senior citizen center (Glanz, Marger, & Meehan, 1986). The facilitators were effective in increasing both their own knowledge and attitudes as well as those of attenders at the center. Several other peer-led programs reported positive evaluations (Becker & Zarit, 1978; Byrd, 1984; Campbell & Chenoweth, 1981; Cox, 1979; Haber, 1986; Lacey et al., 1989; Shannon et al., 1983).

PURPOSE AND FRAMEWORK

This study evaluated the use of a peer-education program among older adults to provide information and skills to prevent heart disease. The research question was, What effect on residents of a senior housing facility does a peer educator program have on their knowledge of heart disease risk factors, perceived self-efficacy regarding diet, exercise, losing weight, and quitting smoking, and heart disease risk?

Social learning theory served as the framework. This theory looks at ways people change their behaviors, including vicarious experiences (modeling) and verbal persuasion. It proposes that expectations of perceived efficacy determine how much effort people will expend and how long they will persist in the face of obstacles. The stronger the expectations, the more active the efforts (Bandura, 1986).

METHODS

The research followed the nonequivalent comparison group design directed at intact groups of older residents of senior citizen independent housing units. Two intervention sites and two control sites participated. All sites were residences where independent persons age 60 years and older live in their own apartment units. The intervention sites housed approximately 80 and 100 people, respectively. The control sites housed approximately 100 and 125 people, respectively.

Thirty-six residents from one intervention site and 25 from the other completed both the baseline and the four-month follow-up surveys. One resident from each site did not complete the follow-up survey (one refused, one moved).

Seventy residents from one control site and 24 from the other answered both the baseline and four-month follow-up surveys. Four residents from one control site did not complete both surveys (one died, two refused, one moved). All residents from the other control site completed both surveys.

The administration at each intervention site chose a group of potential peer educators, consisting of 8 floor captains and 12 identified leaders. After understanding the purpose and the commitment of peer educator training (classes twice a week for one month, plus two follow-up sessions), 5 of the 8 residents from one group and 9 of the 12 from the other group agreed to participate and completed the program.

Training consisted of eight two-hour sessions on health promotion and the older person, heart disease and its risk factors, hypertension prevention and control, low-fat and -cholesterol diets, low-sodium diets, exercise, stress management, and communication skills. At one-month intervals after the initial training, two follow-up sessions were held on nutrition and smoking cessation.

The peer educators generally attended all of the classes, received a formal certificate of participation by the investigator, and had their names appear in their respective resident newsletters as completing the program and being able to answer questions about the prevention of cardiovascular disease. The educators were encouraged to communicate this information informally to their fellow-residents.

Instruments

The knowledge of cardiovascular health-related diet and exercise behaviors scale (Vega et al., 1987) and seven knowledge questions from the national health interview survey of health promotion and disease prevention (Thornberry, Wilson, & Golden, 1986) made up the scale for knowledge of heart disease risk factors. The tool was scored by determining the number of correct responses for overall knowledge and for the subscales of knowledge of salt, fat, and cholesterol, exercise, and the influence on heart disease of hypertension, stress, and cigarette smoking. The former scale's test-retest reliability was 0.76, with alpha reliability of 0.80.

The self-efficacy scales included a total score for dietary self-efficacy and a score for the subscales of ability to reduce calories, salt, and fat. There was a scale on self-efficacy to exercise regularly. Both tools (self-efficacy for cardiovascular health-related diet and exercise behaviors) were developed by Sallis et al. (1988). A higher self-efficacy score indicated a higher confidence level to change to healthier eating behavior or to exercise regularly. The test-retest reliability for the exercise self-efficacy factor was 0.68; that for the self-efficacy for eating behavior factor ranged from 0.43 to 0.64. The authors believed that these low reliabilities may have reflected some true changes in self-efficacy

over time. The alpha coefficients for internal consistency for the scales ranged from 0.83 to 0.93 (Sallis et al., 1988).

Heart disease risk factor scores were determined by the use of the simplified self-scoring test of heart disease and stroke risk (Farquhar, 1987). It provided (by self-report) a total risk score and rated risk scores for salt intake, fat and cholesterol intake, weight, cigarette smoking, physical activity, and stress. The instrument was used in the Stanford heart disease prevention program. Data on psychometric properties of the instrument are not available at this time (Farquhar, 1987).

Sample

The peer educators were 14 black women between 63 and 85 years of age (mean 70.14 yrs). Their mean number of years of formal education was 9.93 (range 8–14 yrs).

Sixty-one residents in the intervention group and 94 in the control group completed both the baseline and the four-month follow-up surveys (Table 1). A chi-square test on sex, race, and marital status, and a Mann-Whitney U test on age, years of education, and total number of health problems showed no statistically significant differences.

RESULTS

Residents at two intervention sites where peer educators were in residence were asked to volunteer to answer a questionnaire by interview both before the peer educator training program began and again four months after the program began. At approximately the same time, residents at two control sites were asked to volunteer to answer the same questionnaire initially and again in four months.

Since there are problems noted with change score analysis, baseline measures for the dependent variables were assessed to determine if any statistically significant differences existed between the groups. When differences appeared, analysis of covariance (ANCOVA), with the pretest as the covariate, was performed. The variables that differed were knowledge of fat, salt, exercise, and total knowledge; self-efficacy of salt intake and total dietary self-efficacy.

One section of the questionnaire asked 25 questions to test knowledge of cardiovascular disease risk factors. There were eight questions on knowledge of fat and cholesterol, four on knowledge of salt, six on knowledge of exercise and one each on influence of hypertension, stress, and cigarette smoking on heart disease. A change score between baseline and four-month follow-up surveys was determined for each subject on each of the knowledge scales. The mean number of questions answered correctly, and the mean change scores and the significance levels appear in Table 2. The intervention group showed significantly greater increases in overall knowledge of cardiovascular disease ($P=0.006$) and in knowledge of salt ($P=0.005$) than the control group. The other scales showed no significant differences. An ANCOVA test was performed on knowledge of fat

TABLE 1. *Demographics of Residents*

Characteristics	Intervention (n = 61) No.	%	Control (n = 94) No.	%
Sex				
F	55	90.0	75	79.8
M	6	10.0	19	20.2
Race				
Black	45	73.8	60	63.8
White	16	26.2	34	36.2
Marital status				
Married	1	1.6	7	7.4
Separated/divorced	17	27.9	23	24.4
Widowed	27	44.3	49	52.2
Never married	16	26.2	15	16.0
Mean age (yrs) (range)	74.9	(61–96)	75.7	(60–94)
Mean years of education (range)	10.0	(3–15)	10.5	(3–15)
Mean total number of health problems (range)	2.0	(0–7)	2.1	(0–8)

TABLE 2. *Mean Number of Correct Answers and Change Scores Between Baseline and Four-Month Surveys on Knowledge of Heart Disease Risk Factors*

Knowledge	Intervention (n = 61)	Control (n = 94)	P
Fat and cholesterol	3.30	4.11	
Mean change scores	0.30	0.08	NS
Salt	2.14	2.89	
Mean change scores	0.66	0.29	0.005
Exercise	2.08	2.58	
Mean change scores	0.20	−0.06	0.07
Hypertension	0.94	0.93	
Mean change scores	0.00	0.07	NS
Cigarette smoking	0.86	0.87	
Mean change scores	0.07	0.16	NS
Stress	0.89	0.91	
Mean change scores	0.03	0.05	NS
Totals	11.92	14.22	
Mean change score	1.13	0.44	0.006

($P<0.05$), knowledge of salt (NS), knowledge of exercise ($P<0.005$), and total knowledge ($P<0.001$).

The mean baseline scores and the mean change in individual scores for the self-efficacy scales and the significance levels are shown in Table 3. The dietary self-efficacy scores could range from 20 to 100, with a higher score indicating a higher level of confidence to adopt healthier eating behaviors. The exercise self-efficacy scores could range from 11 to 55, with 55 being a high level of confidence to exercise regularly. The range in scores for each of the subscales was 5 to 25, with the higher number indicating a higher confidence to reduce calories, fat, or salt.

The mean change scores on the dietary self-efficacy scale, exercise self-efficacy scale, and each of the dietary subscales (reduction of calories, fat, salt) were statistically significant between groups, with the intervention group having more positive changes. The Mann-Whitney U test showed significance between 0.009 and 0.001. The ANCOVA tests on self-efficacy to reduce salt intake ($P<0.001$) and total dietary self-efficacy scales ($P<0.001$) were also significant.

Nineteen (31.1%) of the 61 respondents in the intervention group and 13 (13.8%) of the 94 in the control group were smokers at the baseline survey. Their mean self-efficacy scores to quit smoking (range 1–5) were 2.89 and 2.77, respectively. Their mean change scores were 0.47 and 0, respectively.

Twenty seven (44.3%) of the intervention group and 50 (53.3%) of the control group reported that they considered themselves overweight. Their mean baseline scores for self-efficacy to lose weight (range 1–5) were 3.63 and 3.70, respectively. The mean change scores were 0.58 and −0.2, respectively. The self-efficacy to lose weight change score differences between groups were significant ($P=0.04$) using the Mann-Whitney U test, with the intervention group showing a more positive change. The self-efficacy to quit smoking change scores were not significantly different ($P=0.36$).

The mean baseline and change scores and significance levels for the intervention and control groups for cardiovascular disease risk are presented in Table 4. Negative change indicated a reduction in risk for developing heart disease. The Mann-Whitney U test showed a statistically significant difference in change scores between the groups for three scales, with the intervention group improving their risk scores. The difference between total risk change scores and the stress risk change scores were statistically significant ($P=0.001$). The fat intake risk change scores were also statistically significant ($P=0.03$). The other risk scores did not show statistical significance.

A follow-up question asked if respondents had heard any information in the past four weeks on cardiovascular disease prevention (reducing calories, fat, or salt; exercising; quitting smoking; losing weight). The respondents could not identify the specific topic but stated whether or not they had heard anything in those areas in general in the past month, and where and from whom. Twenty-six (42.6%) people from the intervention group and four (4.3%) from the control group stated that they heard such information from peers in their residence buildings. Twenty-four (39.3%) from the intervention group and 41 (43.6%) from the control group had heard or seen such information from television, radio, or newspapers. There was a high statistically significant difference between the two groups using the chi-square statistic ($P=0.001$), with the intervention group hearing

TABLE 3. *Mean Baseline and Change Scores for Dietary and Exercise Self-Efficacy Using Mann-Whitney U Tests*

	Intervention (n = 61)	Control (n = 94)	P
Dietary (total)	69.89	76.18	
Mean change scores	8.52	0.75	0.001
Calorie reduction	17.79	18.03	
Mean change scores	2.57	0.96	0.009
Fat reduction	19.14	20.23	
Mean change scores	1.93	−0.39	0.001
Salt reduction	17.65	19.48	
Mean change scores	2.07	−0.17	0.001
Exercise	31.08	31.68	
Mean change scores	5.26	0.80	0.003

TABLE 4. *Mean Baseline and Change Scores for Heart Disease Risk Using Mann-Whitney U Test*

	Intervention (n = 61)	Control (n = 94)	P
Total risk	11.95	11.08	
Mean change scores	−0.60	0.41	0.001
Smoking risk	0.56	0.22	
Mean change scores	−0.07	0.00	NS
Weight risk	1.82	1.64	
Mean change scores	−0.02	−0.02	NS
Salt intake risk	1.32	1.31	
Mean change scores	−0.15	0.05	0.07
Fat intake risk	1.83	1.62	
Mean change scores	−0.22	0.10	0.03
Stress risk	1.91	1.70	
Mean change scores	−0.14	0.19	0.001
Exercise risk	3.67	3.66	
Mean change scores	0.02	0.03	NS

A negative change score represents a more favorable risk status.

more information from their peers than the control group.

DISCUSSION

A statistically significant difference was seen between groups in the cardiovascular disease knowledge change scores for the total tool and for the salt subscale, with the intervention group having greater positive changes than the control group. The other knowledge subscales, including fat, exercise, hypertension, smoking, and stress, showed no significant differences in change scores. The scores for the influence of smoking, hypertension, and stress on heart disease were all very high initially. The mean change scores for fat intake and exercise were both higher in the intervention group, but not statistically significant.

A high statistically significant difference was seen between groups in the dietary, in addition to calorie, fat, and salt reduction, and the exercise self-efficacy change scores, with the intervention group having greater positive changes than the control group. The self-efficacy to lose weight (among those who considered themselves overweight) change scores were higher in the intervention group. The self-efficacy to quit smoking (among the smokers) was not statistically significant between groups. The self-efficacy question asked how sure the respondents were that they could quit smoking completely forever in the next few weeks. The additional words "completely forever" may have influenced their perceived self-efficacy.

The heart disease total risk and the fat intake and stress subscale change scores were reduced in the intervention group compared with the control group. The smoking, body weight, salt intake, and physical activity change scores were not significant between groups. There was a statistically significant reduction in the fat intake risk in the intervention group individual change scores, but no significant increase in their scores for knowledge of fat. A statistically significant increase was noted in knowledge of salt change scores in the intervention group, but no significant reduction in salt risk change scores. The initial salt risk scores showed a low risk and there was less room for change.

The local television news presented a series on cholesterol during the study period. Both groups reported hearing information on heart disease prevention from the media. However, the intervention group change scores for fat intake risk improved significantly more than those of the control group. The decrease in stress risk change scores in the intervention group may be related to the peer educators sharing their newly gained information on relaxation, or to changes in internal or external circumstances at the sites. The investigator was not aware of any such changes.

In general, the self-reported risk behaviors for both groups were initially low on a scale of 0 to 4 except for body weight and physical activity. The findings in this study of favorable health habits is similar to other studies reporting that persons over 60 years of age practiced more positive health behaviors than those under 60 years of age (Belloc & Breslow, 1972; Prochaska et al., 1985).

Social learning theory, the framework for this study, proposes that people change their behaviors through vicarious experiences (modeling) and verbal communications. It states that perceived self-efficacy, together with contextual cues and motivation to obtain a particular outcome, help direct behavior (Bandura, 1986). Self-efficacy to change behavior in diet and exercise was the area that was most highly significant between the groups, with the intervention group increasing their perceived self-efficacy more than the control group. The peer educators in this study were already part of a social network system through which they could communicate information on heart disease prevention and serve as role models.

Generalizations about the effectiveness of this peer-education program on other older persons cannot be made. The peer educators were chosen by site administrators, which could have introduced bias into the study. Potential threats to validity with the nonequivalent control group design (e.g., interaction of selection and history, interaction of selection and maturation, instrumentation, and statistical regression) are acknowledged. The subjects in this study were intact groups, and random assignment was not possible. There was no way to determine if people who agreed to participate were similar or dissimilar to those who refused to participate or to other older individuals in the population.

Recommendations for future study include randomization of as many sites as possible to improve the generalizability of results. Studies of longer duration are also required to determine long-term effects of knowledge, self-efficacy, and risk behaviors. Studies evaluating the effect of risk reduction peer education on high-risk older persons might prove beneficial.

This study adds to the available research on health promotion and disease prevention for older individuals. Similar programs could be implemented in various community agencies, health departments, retirement communities, churches, temples, senior citizen centers, shopping malls, and other areas where the elderly congregate. The peer educator approach is an efficient and practical way to reach older people. It also provides an opportunity for them to participate in volunteer work. Offering the elderly ways to reduce the risks of heart disease could potentially spare them the physical, emotional, and financial burdens of these disorders and their

complications. Research on primary prevention with older citizens should encourage health professionals to provide age-tailored health-promotion and disease-prevention programs.

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