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ABSTRACT

This study sought to determine the effects of a high blood pressure education program for sixth graders on the preventive hypertension health attitudes and behaviors of their parents. Attention was focused on the role of students ("significant others") in affecting parental attitude and behavior changes relating to the three risk factors of smoking, dietary salt, and high blood pressure. Parents of children exposed to a high blood pressure education program served as the experimental treatment group, and parents of sixth graders not participating in the program served as the control group. A relationship was found between the health locus of control attitudes of parents and their perception of the role of "significant others" in fostering preventive health behaviors. A review of the comparisons between the treatment groups indicated that the preventive health actions of parents in the experimental group were different for the three risk factors. Parents in the control group reported significantly less preventive health actions than the treatment group. Demographic factors of age, race, and education of the parents were not found to be significant. (JD)

HYPERTENSION EDUCATION:

IMPACT ON PARENT HEALTH BEHAVIORS

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INTRODUCTION

In the 1970's, the federal government, through its Regional Medical Program agencies, implemented pilot studies to evaluate the magnitude of the hypertension problem in communities throughout the United States. The unchecked spread of high blood pressure in middle aged (35 to 50 years) Americans has resulted in the rapid increase in morbidity and mortality in the most economically productive segment of the American society (Smith, 1977). Filandro (1976) reported that the popular estimate of twenty-three million Americans with hypertension was low, since governmental pilot studies indicated between fifteen and twenty percent of the population screened had elevated readings. The American Heart Association (1978) now estimates twenty-four million Americans have elevated blood pressures and that cardiovascular disease accounts for over one million deaths annually, as well as costing the American economy twenty-eight and a half billion dollars in 1978.

The appalling statistics of hypertension related morbidity, mortality and economic impact indicate that an effective program of preventive hypertension education be disseminated to the American public utilizing strategies effective in fostering preventive hypertension behaviors and attitudes.

It is time to begin organized, coordinated preventive hypertension education programs within the school systems, community, and the home (Freis, 1973). Public pressure and participation in health-related matters is increasing the need for preventive hypertension health education (Freis, 1973). The public is showing an increased interest in

receiving high quality care in all areas of health, and the rising costs of such care have brought about demands for health education as part of the total spectrum of health care services available in the United States (Jones, 1979).

In 1975, a conference of health educators and behavioral scientists at the National Heart, Lung, and Blood Institute defined health education as a process which bridges the gap between health information and health practices. It is obvious that effective health education must be more than just the dissemination of information. Dissemination of information, while important, is only one step in the educational process. Therefore, the goal of preventive hypertension education is behavior reassessment directed toward an increased level of wellness through reduction of harmful living habits that promote hypertension morbidity and mortality (Green, 1976).

To meet the challenge of reducing the incidence of hypertension in the Commonwealth of Virginia, the American Heart Association/Virginia Affiliate contracted with the Health Education Department of the University of Virginia to develop a high blood pressure education program for dissemination into the middle school health curriculum (Grades 6-8). Consequently, the Virginia High Blood Pressure Education Program (VHBPEP) was developed and pilot-tested in the Spring of 1978 at Walton Middle School in Virginia. Revisions in the program's curriculum were made as a result of the pilot-study, and a final form of the program was prepared by the VHBPEP staff under the supervision of Dr. Keith Howell. During August 1978, a High Blood Pressure Education Workshop was held in Charlottesville

and was attended by sixteen teachers from ten middle schools. The selection process permitted two middle schools from each of the five Virginia Health Systems Agencies to be represented. The teachers (health and science) were taught the High Blood Pressure education curriculum during the five-day workshop through a series of lectures and hands-on activities.

During the Fall, 1978, the VHBPEP was taught in twenty-six sixth grade classes. The program's education process included pre and post cardiovascular knowledge tests, blood pressure measurement accuracy tests, and evaluations of the program by the participating teachers. The results of the evaluation process indicated highly significant cardiovascular knowledge gains ($p < .001$) between the pre-test and post-test. The skill test indicated approximately fifty-five percent accuracy (± 4 mm Hh Systolic and Diastolic) after two weeks exposure to the VHBPEP. The results compared quite favorably to the nationally recognized Georgia Heart Association study conducted by Owen (1976).

The VHBPEP study, like the Owen (1974) study lacked one critical evaluation. When VHBPEP developers were asked to provide data which would support the fact that the program was effective in altering adult health behaviors, there was none available. One possible means of anticipating the long range effects of the program as they relate to the health behavior and attitudes of adults is to investigate the impact on parents whose children received the educational information and the blood pressure skill practice.

Three schools were randomly selected from the ten middle schools. The parents of children exposed to the VHBPEP served as the experimental

treatment group, and parents of sixth graders not taught the program served as the control group.

The research presented here measures the impact of a high blood pressure education program on parent preventive health behaviors as they relate to hypertension. The research seeks to answer these major questions:

1. How important are sixth graders functioning as significant others in fostering parental preventive hypertension health behaviors?
2. Will the Health Locus of Control (HLC) of parents exposed to the VHBPEP be significantly different from that of parents in the control group with respect to preventive health attitudes?
3. Will Health Belief Model (HBM) variables show a significant difference between the parent treatment groups with respect to preventive hypertension health behaviors?
4. Will demographic variables such as age, race, sex and education provide a statistical composite of the parental types most likely to take preventive hypertension actions as a result of exposure to VHBPEP via their children as significant others.

Statement of the Problem

Many of the atherogenic traits which provoke atherosclerotic cardiovascular disease appear to have their roots in childhood. Kannel (1976) suggested that preventive management is best begun early in life, and should be viewed as a family affair since the propensity to disease tends to be shared by family members. Although the optimal time to begin prophylaxis during the adult life span is not established, there is evidence to suggest that health education instructional units during school-age years emphasizing preventive hypertension health concepts may effectively support the development of positive health behaviors in later years (Davis, 1973; Owen, 1974; Johnson and Stark, 1978).

Only recently have there been organized attempts by health educators to develop educational strategies which focused on the reduction of cardiovascular disease risk factors of family members (Davis, 1973; Owen, 1976). Kannel (1976) noted that preventive health actions are most successful when presented to the entire family unit where support of the desired behavioral changes by other family members can be effective in manifesting the desired change.

School health educators attempting to modify family cardiovascular disease risk factors, must now identify methods to effectively modify the parents' health behaviors so that health information taught to students is reinforced at home. Since the parents can not come to school to learn the desired preventive health behaviors, it is incumbent upon the school health educator to develop educational strategies which will modify parent preventive health behaviors and attitudes. Research by Owen (1976) has attempted to bridge the gap in which parents and other family members are brought into the educational process by involving the entire family in blood pressure screening by using the children to teach the parents about the dangers of high blood pressure. Owen (1976) reported the family blood pressure measurement sessions conducted by children resulted in parents visiting their physicians who suspected hypertension. The physicians reported an 80 percent confirmation of the children referrals for suspected high blood pressure.

The health educator, attempting to modify parent cardiovascular risk factor behaviors utilizing young students (as significant others), should select behaviors which need to be changed both in the student and the parent. A review of the literature associated with the nine cardiovascular

risk factors identified by the American Heart Association indicates the risk factors of smoking, dietary salt, and high blood pressure to be the most appropriate for introduction to parents by their children in the middle school grades (Owen, 1974; Johnson and Stark, 1978).

Thus this study seeked to determine the impact of a high blood pressure education program for sixth graders on the preventive hypertension health attitudes and behaviors of their parents. The study focused attention on the role of students (as significant others) in effecting parental attitude and behavior changes relating to the cardiovascular disease risk factors of smoking, dietary salt and high blood pressure.

The assessment of the program's impact on preventive hypertension attitudes and behaviors of parents toward the risk factors of smoking, dietary salt and high blood pressure will be through the following variables:

1. Utilization of children as significant others
2. Health Locus of Control
3. Health Belief Model variables:

   -perceived susceptibility of hypertension
   -perceived severity of hypertension
   -perceived barriers of hypertension
   -perceived benefits of hypertension
   -efficacy of treatment
   -general health motivation
   -cardiovascular knowledge

4. Demographic factors of age, race, sex and education.
5. Preventive health behavior self-report.

Significance of the Problem

With current emphasis on the establishment of hypertension education and risk factor control programs (Davis, 1973; Owen, 1976; White, 1978; Johnson and Stark, 1978), this study will make a contribution to knowledge

in the area of program assessment of parent behavior with regard to hypertension risk reduction. This study explored preventive hypertension attitudes and behaviors of parents through the theoretical framework of (a) The Health Belief Model (Becker, et al. 1972), and (b) The Health Locus of Control (Wallston and Wallston, et al. 1976).

The HBM hypothesizes that preventive health behavior is derived principally from two variables. First, the person's psychological state of readiness to take a specific action, as determined by his or her perceived susceptibility to a given pathogen. The state of readiness results in the belief that a perceived course of action will be effective in reducing the perceived threat of the pathogen (Kasl and Cobb, 1966; Rosenstock, 1974). Secondly, the perceived severity of a particular disease condition, and the possibility of restrictions placed on a person's lifestyle may influence his or health action. Therefore, a particular health action undertaken by a person that perceives the severity of the disease to be threatening to his or her economic base, emotional health or physical mobility may be deemed equally effective as a stimulus (Rosenstock, 1974). The H M, however, presents little information on the role of "significant others: as cues to future preventive health action. This study assessed the impact of the role of children in initiating the discussion of hypertension risk factors with parents, and the measurement of parents' blood pressures in motivating parental preventive health attitudes and behaviors.

The Health Locus of Control hypothesizes that preventive health attitudes and behaviors are manipulated by the following variables:

1. External perceived health locus of control suggests the individual is powerless to influence his or her fate, therefore preventive health measures perceived as less effective in altering one's pre-determined health fate;

2. Internal perceived health locus of control suggests the individual believes that fate is determined by his or her own actions. Therefore, preventive health actions are seen as effective in avoiding disease;

3. Powerful others are perceived by the externally controlled individual to be outside his or her control. Thus fate, luck or chance tend to determine one's destiny so preventive health measures are deemed to have little value.

Scotch and Geiger (1963) and Ostfeld and Shekelle (1967) have attempted to link hypertension and health attitudes, but did not find any statistically meaningful or significant relationships. This study explored the health locus of control variables to determine the blood pressure program's impact on parent health attitudes. In so doing, this study provided research in an area that is vital to health education strategists.

The use of the HBM and the HLC provided an assessment of the impact of a program on hypertension. Stamler (1973) notes hypertensive disease is a major public health problem in the United States that is responsible for producing premature sickness, disability and death to millions of Americans. Hypertension is widely prevalent among all strata of the adult population from low, middle to high income, and from all geographic locations in this country (Moss and Scott, 1978). To combat the problem

of rising hypertension rates, the federal government through its National High Blood Pressure Education Department is encouraging the development of education programs. Hypertension education programs are needed for the major segments of the American society ranging from school to the community. Thus, there is a need to determine whether a program presented to sixth graders will alter the preventive health perceptions of their parents toward hypertension.

Significant Others

The role children played in modifying the preventive health behaviors of parents was investigated in this study. Previous research (Kegeles, 1969; Owen, 1976; Aho, 1977) suggested that significant others played a vital role in modifying the health behaviors of others. The present study attempted to expand upon this premise by proposing that children could effectively alter the preventive hypertension health behaviors of their parents. To that end, the children of parents in the experimental group provided information on the risk factors (smoking, dietary salt and high blood pressure) associated with hypertension to their parents during family health discussions, while the parents in the control group did not formally receive such information. To examine the effects of the role of children (as significant others) in modifying the health concepts and behaviors of parents, the following hypothesis is presented:

> Hypothesis 1. There is no difference in the mean scores for treatment groups on the role of significant others in disseminating risk factors (smoking, dietary salt and high blood pressure) information and eliciting behavioral change for hypertension.

Tables 1 thru 4 present the responses of parents to a series of questions which assessed their impressions of the role their children played in providing hypertension risk factors (smoking, dietary salt and high blood pressure) reduction information which modified their preventive health behaviors. As indicated by the data in Table 1, there was a significant difference ($p < .05$) in the perception of the role children played (as significant others) in disseminating health information and eliciting behavioral change between parent treatment groups.

Table 1

t-test Analysis of the Role that Significant Others Played in Modifying Risk Factor Behaviors of Parents

Group	$\bar{X}$	s.d.	d.f	t
Experimental n = 189	.2810	.195	341	4.70*
Control n = 154	.1857	.176		

*$p < .001$

The data in the next three tables provided an insight into the nature and extent of the role children played in modifying risk factor behaviors as perceived by the parents in the treatment groups. Table 2

presents the specific analysis for the risk factor of smoking. Although the total variance for all three risk factors (smoking, dietary salt and high blood pressure) are highly significant, the findings reported in Table 2 indicate significant others did not modify the risk factor of smoking for the treatment groups. Analysis of the role of significant others suggest the amount of explained variance attributable to their actions to reduce the smoking behaviors of parents in the experimental group was not significant when viewed separately.

Table 2

Analysis of Variance for the Modification of the Risk Factor of Smoking by Significant Others for Parent Treatment Groups

Groups	n	Sum of Squares	d.f.	F-Ratio
Experimental to Control	189 154	.172	1	.587

An explanation for the lack of success by significant others in modifying the risk factor of smoking is that this habit may not be amenable to short term cognitive strategies.

The findings for the risk factor of high dietary salt intake in Table 3 indicated that significant others were influential factors in disseminating information and eliciting behavioral changes which modified the health actions of parents in the experimental group.

Table 3

Analysis of Variance for the Modification of the Risk Factor of Dietary Salt by Significant Others for Parent Treatment Groups

Groups	n	Sum of Squares	d.f.	F-Ratio
Experimental to Control	189 154	11.400	1	19.407*

*p < .001

An explanation for the success of significant others in modifying the dietary salt risk factor is provided in research by Blair-West et al. (1970) which reported the taste for salt is acquired rather than perpetuated by some physiologic need. Thus, cognitive health strategies about the dangers of high dietary salt intake and its relationship to hypertension was accepted by parents in the experimental group.

Table 4 presents the findings for the role of significant others in modifying the risk factors of high blood pressure. The results indicate that parents in the experimental group took health actions to modify the risk factor of high blood pressure. Parents in the experimental group reported increased physician contacts, more frequent blood pressure checks, and a desire to stay on anti-hypertension medications (for those that were hypertensives) as a direct result of their child's influence and concern. Owen (1976) and Johnson and Stark (1978) also reported similar results in their studies.

Review of the comparisons between the treatment groups indicated the preventive health actions of parents in the experimental group were significantly different for the three risk factors of smoking, dietary salt and high blood pressure. Therefore, hypothesis one was rejected.

Table 4

Analysis of Variation for the Modiffcation of the Risk Factor of High Blood Pressure

Groups	n	Sum of Squares	d.f.	F-Ratio
Experimental	189			
to		24.826	1	15.981*
Control	154			

*p < .001

2. Will the Health Locus of Control (HLC) of parents exposed to the VHBPEP be significantly different from that of parents in the control treatment group with respect to preventive health attitudes?

The second research question looked at the strength of the relationship between the health locus of control, and the perception of the role of children (as significant others) in fostering preventive health habits for the parent treatment groups. The relationship is stated as follows:

> Hypothesis 2. There is no relationship between the health locus of control scale and the perception of the role of significant others in fostering preventive hypertension health behaviors between treatment groups.

The data for hypothesis two are presented in Table 5. The findings indicated the experimental treatment had some effect on the relationship of significant others and the health locus of control as perceived by parents in the experimental treatment group. Although the correlation is significant, the amount of variance accounted for is minimum. The control group and the experimental group had a similar mean score for the HLC, but the perceived role of significant others in fostering preventive health behavioral changes was significantly less for the control treatment group. Thus, the comparative correlations for the treatment groups indicated a stronger correlation for the experimental treatment group.

Tables 6, 7, and 8 also support the theoretical premise suggested by Langlie (1977) for the association of the Health Locus of Control

with the Health Belief Model. The union of these two models provide a more comprehensive instrument for assessing preventive health attitudes and behaviors more distinctively than other instruments used alone. Table 6 indicates significant others and the health locus of control were the primary factors considered by treatment groups for preventive health actions against the risk factor of smoking.

Tables 7 and 8 suggest the actions taken by the experimental group against the risk factors of high dietary salt intake and high blood pressure were consistent with their scores on the HLC and HBM scales. The position of the HLC for the control group in Tables 7 and 8 suggest that HLC variable did not contribute as much to the explained variance for dietary salt and high blood pressure. These results are consistent with the results reported in Table 5.

In conclusion, hypothesis two is rejected.

Table 5

Pearson Correlation of Health Locus of Control Variables With Significant Others (HBM) for All Parents

Groups	n	r	p	r^2
Experimental	189	-.1600	.03	.026
Control	154	.461	.57	.213

Table 6

Stepwise Multiple Regression Analysis

of HLC and HBM Variables for Smoking

Experimental Group

Step	Variables	Multiple R	R Square	Simple R	F-Ratio
1	Significant Others	.37312	.13922	.37312	30.24495*
2	Health Locus of Control	.38761	.15024	.04391	16.44243

Control Group

1	Significant Others	.48115	.23151	.48115	45.79041**
2	Health Locus of Control	.50016	.25016	.15858	25.18811*

*p < .05
**p < .001

Table 7

Stepwise Multiple Regression Analysis

of HLC and HBM Variables for Salt

Step	Variables	Multiple R	R. Square	Simple R	F-Ratio
Experimental Group					
1	Significant Others	.72801	.53001	.72801	210.87665*
2	Health Locus of Control	.73061	.53379	-.05577	106.48003
Control Group					
1	Significant Others	.74577	.55587	.74557	190.24239*
3	Health Locus of Control	.76749	.58904	-.06225	71.66576**

*p < .05
**p < .01

Table 8

Stepwise Multiple Regression Analysis of HLC and HBM Variables for High Blood Pressure

Step	Variables	Multiple R	R Square	Simple R	F-Ratio
Experimental Group					
1	Significant Others	.85501	.73104	.85501	508.26944*
2	Health Locus of Control	.85927	.73835	-.22117	262.42995*
Control Group					
1	Significant Others	.88501	.78324	.88501	549.24215*
2	Health Locus of Control	.89114	.79413	.02838	80.45381

*p < .05

Health Belief Model

3. Will the Health Belief Model (HBM) variables show a significant difference between the parent treatment groups with respect to preventive hypertension behaviors?

A review of the literature indicates the focus of research on the HBM has been mainly on the variables of perceived susceptibility, perceived severity, perceived barriers and benefits. The present study sought to include other variables of the HBM that were implied but have not been as actively investigated. Thus the additional HBM variables included are efficacy of treatment benefits, knowledge of the disease (in this case hypertension), and general health motivation.

The mean scores on each of the HBM variables for the experimental and control groups were not significantly different.

Demographic Factors and Their Relationship to Preventive Health Actions

4. Will demographic variables such as age, race, sex and education provide a statistical composite of the parental types most likely to take preventive actions as a result of exposure to VHBPEP via their children?

In Table 1 a t-test for the significance of the difference between treatment groups on the perception of the role of significant others (sixth graders) in disseminating preventive hypertension health information yielded highly significant results. Parents in the experimental group perceived the role of significant others to be an influential factor in their decision to take preventive health actions against the hypertension risk factors of smoking, dietary salt and high blood pressure.

Whereas parents in the control group reported significantly less preventive health actions during the same experimental time interval. Table 9 indicates the demographic factor of age has a wide range for treatment groups although the mean ages are similar. Consequently, it was desirable to use the analysis of convariance to see whether the difference in age is sufficient to account for the observed difference in the relationship of observed risk factors and demographic variables.

Table 9

Treatment Groups Demographics

	Experimental (n = 189)	Control (n = 154)
Age	$\bar{X}$ = 38.5 yrs range 27 to 71*	$\bar{X}$ = 37.4 yrs ranges 23 to 55
Race	white 75% black 25%	white 67% black 33%
Sex	female 77% male 23%	female 82% male 18%
Education	38% no high school certificate 62% completed high school 20% indicated college attendance 8% won degrees	43% no high school certificate 57% completed high school 23% indicated college attendance 11% won degrees

* was a grandmother serving as legal guardian

The following hypothesis is presented:

Hypothesis 3. Demographic factors such as age, race, sex and education will not be predictive of parental perception of the role of significant others in fostering parental preventive health actions.

The data in Table 10 for the variable of dietary salt indicate a significant difference ($p < .05$) between treatment groups on the perceived role that significant others (sixth graders) played in fostering preventive health actions against the risk factor of dietary salt. The demographic variable of race was a significant factor ($p < .05$) between treatment groups in predicting parental preventive health actions against high dietary salt intake while controlling for the covariate of age.

Table 10

Multivariate Analysis of Covariance for Dietary Salt and Demographic Factors for all Parents

Variable	beta	d.f.	s.e.	f	p
Treatment Groups (Exp./Con.)		1	.03165	7.3138	.007
Race		1	0.3175	6.1618	.014
Sex		1	.03173	.0185	.462
Education		1	.03152	.2963	.544
Age	-.0379		.0037	.4672	.495

Table 11 presents a breakdown of the means for the demographic factor of race by treatment group. The data indicates that parents in the experimental group who were black were more receptive to the preventive health information given by significant others. Whereas

the fathers (both black and white) in the control group took no action to reduce the risk factor of high dietary salt intake.

Table 11

Treatment Group Means for the Demographic Factor

Factor of Race with Dietary Salt

Race	Sex	Education	Experimental/Control
1. Black	Mother	with ≥ H.S. Grad.	.42857/.22727
2. Black	Father	with ≤ H.S. Grad.	.37500/0
3. Black	Father	with ≥ H.S. Grad.	.37550/0
4. Black	Mother	with ≤ H.S. Grad.	.36364/.09524
5. White	Mother	with ≤ H.S. Grad.	.30303/.12857
6. White	Mother	with ≥ H.S. Grad.	.2800/.09365
7. White	Father	with ≥ H.S. Grad.	.18000/0
8. White	Father	with ≤ H.S. Grad.	.07143/0

In summary, since the variance accounted for by the covariate (age) is not significant between treatment groups, one may conclude the difference in preventive health action taken by the treatment groups for the variables of dietary salt and race may be due to the experimental treatment. Thus hypothesis three is rejected for variable of dietary salt.

The data in Table 12 reveals that the multivariate test of equality of mean vectors was significantly ($p < .05$) different between treatment groups for the main effects of Race and Education in reference to preventive high blood pressure behaviors of parents. In addition, Table 12 also reveals the experimental treatment resulted in two significant interactions ($p < .05$) between (1) Race, Sex, and Education, and (2) Race, Sex and Treatment Groups (Exp./Con.).

Table 12

Multivariate Analysis of Convariance for High Blood Pressure and Demographic Factors for All Parents

Variable	beta	d.f.	s.e.	f	p
Treatment Groups (Exp./Con.)		1	.02029	3.8134	.052
Race		1	.02034	4.2169	.041
Sex		1	0.2033	.2288	.633
Education		1	.02020	5.6221	.018
Race by Sex by Tx. Grp		1	.02020	4.6466	0.32
Age	.69605		.00235	3.0259	.83

The data in Table 13 indicates that the demographic factor of race was a common factor for three of the four highest group means. Education also served as a common factor in that four of the five highest group means indicated that parents with less than a high school certificate were

most receptive to high blood pressure risk reduction information by significant others. In addition, Table 13 also reveals two significant interactions: first, the demographic factors of race, sex and education suggest that black mothers with less than a high school certificate are most receptive to the high blood pressure risk education information, and secondly, the demographic factors of race and sex by treatment groups indicates black mothers in the experimental groups reported the greatest impact on their preventive health behaviors by parents.

Table 13

Treatment Group Means for the Risk Factor of High Blood Pressure With the Demographic Factors of Race, Sex and Education

Race	Sex	Education	Experimental/Control
1. Black	Mother	with ≤ H.S. Grad.	.31818/.09524
2. Black	Mother	with ≥ H.S. Grad.	.31429/.11818
3. White	Mother	with ≤ H.S. Grad.	.29091/.18857
4. Black	Father	with ≤ H.S. Grad.	.25000/0
5. White	Father	with ≤ H.S. Grad.	.20000/.07500
6. White	Father	with ≥ H.S. Grad.	.18400/.05000
7. White	Mother	with ≥ H.S. Grad.	.15733/.07500
8. Black	Father	with ≥ H.S. Grad.	.15000/.06667

In summary, since the variance accounted for by the covariate (age) is not significant between treatment groups, one may conclude the difference in preventive health action taken by the treatment groups for

the risk factor of high blood pressure in reference to the demographic factors of race and education was due to the experimental treatment. Thus hypothesis three was rejected for the variable of high blood pressure.

The analysis of Table 14 reveals that the multivariate test of equality of mean vectors was not significantly ($p < .05$) different between treatment groups for the main effects of demographic factors in reference to preventive smoking health behaviors of parents. However, Table 14 indicates a significant interaction ($p < .05$) occurred between treatment groups for the demographic factors of Sex and Education for the variable of smoking.

Table 14

Multivariate Analysis of Convariance for Smoking and Demographic Factors for All Parents

Variable	beta	d.f.	s.e.	f	p
Treatment Groups (Exp./Con.)		1	.01477	1.7075	.192
Race		1	.01481	3.3088	.690
Sex		1	.01480	1.1903	.276
Education		1	.01471	2.1025	.148
Sex by Education		1	.01469	4.6898	.031
Age	.05245		.00171	.8964	.344

Table 15 reveals the reason that race approaches significance was due to the fact that three of the four highest group means were composed of black parents. The interaction of the demographic factors of sex and education reveal that fathers were most receptive to the smoking information. The top two group means also indicate that fathers with less than a high school certificate reported the highest risk behaviors modification for the variable of smoking.

Table 15

Treatment Group Means For the Risk Factor of Smoking With the Demographic Factors of Race, Sex and Education

Race	Sex	Education	Experimental/Control
1. Black	Father	with ≤ H.S. Grad.	.54167/.50000
2. White	Father	with ≤ H.S. Grad.	.42857/.33333
3. Black	Father	with ≥ H.S. Grad.	.41667/.27778
4. Black	Mother	with ≥ H.S. Grad.	.40476/.37879
5. Black	Mother	with ≤ H.S. Grad.	.40909/.38095
6. White	Mother	with ≥ H.S. Grad.	.36000/.38194
7. White	Mother	with ≤ H.S. Grad.	.35354/.29524
8. White	Father	with ≥ H.S. Grad.	.30667/.38889

In summary, since the variance accounted for by the covariate (age) is not significant between treatment groups, one may conclude the difference in preventive health action taken by the treatment groups

for the risk factor of smoking in reference to the demographic factors of sex and education was due to the experimental treatment. Thus hypothesis three was rejected for the variable of smoking.

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