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□**Original Article**□

Factors Associated with Attendance in a Nutrition Education Program for Hyperlipidemic Patients*

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ABSTRACT

This study was conducted to examine factors associated with attendance in a hyperlipidemia nutrition education program among 101 hyperlipidemic outpatients(38 males, 63 females) at Samsung Medical Center. We employed the Health Belief Model(HBM) as the theoretical framework. The individual nutrition education and counseling program was scheduled with 4 half-hour sessions in 2 to 4 weeks intervals. Upon initiation of the program, a trained dietitian surveyed HBM constructs and psychosocial factors. The following were included : perceived susceptibility to cardiovascular disease(CVD), perceived severity to CVD, perceived benefits to diet modification, perceived barriers to persistence in maintaining diet therapy, and self-efficacy and social support from family. Sociodemographic data, health factors, stress level, nutrition knowledge, and 24-hour dietary recall behavior were also surveyed. All these data were analyzed according to the number of nutrition sessions attended. The subjects were 55.9 ± 9.4 years old, and 24.6 ± 2.7 kg/m^2. Sociodemographic factors were not associated with the number of nutrition sessions attended. HBM constructs and psychosocial factors were significantly associated with the number of nutrition sessions attended, according to Spearman correlation coefficients. From stepwise regression analyses using HBM constructs as independent variables, perceived barriers to persistence in maintaining diet therapy(negative) proved to be the strongest predictors for the number of nutrition sessions attended(partial R^2 = 72.3%), followed by perceived severity to CVD, and self-efficacy(model R^2 = 76.6%). The findings indicate that HBM constructs and psychosocial factors were closely associated with patient attendance. It suggests that information and guidance to minimize patients' perceived barriers to diet therapy might help to improve patients' adherence to scheduled appointments in nutrition education programs. (*J Community Nutrition* 3(1) : 21~29, 2001)

KEY WORDS : hyperlipidemia · nutrition education · attendance · health belief model · perceived barriers · perceived benefits.

Introduction

Recently, researchers have used theoretically derived constructs to understand the determinants of patients' health-maintenance behaviors and intentions, which are critical for the development of effective intervention programs. The Health Belief Model(HBM) was proposed in the 1960s as a framework for exploring why some people who are free of illness take precautions to avoid illness, while others fail to take precautions(Rosenstock et al. 1988). Variables affecting predisposition to take precautions include individual recognition of threat to personal health and the conviction that the benefits of taking action to protect health outweigh the barriers that will be encountered. Beliefs about personal susceptibility and the seriousness of a specific disease combine to produce the degree of threat perceived for a particular disease. Perceived susceptibility reflects individuals' feelings of personal vulnerability to a specific health problem. Perceived severity of a given health problem can be judged either by the degree of emotional anxiety created by the thought of having a disease or by the medical/clinical or social difficulties that individuals believe a given

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health condition would create for them. Perceived benefits are beliefs about the effectiveness of recommended precautions in preventing a health threat. Perceived barriers are perceptions concerning the potential negative aspects of taking precautions such as expense, danger, unpleasantness, inconvenience, and time required. These beliefs work together to determine the nature of precautions taken. Thus, a patient who is positively motivated towards health, and perceives a disease as threatening, is more likely to engage in threat-reducing behavior than someone who lacks such motivation(Pender 1996). Modifying factors, such as demographic and sociopsychologic factors, indirectly affect precautionary tendencies, through their relationship with perception of threat(Strecher & Rosenstock 1997).

Several studies have investigated HBM and intervention program appointment-keeping for implementation of disease prevention. Mirotznik et al.(1998) found that HBM constructs were closely associated with scheduled appointment-keeping in the management of a chronic condition. Jones et al.(1991) also showed that intervention to increase perceptions of disease severity and susceptibility assisted patients in schedule adherence. As these studies have demonstrated, HBM constructs can explain individual preventive health behavior and intention. However, the model has not been applied to predicting attendance in a nutrition education program. Utilizing the model in a nutrition education program for hyperlipidemia patients is the subject of this study.

Hyperlipidemia is one of the major risk factors for cardiovascular disease(CVD), which is the leading cause of mortality in Korea(Korea National Statistical Office 2000). Clinical management of hyperlipidemia currently utilizes pharmacological and nonpharmacological approaches. The principal nonpharmacological therapies are centered on modification of lifestyle factors. Nonpharmacological therapies that may have a clinically important influence on the serum lipid profile include the following : low fat diet, loss of excess body weight, increased physical activity, and smoking cessation (NCEP 193). Among these nonpharmacological therapies, dietary intervention is central(McDonald et al. 1998).

Effective dietary management depends on patients' long-term adherence to a treatment plan. Effecting such adherence is one of the most challenging aspects in implementation of any intervention program. Although patients initially enroll in health intervention programs, there are many instances of erratic participation and dropouts. Studies have shown that active participation in health promotion programs is associated with increased program benefits(Clifford et al. 1991). Adherence to dietitians' advice is the first step in successful implementation of treatment. Accordingly, there is a need to determine which factors influence dropout rate.

The purpose of this study was to identify factors associated with attendance in a nutrition education program for hyperlipidemic outpatients, in order to improve scheduled appointment-keeping. HBM constructs were applied to aid in understanding and predicting patients' attendance behavior.

Subjects and Methods

1. Research participants

The study was conducted in an outpatient clinic at Samsung Medical Center in 1999 and 2000. Hyperlipidemic patients who met specific criteria were invited to participate in a Hyperlipidemia Nutrition Education Program. Patients whose total cholesterol level was over 220mg/dl were admitted into the study. Patients were excluded from the study for the following reasons : if they were involved in another study, if they had complications including diabetes and/or thyroid disease, if they were on a special diet, pregnant, or breastfeeding infants, or if they had psychiatric problems likely to interfere with adherence to the study protocol.

Medication and nutrition education experience were not considered. One hundred and one patients enrolled in the program. All participants provided written informed consent, and the Human Research Ethics Committee of the Samsung Medical Center approved the study.

2. Study design

When patients enrolled in the program, a dietitian descriptively explained the program schedule and ad-

ministered a structured questionnaire about socioeconomic background, health behavior, HBM constructs, self-efficacy, social supports, and daily energy and nutrient intake using the 24-hour dietary recall method. The Nutrition Education Program was carried out by one trained dietitian. It consisted of 4 half-hour sessions of individualized education and counseling, which was tailored according to patients' needs in 2 to 4 weeks intervals. Education contents included main points of choosing low cholesterol food and low saturated fat diet, cooking skills, and dining out. Attendance was taken at each session.

3. Variables

Health Belief Model(HBM) constructs were measured using five-point Likert scales(strongly agree = 5 through strongly disagree = 1). Questionnaire items were based on other investigators' operationalization of the dimensions of the HBM(Brock & Beazley 1995 ; Kloeblen & Batish 1999). The perceived susceptibility construct(range 5 – 25) was measured by summing subject response to five statements, with a higher score reflecting higher perceived risk for acquiring CVD or complications. The perceived severity construct(range 5 – 25) was measured similarly, with a higher score representing greater perceived seriousness of hyperlipidemia. The perceived benefits construct(range 6 – 30) was measured by summing subject response to six statements, with a higher score reflecting greater perceived advantages to following a low cholesterol, low saturated fat diet. The perceived barriers construct(range 6 – 30) was measured in the same manner, with a higher score indicating greater perceived costs in following diet therapy.

The self-efficacy construct(range 9 – 45) was measured by summing subject response to nine statements, with a higher score representing greater confidence in one's ability to follow diet therapy. The social support construct(range 3 – 15) was measured using three statements, with a higher score representing greater support from family in following diet therapy. Stress level was surveyed with a Stress Warning Signal Inventory (Benson & Stuart 1992) 5-item questionnaire, which was rated on a 5-point Likert scale from 'Always'(4) to 'Hardly ever'(0). The score ranged 0 to 20. Concern for consuming low cholesterol food was measured using one question. Nutrition knowledge score was surveyed using the sum of 10 yes/no questions answered correctly.

Anthropometric and clinical data were adopted from up-to-date hospital records when enrolled in the program. The following were included : height, weight, systolic and diastolic blood pressure, fasting plasma levels of total cholesterol, high-density lipoprotein(HDL)-cholesterol, and triacylglycerol. To assess nutrient intake, food consumption was determined using the 24-hour recall method. A food model was used to help estimation of portion size. Daily energy, fat, and cholesterol consumption were analyzed using a food composition table(The Office of Rural Development 1996 ; USDA 1999).

4. Data analysis

Data analysis was performed with the SAS statistical software(ver 6.12, SAS Institute, Cary, NC). Values are expressed as percentage and number for categorical variables, and as mean and standard deviation for continuous variables. The non-parametric Kruskal-Wallis k-sample test was used to assess the differences of mean levels of continuous variables according to the number of nutrition sessions attended. The Mantel-Haenszel chi-square test was used to compare categorical variables. A P-value of < 0.05 was considered to be significant. Relations between the number of nutrition sessions attended and sociodemographic factors, HBM and related psychosocial constructs were analyzed by Spearman correlation coefficients and Kendall Tau-b correlation coefficients. Stepwise multiple regression analyses were performed to assess the independent effects of HBM constructs and related psychosocial constructs on the number of nutrition sessions attended. Variables which showed a significance level less than 0.10, entered into the model. The internal consistency reliability of HBM constructs and psychosocial measures was assessed using Cronbach's alpha.

Results

1. Characteristics of the subjects

Subjects' general characteristics categorized according

to the number of nutrition sessions attended are shown in Table 1. One hundred and one adults(male : 38, female : 63) participated. The age of subjects ranged from 31 to 79 years, with a mean of 55.9 years. Mean education duration was 12.7 years and 33.7% of the subjects had jobs. Around 30 percent of subjects took medication, and 28.8% of them had experience with nutrition education. Their mean daily energy intake was 1732kcal, with 46g of fat and 299 mg of cholesterol intake.

The anthropometric and clinical characteristics of the subjects are presented in Table 2. Mean body mass index(BMI) was 24.6 ± 2.7kg/m^2. Using the World Health Organization Asian Pacific Region cut-off values(2000) – which have recommended cut-off points for obesity BMI ≥ 25kg/m^2 – it was determined that 36.6% of the subjects were obese. These guidelines were used as indicative of elevated levels of risk factors and were associated with a higher morbidity and mortality from degenerative diseases such as CVD.

Table 1. General characteristics of the subjects

Variables	All	Number of sessions attended			
		1	2	3	4
N	101	59	15	14	13
Male : Female	38 : 63	21 : 38	2 : 13	8 : 6	7 : 6
Age	55.9 ± 9.4	57.5 ± 8.7	56.1 ± 9.9	52.0 ± 9.2	53.0 ± 11.3
Education(yrs)	12.7 ± 3.4	12.4 ± 3.5	11.5 ± 3.5	14.9 ± 1.9	13.2 ± 3.2
Monthly income(10,000 won/M)	250.3 ± 118.3	281.2 ± 143.0	240.0 ± 104.5	262.0 ± 98.3	212.0 ± 65.5
Job status	16(33.7%)	16(27.1%)	5(33.3%)	8(57.1%)	5(38.5%)
Current smoking	13(12.9%)	10(16.9%)	0(0.0%)	1(7.1%)	2(15.4%)
Alcohol drinking	35(34.7%)	20(33.9%)	4(26.7%)	5(35.7%)	6(46.2%)
Regular exercise	58(57.4%)	30(50.9%)	8(53.3%)	9(64.3%)	11(84.6%)
Medication	30(29.7%)	17(28.8%)	3(20.0%)	3(21.4%)	7(53.9%)
Previous nutrition education	18(17.8%)	8(13.6%)	4(26.7%)	4(28.6%)	2(15.4%)
Daily energy intake(kcal)	1732.1 ± 399.1	1702.9 ± 118.3	1797.1 ± 547.1	1734.4 ± 435.8	1737.8 ± 335.8
Fat(g)	46.0 ± 20.3	44.9 ± 19.8	44.4 ± 22.1	51.3 ± 20.4	45.8 ± 20.9
Energy from fat(%)	24.8 ± 7.8	24.7 ± 8.2	22.5 ± 8.0	27.7 ± 5.6	25.0 ± 8.3
Cholesterol(mg)	299.0 ± 179.8	302.3 ± 196.8	309.3 ± 176.3	300.7 ± 187.1	276.1 ± 138.4

Mean ± SD, N(%)
All variables are not significantly different($p > 0.05$) by the number of sessions attended, according to Kruskal-Wallis k-sample test or Mantel-Haenszel Chi-Square test

Table 2. Physical and clinical characteristics of the subjects

Variables	All	Number of sessions attended			
		1	2	3	4
BMI(kg/m^2)	24.6 ± 2.7	24.9 ± 2.9	24.9 ± 2.5	23.5 ± 1.8	23.9 ± 2.5
Prevalence of obesity (BMI ≥ 25kg/m^2)	37(36.6%)	24(40.7%)	7(46.7%)	2(14.3%)	4(30.8%)
Waist to hip ratio	0.87 ± 0.05	0.88 ± 0.05	0.87 ± 0.05	0.88 ± 0.06	0.87 ± 0.04
Prevalence of upper obesity (M : WHR ≥ 0.95, F : WHR ≥ 0.85)	32(31.7%)	19(32.2%)	7(46.7%)	3(21.4%)	3(23.1%)
Systolic blood pressure(mmHg)	134.9 ± 18.3	136.2 ± 19.5	131.5 ± 16.0	135.1 ± 17.2	133.2 ± 17.2
Diastolic blood pressure(mmHg)	83.2 ± 13.6	84.8 ± 13.2	78.9 ± 17.7	82.9 ± 13.9	80.8 ± 9.9
Total Cholesterol(mg/dl)	251.9 ± 38.4	255.2 ± 35.8	239.1 ± 25.1	250.9 ± 29.2	252.9 ± 63.3
HDL-cholesterol(mg/dl)	55.7 ± 16.7	55.2 ± 17.2	56.4 ± 18.4	55.5 ± 14.9	57.2 ± 16.4
LDL-cholesterol(mg/dl)	165.9 ± 38.8	171.2 ± 32.5	148.5 ± 38.3	162.3 ± 21.4	165.4 ± 69.3
Triacylglycerol(mg/dl)	196.0 ± 126.6	203.9 ± 136.1	192.7 ± 146.7	160.8 ± 53.9	200.1 ± 120.8

Mean ± SD, N(%)
All variables are not significantly different($p > 0.05$) by the number of sessions attended, according to Kruskal-Wallis k-sample test or Mantel-Haenszel Chi-Square test

Waist-to-hip ratio(WHR) was 0.87 ± 0.05. Using WHR above 0.95(male) and 0.85(female) as the measure for an upper-obesity high-risk group, 31.7% of the subjects were placed in this category. The mean levels of blood pressure were 134.9 ± 18.3mmHg for systolic and 83.2 ± 13.6mmHg for diastolic blood pressure. The mean plasma lipid levels were 251.9 ± 38.4mg/dL for total cholesterol, 55.7 ± 16.7mg/dL for high density lipoprotein(HDL)-cholesterol, 165.9 ± 38.8mg/dL for low density lipoprotein(LDL) cholesterol, and 196.0 ± 126.6mg/dL for triacylglycerol, respectively. Variables did not significantly differ relative to the number of sessions attended, according to Kruskal-Wallis k-sample test.

2. Characteristics of the HBM constructs and related psychosocial factors

The ranges and means of the HBM constructs and related psychosocial variables are presented in Table 3. The internal consistency reliability, assessed using Cronbach's alpha, ranged from 0.737 to 0.859. Several studies evaluating the psychometric properties of various operationalizations of the dimensions of the HBM have reported similar reliability coefficients(Brock & Beazley 1995 ; Mirotznik et al. 1995).

3. Correlations with the HBM constructs, self-efficacy, social support, and the number of nutrition sessions attended

To assess the relation between the number of nutrition education sessions attended, subjects' sociodemographic variables, and the HBM constructs, we calculated the Spearman correlation coefficients and Kendall Tau-b correlation coefficients(Table 4). There were no significant correlations between age, obesity index, years of education, monthly income, or blood lipid levels, with the number of nutrition education sessions attended, except LDL-cholesterol level which showed significant negative correlation. The HBM constructs were strongly correlated with the number of nutrition sessions attended. Self-efficacy and social support, which are important psychosocial factors, were also significantly associated, while the nutrition knowledge score was not significantly correlated.

Each item of perceived susceptibility to CVD and perceived severity of CVD was positively correlated with the number of nutrition sessions attended(Table 5). Items of perceived benefits in keeping to diet therapy also exhibited positive correlation with the number of nutrition sessions attended, except one statement "My family would be happy if I keep to diet therapy", which was not significantly associated. Perceived barriers were negatively associated, but the item "I don't know enough about what foods are low in cholesterol" was not significantly associated(Table 5).

Table 6 shows correlation coefficients between self-

Table 3. The health belief model constructs and related factors

Variables	# of items	Cronbach alpha	Range		Mean ± SD
Perceived susceptibility	5	0.835	5	25	15.5 ± 4.2
Perceived severity	5	0.859	5	25	20.6 ± 3.2
Perceived benefits	6	0.850	6	30	18.4 ± 4.2
Perceived barriers	6	0.752	6	30	23.5 ± 4.0
Self-efficacy	9	0.737	9	45	29.8 ± 5.3
Social support	3	0.821	3	15	7.9 ± 3.4
Stress	5	0.813	0	20	4.8 ± 3.4
Consideration for low cholesterol food	1		1	3	2.1 ± 0.8
Nutrition knowledge score	10		1	10	5.6 ± 1.9

Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, social support : strongly agree (5) through strongly disagree (1). Stress level : always (4) to hardly ever (0)

Table 4. Correlation coefficients with the numbers of nutrition education sessions attended

	Spearman coefficients	Kendall Tau b coefficients
Age	-0.192	-0.151
Body mass index	-0.185	-0.148
% Ideal body weight	-0.190	-0.150
Waist to hip ratio	-0.041	-0.028
Education years	0.138	0.120
Monthly income	-0.165	-0.132
Systolic blood pressure	0.031	0.020
Diastolic blood pressure	0.107	0.080
Total cholesterol	0.093	-0.072
HDL-cholesterol	0.062	0.054
LDL-cholesterol	0.244*	0.195*
Triacylglycerol	0.036	-0.023
Stress score	0.223	0.175*
Consideration for low cholesterol food	0.209*	0.185*
Nutrition knowledge score	0.051	0.040

* : $p<0.05$, *** : $p<0.001$

Table 5. Correlation coefficients with the numbers of nutrition education sessions attended, and perceived susceptibility, perceived severity, perceived benefits and barriers

Variables	Spearman	Kendall Tau b
Perceived susceptibility	.491***	.407***
If I have a high cholesterol diet, it would induce severe hyperlipidemic status	.195*	.171*
- Without diet therapy, I could get CVD easily	.611***	.566***
- Someday I could get CVD, because of hyperlipidemia	.612***	.554***
- If I don't treat hyperlipidemia, I could get CVD earlier	.234*	.204*
- I could be hyperlipidemic without my even knowing it	.221*	.192*
Perceived severity	.422***	.344***
Having hyperlipidemia is a very serious condition	.616***	.556***
- It would be very difficult to treat hyperlipidemia	.336***	.312***
It would be very expensive to treat hyperlipidemia	.362***	.328***
- Having hyperlipidemia would be an obstacle in doing social activities	.308**	.282**
- Complications of hyperlipidemia are severe and could even result in death	.352***	.320***
Perceived benefits	.503***	.404***
- Keeping diet therapy would reduce blood cholesterol levels	.659***	.599***
- My family would be happy if I keep diet therapy	.194	.166
- Having low cholesterol diet could make me healthier	.334***	.290***
- Diet therapy could prevent CVD	.339***	.298***
- Diet therapy could save me expense in treating hyperlipidemia	.254*	.222*
- Keeping diet therapy could make me feel better	.400***	.340***
Perceived barriers	-.863***	-.739***
- Diet therapy would be expensive	-.886***	-.780***
- I don't know enough about what foods are low in cholesterol	.048	.043
I don't like most foods that are low in cholesterol	-.953***	-.905***
It would take too much time to change my diet habit	-.838***	-.788***
- It would be too difficult to change diet to low in cholesterol	-.874***	-.770***
- My family would dislike the changes in my diet	-.224*	-.172

* : p<0.05, ** : p<0.01, *** : p<0.001

Table 6. Correlation coefficients with the number of nutrition education sessions attended, and self-efficacy and social support

Variables	Spearman	Kendall Tau b
Self-efficacy	.554***	.461***
- I never overeat	.608***	.549***
- I don't have high-cholesterol foods	.537***	.472***
- I don't have animal fat	.592***	.540***
- I don't drink alcohol too much	.086	.088
- I eat lots of vegetables	.145	.124
- I eat lots of fruits	.098	.085
- I eat less salty food	.034	.029
- I don't eat snack	.257**	.224**
- I try to drink fruit juice instead of carbonated beverage	.145	.119
Social support	.459***	.370***
- My family encourags me not to have high fat food	.267**	.230**
- My family would support my diet changes to low in cholesterol	.585***	.521***
- My family would join my diet therapy	.282**	.238**

* : p<0.05, ** : p<0.01, *** : p<0.001

efficacy and social support and the number of nutrition sessions attended. From 9 items of self-efficacy, 4 items were positively correlated, while others were not significantly correlated. The items, which showed significant correlations, were "I never overeat", "I don't have high-cholesterol foods", "I don't have animal fat", and "I don't eat snack". In social support from family, all items were significantly correlated with the number of nutrition sessions attended.

Table 7 represents the results for stepwise regression analyses for the number of nutrition education sessions attended with the HBM constructs, and related psychosocial factors. When using the HBM constructs as independent variables in the model, perceived barriers(negative) were the strongest predictor for the number of nutrition education sessions attended(partial $R^2 = 72.3\%$), followed by perceived severity of CVD and self-efficacy(model $R^2 = 76.6\%$).

Table 7. Stepwise regression analysis associated with the number of nutrition education sessions attended

Variables	Parameter estimate	SE	F-value	P	Cumulative R^2
Independent variables : Health belief model constructs					
Perceived barriers	0.194	0.017	257.961	0.001	0.723
Perceived severity	0.050	0.018	11.051	0.001	0.751
Self-efficacy	0.025	0.013	6.110	0.015	0.766

Independent variables : Health Belief Model Constructs included as follows : Perceived susceptibility score : perceived severity score, perceived benefits score, perceived barriers score, self efficacy score, social support score, stress score, and nutrition knowledge score. Variables which showed a significance level less than 0.10, entered into the model.

Discussion

These results show that patient perceptions about disease and health promotion are closely associated with attendance in the hyperlipidemia nutrition education program. The HBM constructs, such as perceived susceptibility to CVD, perceived severity to CVD, perceived benefits, perceived barriers to diet modification, self-efficacy and social support seem to be strong predictors that help to explain hyperlipidemic outpatients' adherence to program schedules. Lower perceived barriers were the most important predictor for attendance. In accordance with our results, Janz & Becker(1984) concluded that perceived barriers are the most powerful of the HBM dimensions in explaining or predicting various health behaviors. However, nutrition knowledge, stress level, sociodemographic factors, or blood lipid profiles do not have any significant association with outpatients' nutrition education attendance. These modifying factors are known to affect precautionary tendencies indirectly through their relationship with perception of threat(Strecher & Rosenstock 1997).

The HBM is one of the most widely used public health theoretical frameworks. It could explain health behavior modifications and could function as the foundation for health education intervention(Strecher and Rosenstock 1997). The model assumes a value expectancy approach, postulating that behavior depends on the expected outcomes of an action and the value an individual places on those outcomes. Many researchers have successfully applied the model's construct in explaining a variety of preventive health behaviors(Irwin et al. 1993 ; Jones et al. 1991 ; Mirotznik et al. 1998). From the results it seems plausible to suggest that HBM constructs could be useful in developing strategies for improving patient schedule-adherence in nutrition education programs.

Strong agreement responses to perceived susceptibility to CVD questionnaire items, such as "Without diet therapy, I could get CVD easily" or "Someday I could get CVD, because of hyperlipidemia", showed close correlation with the number of nutrition sessions attended in our study. Therefore, if a patient's belief that his disease would worsen in the future and would result in a series of specific untoward consequences was stronger, then he/she would attend the nutrition education session more regularly.

Perceived severity was positively correlated with the number of nutrition sessions attended. Thus if a patient worried about having a disease and believed the disease to be serious, problematic, and disruptive, then he/she would attend the nutrition sessions more regularly. Mirotznik et al.(1998) showed that perceived severity was significantly associated with the scheduled clinic appointment keeping.

Perceived benefits were also positively correlated with the number of nutrition sessions attended. Accordingly, if a patient believed that proper diet modifications were helpful in controlling hyperlipidemia, and preventing cerebrovascular disease or heart disease, and then he/she would attend more.

In contrast with other HBM constructs, perceived barriers were negatively correlated with the number of sessions attended. Therefore if a patient were strongly concerned with the cost of diet therapy, low food preference, and/or lack of time, then it would be easy to dropout.

Self-efficacy was also significantly correlated with the number of nutrition education sessions attended. From 9 self-efficacy statements, those that related to

high fat and cholesterol intake had significant associations with the number of sessions attended, while others related to a healthy diet revealed no significant associations. Perceived self-efficacy, first proposed by Bandura(1977), is defined as one's confidence in accomplishing a certain level of performance in executing a specific behavior. A lot of studies confirm the importance of self-efficacy in the explanation and prediction of behavior. For example, self-efficacy has been identified as a significant predictor of exercise level(McAuley & Jacobson 1991) and self-breast examination(Seydel et al. 1990).

Social support can be defined, as the subjective feeling of being accepted, loved, esteemed, and/or valued for oneself. Throughout the social support literature, various types of support are proposed, such as emotional support, instrumental aid, informational support and affirmation(Pender 1996). In this paper, emotional support from family was measured – such as encouragement and empathy – and it showed significant positive correlations with the number of nutrition sessions attended. Therefore, it may be suggested that emotional support from family is an important factor in improving attendance in such programs. In most instances, the family constitutes the primary support group. In order to provide appropriate support, families should be sensitive to the needs of family members, should establish effective communication, should respect the needs of family members, and should establish expectations of mutual help and assistance(Pender 1996).

In this study, adherence to nutrition education program recommendations was measured in terms of number of nutrition education sessions attended. Attendance is known to have an apparent objectivity and face validity as a measure of adherence(Mirotznik et al. 1995).

This paper focused on hyperlipidemic outpatients' appointment keeping behavior during scheduled nutrition education sessions. Therefore, it did not report outpatients' compliance behavior and adherence to dietitian's advice. Future articles will detail the results of investigation with reference to adherence to diet modification, utilizing the HBM approach.

Conclusion

The results of this study indicate that HBM constructs – such as patients' perceived susceptibility, perceived severity of cardiovascular disease, perceived benefits and barriers to diet modification, self-efficacy, and social support from family – significantly influenced nutrition education program appointment keeping behavior in a nutrition education program for hyperlipidemic outpatients. Additionally, it was demonstrated that patients' sociodemographic background did not significantly influence program schedule adherence. Therefore, strategies to improve patient attendance in such programs should focus on perception and psychosocial factors. These results also suggest that information and guidance to minimize patients' perceived barriers to diet therapy might be necessary to improve patients' program schedule adherence.

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