Research article

Patient compliance: Challenges in management of cardiac diseases in Kuala Lumpur and Perak, Malaysia

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ABSTRACT

Background

The objective of this study was to investigate the degree of compliance among cardiac patients who attend the health facilities in Kuala Lumpur and Perak, Malaysia. The reasons for non-compliance and recommendations from healthcare professionals were also evaluated.

Method

A cross-sectional study of 400 patients and 100 healthcare professionals was carried out. This study utilizes variables on external factors and internal factors as the measurement tools. The questionnaire which consists of Morisky self-reported medication adherence questions was administered to patients and causes for non-compliance sought. Questionnaire for healthcare professionals was used to determine strategies that can improve compliance rate.

Results

The study revealed a 15.8% of high adherence rate, 54.3% of moderate adherence rate and 30% of poor adherence to cardiovascular disease medications. The chi-square tests showed the strong association between dependent and independent variables. The model chosen for testing the patient compliance through external and internal factors gives an R^2 value of 85.0% with an adjusted R^2 of 84.7%. The F value (317.187) was also significant (p=0.000) which means that the variables have better fit in the multivariate model. The major reasons determined for non-adherence were attitudes and beliefs, lifestyle, side effects and cost of medications. The study recommends that pharmacists and dispensing technicians should be adequately qualified to provide proper counselling to cardiac patients on their medicines and disease conditions.

Conclusion

The result of this study is of value to health care providers. Compliance to cardiovascular medications will avoid treatment failures encountered in therapy.

Keywords: Compliance, cardiovascular disease, healthcare professionals, cross- sectional study, Morisky, external factors, internal factors, counseling

INTRODUCTION

Cardiovascular disease is a universal term that used to refer to class of disease that involve heart or blood vessels[1]. Patient compliance or referred as adherence can be defined as the extent to which the patient's willingness to coincide with health-related advice from prescriber[2]. Patient compliance was fixed as dependent variable in this study. Independent variables which comprised of internal and external factors were studied. Internal factors

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include age, educational level, co-morbidity, attitudes and belief, and lifestyle of patients. Whereas external factors such as side effects of drugs, cost of drugs, patient-physician relationship, role of healthcare professionals and media were the independent variables which influence patient compliance in this study.

There are two main causes of noncompliance: intentional and unintentional. When patient chooses not to follow the treatment recommendations it is known as intentional non-adherence. Whereas unintentional non-adherence happens when patient is prevented from following the agreed treatment by barriers such as poor recall of instructions, complications in administering the treatment, expensive cost of medications or simply forgetting to take it[3]. Medication noncompliance may not only be dangerous for health of patient, but also cause enormous financial costs of public health services[4]. There are direct and indirect methods for measuring adherence. Direct methods include the measurement of the level of medicine, metabolite and biological marker in blood, and directly observed therapy. Whereas examples of indirect methods that are commonly used include patient questionnaires, self-report and pill counts[5]. Cardiovascular disease has been known as the most common disease in Malaysia and can cause heart and renal failure, stroke, and spontaneous sudden death[6]. Prescribers consistently undervalue the problems of non-compliance in their patients[7]. Hence, the objective of this study is to investigate the degree of compliance among cardiac disease patients who attend the health facilities in Kuala Lumpur and Perak. This study helps in understanding the influence of internal factors (age, educational level, co-morbidity, attitudes and beliefs, and lifestyle) and external factors (side effects and cost of drugs, patient- physician relationship, role of healthcare professionals and role of news and media) on the level of adherence to medications among cardiac patients. Recommendations from healthcare professionals to improve compliance level were evaluated in this study.

Literature Review
Prevalence of Cardiovascular Disease in Worldwide

A universal epidemic, cardiovascular disease (CVD) is the principal cause of mortality accounting for 17million deaths per year [8]. In USA, it is approximate that every one in three adults (71.3 million) have one or more forms of CVD with an enormous cost of over US $400 billion in 2006[9].

Prevalence of Cardiovascular Disease in Malaysia

Like other developing countries, CVD is a chief cause of hospitalization in Malaysia, accounting 6–10% of all medical admissions with an inpatient mortality rate of 11% [10].

Compliance

Compliance indicates that "a patient is merely told what to do with regard to therapy management and supposed to follow the suggestions unquestionably," whereas "adherence presumes a relationship between the patient and the treatment provider[11]."

Attitudes and belief

Patient's beliefs and negative attitude towards therapy were recognized as factors that influence compliance rate. Compliance was better when patient believes that CVD could cause severe consequences for his health and that the treatment will be helpful[12].

Lifestyle

Several studies found that patients who smoked or drank alcohol were more likely to be non-compliant. Strategies should be invented to concentrate on diet and physical activity concerns in the community as a measure toward controlling CVD[13].

Side effects of drugs

Many studies revealed that side effects of medication threaten patient's compliance. Pharmacists should counsel patients on common side effects that may be encountered, including method to avoid them and what to do when they occur[14].

Cost of drugs

Malaysian medications prices were very high in terms of international reference pricing (the IRP). Low availability of medicines at public healthcare facilities could have direct impact on access, while patients are then forced to purchase these medications from private from dispensing doctor clinics or pharmacies[15].

MATERIALS & METHODS

Based on the previous studies and research conducted on the relationships among external and

internal factors on degree of compliance, this study used the hypothesis statistical testing to study the influence of external factors and internal factors on compliance rate of cardiac patients in Kuala Lumpur and Perak, Malaysia. Study utilized both descriptive and inferential statistics to test the hypothesis framed in the previous chapter. The independent variables of the study are internal factors such as age, educational level, co-morbidity, attitudes and beliefs, and lifestyle and external factors such as side effects and cost of drugs, patient- physician relationship, role of healthcare professionals and role of news and media. The dependent variable is compliance rate of patients. This study focused on the external and internal factors that influence on the degree of compliance. Hence, this is a correlational research.

The units of analysis for the study are cardiac patients and healthcare professionals working in the health facilities in Kuala Lumpur and Perak. This study is a cross sectional study, because the data collected from the patients and healthcare professionals is just once. This cross-sectional study is utilized by applying a structured interview to patients with cardiac disease. Pilot studies for 30 patients and 30 healthcare professionals were conducted to explore the validity and reliability of the survey instruments[16]. By using Krejcie and Morgan Table, the sample size required in this study was calculated[17]. 400 CVD patients and 100 healthcare professionals from hospitals were interviewed.

Sampling and instrument

Convenience sampling technique was chosen in this study. Questionnaires were given to respondents and structured interview method was conducted to them. Patients who are willing to participate in the study were interviewed. Structured questionnaires were prepared which contains close ended questions with a 4 point Likert scale (strongly disagree, disagree, agree and strongly agree)[18]. The final questionnaire divided into 9 parts with a total 54 items. The first part contains demographic description of the patients. Second part is to access patients' attitudes towards compliance. Third part is to identify the lifestyle of the patients. The fourth part is to find out the side effects of medications. The fifth part is to identify the influence of cost of drugs on compliance. The sixth part covers the relationship between patients and their physicians. The seventh part is on role of healthcare professionals and the eighth part is on role of news and media.

The last part consists of Morisky scale which is used to determine the degree of compliance among cardiac patients. It is composed of 8 questions about past medication use patterns and are therefore simple to use during drug history interviews[19]. According to the researcher, patients are considered highly adherent to their medications when they obtain score of 25-32 points, patients are considered moderate adherent when obtain 17-24 points, and patients are poor adherent when they obtain less than 16 points.

The final questionnaire for healthcare professionals divided into 8 parts with a total 42 items. The first part contains demographic description of HCPs. The second part is to access HCPs' opinions on changing patients' attitudes towards compliance. Third part is to identify the views of HCPs on lifestyle modifications. Fourth part is to find out recommendations on steps to reduce side effects of medications. The fifth part is to identify the recommendations on reduction of cost of drug. The sixth part covers the relationship between HCPs and patients. The seventh part is on role of HCPs and eighth part is on role of news and media. After the collection of data, it was analyzed by using SPSS software version 20.0.

Data Screening and Analysis

Cronbach's Alpha was used to assess the reliability of each measure[20]. Chi-Square tests were performed to detect the association between internal factors and external factors on the compliance rate of patients. Multiple regressions computed to explore the predictive ability of a set of independent variables on one continuous dependent variable. It also helps to find out which variable(s) has/have the significant relation on degree of compliance. Cross-tabulation was used to assess the relationship between demographic variable and compliance rate. The distribution, means, median, mode, percentage, standard deviation of all demographic variables like, age, gender, education level, healthcare facilities attended will be described by computing descriptive statistic analysis.

RESULTS
Demographic Characteristics of Patients

Among the respondents, 50.8% are males and 49.3% are females. Of the 400 patients, 10.3% are less than 30 years, 31.0% are 30-45 years, 39.3% are 46-60years and 19.5% are more than 60years. Of these respondents, 34.5% are Chinese, followed

by Malays (34.5%) and Indians (31.5%) (Table 1). Among the patients, 34% are from rural areas and 66% are from urban areas. 176 (44%) are attending public hospitals whereas 224 (56%) respondents are attending private hospitals. 13.0% of patients are not educated, 28.0% have primary education level, 43.0% have secondary education level and 16.0% of the respondents have tertiary education level.

Table 2 shows that 39.5% of the patients have cardiovascular disease, 39.8% have cardiovascular and endocrine diseases, 8% have cardiovascular and renal diseases, 12.8% have cardiovascular, endocrine and renal diseases. Of these respondents, 68(17%) respondents have their medical problems for 1-5 years, followed by 138 (34.5%) respondents have longer duration of medical problems (6-10 years). The duration of illness were further revealed as follows: diagnosed 11-15 years ago (128 (32%)), more than 15 years (66 (16.5%)).

All the variables consist of five items except for patient compliance scale which consists of 8 items. The average Cronbach's Alpha value for attitudes and belief scale is 0.968, lifestyle scale (0.966), side effects of medications scale (0.976), cost of drugs scale (0.969), patient-physician relationship scale (0.962), role of HCP scale (0.956), role of news and media scale (0.943) and patient compliance scale (0.977).

Normality Testing

All z values of skewness and kurtosis are in the range of -2.58 to +2.58. However, role of HCPs shows a negative skewness of more than one (-1.38) with a standard deviation of 2.893.

Frequencies of All Variables

There are 30% of patients having poor attitudes and belief, and poor lifestyle. 78 (19.5%) of the respondents did not take their medications because of the side effects of the drugs. 66 (16.5%) of the patients had problem of financing their refills. 81.8% of patients have good relationship with physicians. 17.5% of the respondents stated that there is poor role of HCPs in managing their cardiovascular problem. 13.5% of patients mentioned that there is poor information about heart disease in news and media. From Table 4, 63 (15.8%) patients highly adhered to their medications.

Validity of the Instruments

Content validity of the instrument was performed through a Delphi technique by distributing the questionnaire to subject matter experts. A pilot study was also accomplished to validate the instruments used in the study.

Univariate Analysis

Association testing has been evaluated between the internal factors (age, educational level, co-morbidity, attitudes and beliefs, and lifestyle) with degree of patient compliance by using Chi-square test. According to the Chi-Square test, outcome for the association between attitudes and belief and patient compliance is less than 0.05. Based on the test result it is concluded that attitudes and belief is positively related to the degree of patient compliance. Cramer's V result of 41.6% indicates that there is association between attitudes and belief and patient compliance (Table 5). Lifestyle of patients is positively related to patient compliance is verified. In addition, the Phi value (1.194) and the Cramer's V (36%) show the association between lifestyle and patient compliance (Table 6). Side effects of medications is positively related to patient compliance, as the significance level is 0.00. Phi value of 1.170 and the Cramer's V of 37% indicates the moderate association between side effects of medications and patient compliance (Table 7). Based on Table 8, it is concluded that cost of drugs is positively related to the degree of patient compliance. Phi value of 0.858 and Cramer's V result of 25.9% indicates that there is association between cost of medications and patient compliance.

Differences in Opinion Expressed by Various Groups

Independent sample t-test is used to compare the mean scores for of two different groups of people or conditions. ANOVA test is preferable when analyzing the differences between the means of three or more levels of nominal variables[21].

Out of the 400 patients, there were 177 patients attending public hospitals and 223 patients attending private hospitals. The mean values are not equal for side effects of medications and cost of drugs but they are significantly different. This means that public and private hospitals patients have significant different opinions on side effects and cost of drugs. There was different opinions among different medical conditions of patients on degree of compliance as the mean score for cardiac patients is 24.778, patients with cardiac and endocrine disease is 20.044, patients with cardiac and renal disease is 23.969, and patients with cardiac, endocrine and renal diseases is 14.098.

This implies that patients with more than one co-morbidity have lower degree of compliance. According to ANOVA test, there are statistically significant differences among patients with co-morbidities on degree of compliance.

Multivariate Analysis

In Table 9, patient compliance has the highest mean of 21.47 due to highest number of items (8 items) in modified Morisky scale, followed by patient- physician relationship 15.01, role of news and media 14.92. In Table 10, there are positive and negative scores for the correlation test. There is a high significant correlation between attitudes and belief and patient compliance (89.3%), followed by lifestyle and attitudes and belief (88.8%), lifestyle and patient compliance (85.7%). There is a negative correlation between side effects of medications and patient compliance (-58.3%), followed by cost of drugs and patient compliance (-26.9%).

Model Summary

The model chosen for testing patient compliance through seven variables such as internal factors (age, educational level, co-morbidity, attitudes and beliefs, and lifestyle) and external factors (side effects and cost of drugs, patient- physician relationship, role of HCPs and role of news and media) gives an R^2 values of 85.0% with an adjusted R^2 of 84.7%. The results approve that the variables used from both external and internal factors to measure the degree of patient compliance fits in the multivariate model with an F value of 317.187 and it is also significant (p=0.000) (Table 11).

The contribution of individual variables against patient compliance in terms of percentage is given by the standardized beta coefficient. Five variables contributed positively towards patient compliance (attitudes and belief, lifestyle, patient-physician relationship, role of HCPs, role of news and media) and the other two variables contributed negatively (side effects of medications and cost of drugs) towards patient compliance.

Data Analysis and Findings for Healthcare Professionals (HCPs)

Among the healthcare professionals, 33% are males and 67% are females. Of the 100 HCPs, 37% are less than 30 years, 42% are 30-45 years and 21% are 46-60years. Of these respondents, 41% are Malays, followed by Chinese (32%) and Indians (27%). Among the 100 HCPs, 12% are cardiologists, 20% are medical doctors, 34% are pharmacists and 34% are nurses. Of these respondents, 26% are diploma holders, 57% have degree and 17% have master degree.

All the variables in HCP questionnaire consists of five items. The average Cronbach's Alpha value for change in attitudes and belief scale is 0.857, change in patients' lifestyle scale (0.938), reducing side effects of medications scale (0.838), reducing cost of drugs scale (0.972), conversational gap with patients scale (0.872), role of HCPs scale (0.865), and role of news and media scale (0.905).

There are 68% of HCPs highly recommend patients to change their attitudes ad beliefs. 43% of the HCPs highly recommend patiens to change their lifestyles. HCPs highly recommend to reduce side effects of drugs (64%) and cost of medications (20%). There are 58% of HCPs highly recommend to improve the gaps with patients.

DISCUSSION

This study found that the prevalence of CVD was slightly higher in males compared to females. This result is comparable to the Task Force Report by Wood *et.al.* in 1998.

Altogether about 39.3% of patients are aged between 46-60 years while only 10.3% are aged less than 30 years. CVD is largely seen in adult life. The respondents (patients) generally have some form of education, are economically productive and have a basis of income. The majority (34.5%) have lived with CVD for 6-10 years ago, 32% were diagnosed 11-15 years ago and 16.5% were diagnosed more than 15 years ago. The number of CVD patients' decreases with increasing period of their disease condition. The decline in numbers could be attributed to deaths, change of health facility or even trying other option of medicines such as traditional medications.

Reliability and validity of the instruments were tested for all the dependent and independent variables. In relation to the first objective, one of the major findings of this study was the identification of patients with poor adherence. The MORISKY scale items were summed, and the results revealed that 30% of patients had poor adherence to cardiovascular medications. High adherence rate for heart disease medications was low (15.8%), but over all moderate adherence rate was 54.3%.

Chi-Square results proved that there is an association between the independent variables on

degree of patient compliance. Level of education (0.512) has high association on degree of compliance. Pearson correlation test was carried out to test the hypothesis. Patient's beliefs and negative attitude towards therapy were recognized as main factors that influence compliance rate in this study. From the results, patients' beliefs about the reasons and meaning of illness, and motivation to follow the therapy were robustly linked to their compliance with healthcare.

Lifestyle variable has large strength of correlation on compliance rate (r = 0.857). In this study, patients who smoked or seldom exercise had lower degree of compliance. This result was similar with several studies about compliance among CVD patients which found that patients who smoked or drank alcohol were more likely to be non-compliant.

In the case of side effects and cost of medications, there is a negative correlation on degree of compliance (r = -0.583 and r = -0.269). The effect of side effects on compliance may be described in terms of physical discomfort, uncertainty about the effectiveness of the medication, and declining the confidence in physicians. In addition, cost is a critical issue for patients with chronic disease as the treatment period could be life-long[12].

The difference in opinion in urban and rural patients on patient compliance is compared by using independent sample t-tests. Results revealed that urban patients are more adherent to medicines when compared to rural patients. Urban patients having higher level of educations and more family income tend to manage their heart disease problem better than the rural patients. This study also found that private hospital patients have more problems of financing their refills compared to public hospital patients.

ANOVA test revealed that patients more than 60 years old have lower degree of compliance mainly due to poor lifestyle, side effects of drugs, poor patient- physician relationship and inadequate of exposure to news and media regarding cardiac issues. Some studies revealed that elderly patients may have problems in hearing, vision and memory. They may have more problems in following therapy instructions because of cognitive impairment or physical difficulties[23].

In this study, uneducated patients with CVD have the lowest degree of compliance. Some studies found that patients with higher educational level have higher compliance[24]. Analysis revealed that patients with co-morbidities have lower degree of compliance. It is essential to be remembered that co-morbidity leads to polypragmasy, which renders impossible the control over effectiveness of the treatment, increases financial expenses and consequently reduces compliance.

This study shows that patients with less than 10 years of disease duration have better adherence for their medications. Acute illnesses are associated with higher degree of compliance than chronic illnesses[25]. Doctors play a significant role in educating CVD patients regarding their disease with precise emphasis on its causes, the severity of the illness, how their medications work and the effects of non-compliance with therapy. Patients should be discouraged from depending on traditional Chinese medicines to cure their illness.

HCPs encouraged patients to lessen their consumption of fast foods, salt and alcohol, and to stop smoking. Strategies should be invented at the national level to concentrate on diet and physical activity concerns in the community as a measure toward controlling CVD.

Pharmacists should be adequately qualified to provide proper counselling to CVD patients. Health education campaigns regarding CVD should be conveyed through the mediums of radio and television, pamphlets and posters.

This study can contribute many benefits to the healthcare system in Malaysia. Factors influencing compliance in patients and recommendations from HCPs which are determined through this study would be helpful to fill in the knowledge gap and contribute to formulating international strategies for countering non-compliance. To encourage patients to adhere to their medications, the Malaysian public must first identify the responsibility each person plays in taking their medicines as prescribed or in making sure that a loved one does so. The Malaysian public needs better education about medication adherence that raises their awareness, and enhances their inspiration to take their prescribed medication in the suggested method.

Implications for Future Research

Qualitative research should be performed to acquire much more comprehensive information about factors that could increase compliance rate. In this study, not all factors that affect patients' compliance rate with medications were studied. As a result of financial and time constraints, this study was limited to the hospitals in Kuala Lumpur and Perak state. Further studies with larger number of institutions should test the conclusions of the study.The Morisky score method used in this study

is economical but can cause overestimation of the outcomes. Further studies which compare the adherence results of the Morisky scale with an objective method of measurement, such as electronic monitoring can be conducted.

Table 1 Gender, Age Group and Race of the Patients

Gender	Frequency	Percent
Male	203	50.8
Female	197	49.3
Total	400	100.0
Age		
Less than 30 years	41	10.3
30-45 years	124	31.0
46-60 years	157	39.3
More than 60 years	78	19.5
Total	400	100.0
Race		
Malay	136	34.0
Chinese	138	34.5
Indian	126	31.5
Total	400	100.0

Table 2 Medical Condition, Duration of Medical Disorder

Medical Condition	Frequency	Percent
Cardiovascular disease	158	39.5
Cardiovascular disease and endocrine disease	159	39.8
Cardiovascular disease and renal disease	32	8.0
Cardiovascular disease, endocrine disease and renal disease	51	12.8
Total	400	100.0
Duration of Medical Disorder		
1-5 years	68	17.0
6-10 years	138	34.5
11 -15 years	128	32.0
> 15 years	66	16.5
Total	400	100.0

Table 3 Reliability statistics of Independent and dependent variables

Name of Variable	Cronbach's Alpha Value	Number of Items
Attitudes and Belief	0.968	5
Lifestyle	0.966	5
Side Effects of Medications	0.976	5
Cost of Drugs	0.969	5
Patient - Physician Relationship	0.962	5
Role of Healthcare Professionals	0.956	5
Role of News and Media	0.943	5
Patient Compliance	0.977	8

Table 4 Frequencies of All Variables

Attitudes and belief	Frequency	Percent
Poor attitudes and belief	120	30.0
Moderate attitudes and belief	224	56.0
High attitudes and belief	56	14.0
Total	400	100.0
Lifestyle		
Poor Lifestyle	120	30.0
Moderate Lifestyle	182	45.5
Good Lifestyle	98	24.5
Total	400	100.0
Side Effects of Medications		
Less side effects of medications	248	62.0
Moderate side effects of medications	74	18.5
Strong side effects of medications	78	19.5
Total	400	100.0
Cost of Drugs		
Low cost of drugs	262	65.5
Slightly high cost of drugs	72	18.0
High cost of drugs	66	16.5
Total	400	100.0
Patient- Physician Relationship		
Good patient-physician relationship	327	81.8
Moderate patient-physician relationship	47	11.8
Poor patient-physician relationship	26	6.5
Total	400	100.0
Role of Healthcare Professionals		
Poor role of healthcare professionals	70	17.5
Moderate role of healthcare professionals	271	67.8
Strong role of healthcare professionals	59	14.8
Total	400	100.0
Role of News and Media		
Poor role of news and media	54	13.5
Moderate role of news and media	248	62.0
Strong role of news and media	98	24.5
Total	400	100.0
Patient Compliance		
Poor patient compliance	120	30.0
Moderate patient compliance	217	54.3
High patient compliance	63	15.8
Total	400	100.0

Table 5 Association between Attitudes and Belief and Patient Compliance

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	554.672	112	0.000
Likelihood Ratio	545.356	112	0.000
Linear-by-Linear Association	318.072	1	0.000
Symmetric Measures			
		Value	Approx. Sig.
Phi		1.178	0.000
Cramer's V		0.416	0.000

Table 6 Association between Lifestyle and Patient Compliance

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	569.933	154	0.000
Likelihood Ratio	539.731	154	0.000
Linear-by-Linear Association	293.290	1	0.000
Symmetric Measures			
		Value	Approx. Sig.
Phi		1.194	0.000
Cramer's V		0.360	0.000

Table 7 Association between Side Effects of Medications and Patient Compliance

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	547.479	140	0.000
Likelihood Ratio	259.673	140	0.000
Linear-by-Linear Association	135.702	1	0.000
Symmetric Measures			
		Value	Approx. Sig.
Phi		1.170	0.000
Cramer's V		0.370	0.000

Table 8 Association between Cost of Drugs and Patient Compliance

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	294.189	154	0.000
Likelihood Ratio	202.527	154	0.005
Linear-by-Linear Association	28.952	1	0.000
Symmetric Measures			
		Value	Approx. Sig.
Phi		0.858	0.000
Cramer's V		0.259	0.000

Table 9 Multivariate Analysis of all the Variables

	Mean	Std. Deviation
Patient Compliance	21.470	5.850
Attitudes and Belief	13.633	2.908
Lifestyle	14.015	3.296
Side Effects of Medications	12.240	3.175
Cost of Drugs	11.085	3.824
Patient - Physician Relationship	15.013	1.735
Role of Healthcare Professionals	14.190	2.893
Role of News and Media	14.923	2.274

Table 10 Correlation among Independent and Dependent Variables

	Patient Compliance	Attitudes and Belief	Lifestyle	Side Effects of Medications	Cost of Drugs	Patient - Physician Relationship	Role of Healthcare Professionals	Role of News and Media
Patient Compliance	1.000							
Attitudes and Belief	0.893	1.000						
Lifestyle	0.857	0.888	1.000					
Side Effects of Medications	-0.583	-0.505	-0.502	1.000				
Cost of Drugs	-0.269	-0.233	-0.231	-0.020	1.000			
Patient - Physician Relationship	0.333	0.296	0.313	-0.262	-0.093	1.000		
Role of Healthcare Professionals	0.479	0.446	0.457	-0.348	-0.070	0.602	1.000	
Role of News and Media	0.440	0.378	0.374	-0.230	-0.158	0.332	0.458	1.000
Attitudes and Belief	0.000	-						
Lifestyle	0.000	0.000	-					
Side Effects of Medications	0.000	0.000	0.000	-				
Cost of Drugs	0.000	0.000	0.000	0.348	-			
Patient - Physician Relationship	0.000	0.000	0.000	0.000	0.031	-		
Role of Healthcare Professionals	0.000	0.000	0.000	0.000	0.080	0.000	-	
Role of News and Media	0.000	0.000	0.000	0.000	0.001	0.000	0.000	-

Table 11 Coefficient of Determination of ANOVA and General Model

	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
	0.922	0.850	0.847	2.286	0.850
ANOVA					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Regression	11604.791	7	1657.827	317.187	0.000
Residual	2048.849	392	5.227		
Total	13653.640	399			

Table 12 Regression Weights of Independent Variables against Patient Compliance

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	1.633	1.632		1.001	0.318
Attitudes and Belief	1.090	0.088	0.542	12.456	0.000
Lifestyle	0.406	0.077	0.229	5.248	0.000
Side Effects of Medications	-0.305	0.043	-0.166	-7.049	0.000
Cost of Drugs	-0.119	0.032	-0.078	-3.770	0.000
Patient - Physician Relationship	0.019	0.083	0.005	0.223	0.824
Role of Healthcare Professionals	0.057	0.055	0.028	1.029	0.304
Role of News and Media	0.218	0.058	0.085	3.729	0.000

CONCLUSION

The study has discovered a high compliance rate with CVD medications. It also demonstrates that compliance is an important factor related to attitudes and lifestyle of patients. Specifically, results of this study have broad ranging significance for health care professionals dealing directly with heart disease patients in health facilities and generally with the Ministry of Health and Social Development of Malaysia whose authorization involves implementation of appropriate policies appointed towards successful CVD management in the whole country. The findings could conceivably contribute towards evidence-based practice in the concern of enhanced patient care.

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