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Medication adherence and patient satisfaction following percutaneous coronary intervention: experience of a Tertiary Care Cardiac Center in Sri Lanka

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Abstract

Background: Percutaneous coronary intervention (PCI) is an effective treatment modality of coronary revascularization. Since this is not curative, medication adherence with a better patient satisfaction have a major impact on final clinical outcome. This study aims to assess medication adherence and patient satisfaction following PCI.

Method: Total of 145 patients who underwent elective PCI during 2014 and 2015 at Cardiology Unit, Teaching Hospital Kandy, Sri Lanka were followed up. Medication adherence was assessed using Morisky Medication Adherence Scale (MMAS-8). Patient satisfaction was assessed using Patient Satisfaction Questionnaire.

Results: Participants' mean age was 54.97± 8.43 years and 80% (n=116) were males. Mean duration from last myocardial infarction to PCI was 0.89±1.84 years. Number of drugs consumed by a person per day was 7.77±2.33. Majority were on Aspirin (98.6%), Clopidogrel (99.3%) and statins (97.9%).

According to MMAS-8, 90% (n=131) were mode-rate to high adherent to treatments. Forgetfulness (44.8%) and inaccessibility of drugs (13.9%) were the commonest reasons for low adherence. Low adherent to dual antiplatelet therapy was 8.3% (n=12). Majority were unaware about duration of Aspirin (78.6%, n=114) and Clopidogrel (85.5%, n=124) therapy. Major or minor bleeding was observed in 9% (n=13) as an adverse effect. There was no significant association of drug non-adherence with adverse effects of drugs (χ^2=0.457, p=0.557).

Overall satisfaction regarding health care was 95.9% (n=139). Satisfaction about accessibility and convenience of health system was the lowest (46.9%, n=68) with a positive association with male gender (χ^2=3.662, p=0.043) and higher education level (χ^2=14.741, p<0.001). There was no association between high patient satisfaction and drug adherent (χ^2=0.400, p=0.702).

Conclusion: Majority of patients who underwent PCI had moderate to high adherence to pharmacological therapy. Even with limited resources, health system was able to provide a better PCI facility with high patient's satisfaction in most number of aspects.

Key words: percutaneous coronary intervention, medication adherence, patient satisfaction

Introduction

Cardiovascular diseases remain the leading cause of death worldwide, contributing to 31% of all global deaths[1] and ischemic heart disease (IHD) has a major contribution on this. Age and gender standardized prevalence of IHD in Sri Lanka was reported as 9.7% by 2010[2].

Acute coronary syndrome (ACS) is a spectrum of diseases including unstable angina, ST elevated myocardial infarction and non-ST elevated myocardial infarction. Emergency management of ACS is by reperfusion therapy, either by fibrinolytic agents or primary percutaneous coronary intervention (PCI). However, due to limited facilities ACS is managed medically in most of the medical centers in Sri Lanka while elective PCI is performed at specialized centers. Since this intervention is not curative, it has to be accompanied by long term pharmacological and non-pharmacological therapeutic measures to control further progression of ACS. Therefore, medication adherence has a major impact on patient's health status.

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Medication adherence is defined as the extent to which patients take medications as prescribed by their health care providers[3]. This can be influenced by patient factors, demographic variables and other associated co morbidities[4-6]. Satisfactory medication adherence is important for a better health outcome as well as to minimize the health care cost.

The medication adherence can be a reflection of patient's behavior, which can be influenced by the relationship between patient and the health care provider[3]. A higher patient satisfaction about the health care is therefore an important determinant of the health outcome. On the other hand, the aim of health care is not only to improve the health status of an individual, but also to enumerate the quality of life by fulfilling patient needs. Therefore patient satisfaction with regard to the provided health care becomes an important direct feedback on the quality of the health care system. Patient satisfaction had been evaluated under several dimensions with different questionnaires.

Medication adherence and patient satisfaction had been assessed with regard to many medical conditions requiring long term pharmacological and non-pharmacological therapies. Conversely, there is a scarcity of data on medication adherence and patient satisfaction in post PCI patients.

Our objectives of this study are as follows.

1. To describe the demographic data, patient characteristics and other comorbidities
2. To assess the medication adherence and the reasons for non-adherence
3. To assess the patient satisfaction
4. To assess the association between medication adherences with different dimensions of patient satisfaction in patients who underwent PCI at Cardiology Unit, Teaching Hospital Kandy, Sri Lanka.

Methodology

Study design and setting

A retrospective non-randomized descriptive study was performed at Cardiology Unit, Teaching Hospital Kandy, Sri Lanka with the aim of assessing the prevalence of medication adherence and patient satisfaction in a group of patients who underwent elective PCI.

Study population

The study population consisted of a group of patients who underwent PCI at Cardiology Unit, Teaching Hospital Kandy, Sri Lanka during 2014 February to 2015 January and been followed up at Cardiology clinic, Teaching Hospital Kandy, Sri Lanka. Patients who are having diagnosed psychiatric illnesses, who feel difficulty in conversing due to aggravated medical conditions as well as patients transferred to another hospital or department for further follow up were excluded. Informed written consent was obtained from all the participants who wished to take part in our study.

Study instruments

A pre-tested interviewer administered questionnaire was used to obtain information about demographic data, patient characteristics and life style modifications. Medical records and PCI report were used to gather information on the number and type of stents used and other co-morbidities.

The drug adherence was assessed using Morisky's Medication Adherence Scale (MMRS-08) which included eight questions, each with original binary response option (yes/no)[6,7]. Classification of patients as high adherence, moderate adherence and low adherence were done according the total of eight answers.

For the assessment of patient satisfaction validated Patient Satisfaction Questionnaire (PSQ-18) was used[8]. This is an eighteen itemed questionnaire with each item accompanying five responses (strongly agree, agree, uncertain, disagree, and strongly disagree). Since wording of the items were different to each when expressing satisfaction about medical care, all the items were scored in a manner where high score implies satisfaction with medical care. All the items were assessed under seven subscales (General Satisfaction, Technical Quality, Interpersonal Manner, Communication, Financial aspect, Time spent with doctors and Accessibility and Convenience). Patients were grouped as satisfied about medical care and dissatisfied about medical care according to the summation of score.

Data analysis

Data entering and analysis was done by SPSS-19 windows statistical package. Frequency descriptive analysis was conducted for relevant socio-demographic variables.

Prevalence of medication adherence was assessed by the score obtained from MMAS-8 questionnaire. Patients who had a score of eight out of eight were considered as high adherent while a score of six or above were classified as moderate adherent. Patients who gained a score of five or below were categorized as low adherent. Reasons for low adherence and its association with demographic factors were compared using either a standard 2-tailed t-test (for continuous variables) or a $\chi 2$ test (for dichotomous variables).

Mean satisfaction scores was calculated for each of the seven sub scales by averaging the scores of items within each scale. Five Likert-type response categories of each item (strongly agree, agree, uncertain, disagree, strongly disagree) were scored from 1 to 5 with higher scores reflecting higher satisfaction with medical care. Average score above 3.5 for a subgroup was classified as higher satisfaction for the particular sub group whereas score below or equal to 3.5 was considered as low satisfaction.

Life style modifications such as smoking, alcohol consumption, dietary control and regular exercises were assessed with regard to the knowledge and the practices.

Ethical approval was obtained after reviewing the proposal by the Research and Ethical Review Committee, General Hospital (Teaching) Kandy.

Results

The study group consisted of 145 patients. The mean age of the group was 54.97±8.43 years ranging from 33 to 74 years. Majority were males (n=116, 80%). Among the participants, 6.2% had received only the primary education whereas 39.3% were educated upto secondary education. Half of the study population (59.3%) was employed while 17.2% were unemployed and 23.4% were retired. Majority (77.3%) had to expend more than thousand rupees for their medications per month. Out of the participants, 41.4% had diabetes mellitus and most of them (85.2%) were on oral hypoglycemic drugs where as 6.6% were on insulin therapy. There were 37.9% patients who were diagnosed with hypertension and 98.6% were diagnosed with dyslipidemia. Half of the population (53.8%) had never smoked while 42.8% had quit smoking. Despite the fact that 93.8% were given advice to stop smoking, 3.4% do continue smoking. Alcohol consumption is continued by 15.2% and 26.2% had stopped it after PCI. Demographic and other characteristics of study participants are listed in (Table 1).

All the patients had undergone PCI with a mean duration of 0.89±1.84 years from the last coronary vascular event. Most of the patients were treated for a single coronary lesion (83.4%) with a single stent (69.7%). One patient was admitted with stenosis in three coronary vessels and was treated successfully with PCI. Descriptive data on PCI procedure was shown (Table 2).

Through the questionnaire, we inquired whether the patients were given information regarding the PCI. According to the responses given, 37.9% were well informed about the procedure whereas 50.3% were fairly informed. From the study group 74.5% were satisfied about the information given by the medical personnel.

Succeeding PCI almost all the patients were started on Aspirin (98.6%), Clopidogrel (99.3%) and Statins (97.9%) while 81.4% and 75.2% were prescribed on Beta blockers and Angiotensin II converting enzyme inhibitors/ Angiotensin receptor blockers respectively. However Calcium channel blockers (14.5%), Nicorandil (13.8%) and Isosorbite mono nitrates (18.6%) were less frequently prescribed among the post PCI population (Table 3). Average number of tablets consumed by a post PCI patient was calculated as 7.77±2.33 tablets per day. There were 53.1% patients who considered post PCI medications are essential to continue and 44.1% continued their medications just because they were asked to do so by their medical personal.

Table 1. Participants demographic data

Variable name	*Result (n, %)*
Age (mean±SD)	54.97±8.430
Gender	
Male	116 (80%)
Female	29 (20%)
Education	
No schooling	01 (0.7%)
Grade 1 to Grade 5	09 (6.2%)
Grade 6 to Grade 11	31 (21.4%)
Pass Ordinary Level	47 (32.4%)
Pass Advanced Level	48 (33.1%)
Higher Education	9 (6.2%)
Employment	
Unemployed	25 (17.2%)
Employed	86 (59.3%)
Retired	34 (23.4%)
Monthly income	
<Rs.10000/=	30 (20.7%)
Rs. 10000/= to Rs. 20000/-	40 (27.6%)
Rs. 20000/= to Rs. 30000/-	29 (20.0%)
>Rs. 30000/=	46 (31.7%)
Expenses for medication per month	
No expenses	13 (09.0%)
<Rs. 500/=	03 (02.1%)
<Rs. 500/= to Rs. 1000/=	17 (11.7%)
Rs. 1000/= to Rs. 2000/=	23 (15.9%)
>Rs. 2000/=	89 (61.4%)
Co-morbidities	
Diabetes mellitus	60 (41.4%)
Hypertension	55 (37.9%)
Dyslipidemia	143 (98.6%)
Smoking	
Never smoked	78 (53.8%)
Quit smoking	62 (42.8%)
Still smoking	05 (3.4%)

Table 2. Descriptive data on PCI

Variable name	*Result (n, %)*
Type of PCI	
Stent	13 (9.0%)
Stent and Balloon	127 (87.6%)
Balloon only	4 (2.8%)e
Number of stents	
1	101 (69.7%)
2	32 (22.1%)
3	9 (6.2%)
4	3 (2.1%)
Number of PCI locations	
1	121 (83.4%)
2	23 (15.9%)
3	01 (0.7%)

Table 3. Details on medication therapy during post PCI

Variable name	*Result (n, %)*
Aspirin	143 (98.6%)
Clopidogrel	144 (99.3%)
Statins	142 (97.9%)
Beta blockers	118 (81.4%)
ACEIs or ARBs	109 (75.2%)
Nicorandil	20 (13.8%)
ISMN	27 (18.6%)
Calcium channel blockers	21 (14.5%)
Total number of tablets per day (mean±SD)	7.77±2.33

Pharmacological adherence was assessed both in general and specifically to dual antiplatelet therapy using MMAS - 8 questionnaire. The responses given for each item of the questionnaire were summarized in Table 4. Considering all the medication given following PCI, 40.0% were highly adherence to treatment. Moderate adherence was noted in 50.3% and only 9.7% were low adherent to therapy. Adherence to dual antiplatelet therapy was high with 62.8% high adherence and 28.9% were moderately adherent. However, there was 8.3% who had low adherence to the dual antiplatelet therapy.

Lack of interest / forgetfulness (44.8%), problems related to availability of drugs (9.0%), financial difficulties (6.2%) and deficiency in knowledge (5.5%) were documented as common reasons for non-adherence. Group comparison was carried out to identify any association between moderate to low adherence with demographic data. There was no association between moderate to low adherence with age (p=0.177), gender (p=0.836), level of education (p=0.084), expenses for medications per month (p=0.728) or the number of tablets per day (p=0.865). However, there was a statistical significance between moderate to low adherence with monthly income below twenty thousand rupees (p=0.010). Complete group comparison was shown in (Table 5).

Although the patients were advised on post PCI pharmacological therapy following discharge, the awareness about the duration of aspirin (21.4%) and Clopidogrel (14.5%) therapy as well as the awareness on adverse effects of given medications (7.6%) were very much low. Nevertheless, adverse effects such as gastro-oesophageal reflux disease (37.2%) due to aspirin, headache (10.3%) with nitrate therapy, bleeding (major/ minor) (9.0%) owing to dual antiplatelet therapy and myopathies/ muscle cramps (7.6%) due to statin therapy were prevalent within the study group (Table 6). Importantly, there was no significant association of low medication adherence with adverse effects of the drugs (p=0.557).

Patient satisfaction was assessed using PSQ-18 questionnaire and the results were summerzied under seven sub categories (Table 7). General satisfaction of the post PCI study population was 95.9%. The satisfaction about technical quality with regard to PCI procedure and satisfaction about interpersonal skills of health care providers were equally high (98.6%). Among the population, satisfaction about communication skills of health care providers was 87.6%, satisfaction on expenditures for health system was 71.7% and satisfaction about time spent with health care providers was 84.1%. Conversely, satisfaction about accessibility for health system and its convenience remained comparatively low (46.9%). The low satisfaction on accessibility and convenience of health care system was significantly associated with male gender (p=0.043) and higher education level (p<0.001) (Table-8). There was no significant association between age, monthly income and expenses for medications per month with any of the sub groups of patient satisfaction. There was no significant association between high patient satisfaction and drug adherence (p=0.702).

Furthermore, we questioned about lifestyle modifications, especially dietary control and exercising. Even though most of the patients (95.9%) were advised on dietary control, about half of the study group (59.0%) was following advice. Difficulty in applying to all family members (26.9%), lack of knowledge (15.2%), occupation related problems (9.7%) were highlighted as reasons for not following dietary advice. Similarly, 80.7% were advised on the importance of regular exercise yet only 38.6% were doing regular exercise with a mean duration of 3.55±1.81 hours per week. Lack of knowledge (35.9%), lack of time (22.1%) and associated other illnesses (13.1%) were emphasized as reasons for not following advice on regular exercise.

Table 4. Responses given for the MMAS - 8 Questionnaire

Variable name	*Result (n, %)*	
Question	*Yes*	*No*
Do you sometimes forget to take pills?	71 (49.0%)	74 (51.0%)
Did you miss your pills over past two weeks?	20 (13.8%)	125 (86.2%)
Have you ever cut back or stop taking your medications?	07 (4.8%)	138 (95.2%)
Do you forget to bring along your medications when you travel?	19 (13.1%)	126 (86.9%)
Did you take all your medications yesterday?	143 (98.6%)	02 (1.4%)
When symptoms are under control, do you stop taking your medicine?	04 (2.8%)	141 (97.2%)
Do you ever feel hassled about sticking to your treatment plan?	12 (8.3%)	133 (91.7%)
How often do you have difficulty to remembering to take all your medicine?	134 (92.4%)	11 (7.6%)

Table 5. Group comparison on moderate to low adherence with demographic data

Variable name		*Result (n,%)*	*P value*
Age	<40 years	33 (45.8%)	0.177
	>=40 years	25 (34.2%)	
Gender	Male	47 (40.5%)	0.836
	Female	11 (37.9%)	
Level of education	Below Ordinary Level	30 (34.1%)	0.084
	Above Ordinary Level	28 (49.1%)	
Monthly Income	<Rs.20000/=	31 (44.3%)	0.010
	>Rs.20000/=	27 (36.0%)	
Expenses for medications	<Rs.2000/=	21 (37.5%)	0.728
	>Rs.2000/=	37 (41.6%)	
Number of tablets	Less than 7	31 (41.3%)	0.865
	More than 7	27 (38.6%)	

Table 6. Prevalence of adverse effects of the drugs

Variable name	*Result (n, %)*
Gastro-oesophageal reflux disease	54 (37.2%)
Bleeding	13 (9.0%)
Myopathies/muscle cramps	11 (7.6%)
Headache	15 (10.3%)
Cough	2 (1.4%)

Discussion

This study was conducted with the aim of evaluating medication adherence, patient satisfaction and their determinants in a group of post PCI patients. More than four third of the study population had moderate to high adherence for the treatment and the prevalence of low adherence was below ten percent. According to the literature, medication adherence of post PCI patients was observed to be around 70%[4,6] with one study done in Brazil in 2013 with a study population of 101 had demonstrate medication adherence to be 97%[3]. Medication adherence in a group of post myocardial

Table 7. Summary of the results: PSQ - 18

Variable name	*Result (n, %)*	
	Satisfied	Unsatisfied
General satisfaction	139 (95.9%)	6 (4.1%)
Technical Quality satisfaction	143 (98.6%)	2 (1.4%)
Interpersonal Manner satisfaction	143 (98.6%)	2 (1.4%)
Communication satisfaction	127 (87.6%)	18 (12.4%)
Financial Aspect satisfaction	104 (71.7%)	41 (28.3%)
Time spent with Doctor satisfaction	122 (84.1%)	23 (15.9%)
Accessibility and convenience satisfaction	68 (46.9%)	77 (53.1%)

Table 8. Group comparison – Satisfaction on Accessibility and Convenience

Variable name		*Results (n, %)*	*P value*
Age	<40 years	33 (45.8%)	0.868
	>=40 years	35 (47.9%)	
Gender	Male	59 (50.9%)	0.064
	Female	9 (31.0%)	
Level of education	Below Ordinary Level	30 (34.1%)	<0.001
	Above Ordinary Level	38 (66.7%)	
Monthly Income	<Rs.20000/=	29 (41.4%)	0.244
	>Rs.20000/=	39 (52.0%)	

infarction patients was less, with 25% well adherence, 54% fairly adherent and 22% poorly adherent[9]. Therefore post PCI group have a satisfactory medication adherence compared to post myocardial infarction patients without interventions. Aghabekyan et al[4] had shown age and expenditure for medications as independent predictors of non-adherence, which was in contrast with our study. However, monthly income had an influence on drug adherence of our population. There was a higher adherence level for dual antiplatelet therapy than general adherence, which are the most important drugs to prevent major adverse coronary events. This high adherence could be a result of patients' perception, as evident by our study; most of the patients do believe that continuation of medication is essential after the PCI while others continue to take medications as they were enforced to do so by the medical staff. Therefore discussion about the need and duration of antiplatelet and other medications with the patients before and after the PCI procedure is important for further improvement of medication compliance.

Nevertheless, awareness about dual antiplatelet therapy was very much low with in the study group. The duration for which dual antiplatelet therapy need to be continued is still an arbitrary point. Early discontinuation of dual antiplatelet therapy could be associated with stent thrombosis, myocardial re-infarction or even sudden cardiac death[10,11]. Thus, improving the knowledge about the duration and importance of continuing dual antiplatelet therapy following PCI among the patients is very much important.

Prevalence of medication side effects among Sri Lankan population had not been assessed up to date. Antiplatelet associated bleeding (major or minor) was reported to be 8.9%[12], which is mostly the same for our population. Incident of major bleeding was documented as 2%[13,14] which need to be evaluated in our population in future studies. Prevalence of aspirin associated gastro-oesophageal reflux disease is higher than the incidence noted in literature[15,16].

There was a study where patient satisfaction was assessed under few subgroups and the results revealed 77.5% being generally satisfied, 95.9% satisfied with interpersonal manner and 88.2% were satisfied about communication[4]. The satisfaction about perceived health care of our population seems to be higher. In addition, this study had concluded that there was no statistical significance between high patient satisfaction and drug adherence[4], which was the same for our study as well.

This is a single center experience. However being one of the largest cardiac centers in the country, we encounter patients from different areas of the country, making the study more generalized. The time gap after the stent placement was not accounted, resulting different period of time which may cause an impact on the assessment of medication adherence. Also we collected self-reported information on medication adherence and patient satisfaction, which can be subjected to reporting bias. Correlation between health status and medication adherence was not assessed in our study, which will be a good implication for further studies.

In conclusion, majority of the patients had moderate to high adherence to pharmacological therapy and low adherence was influenced by monthly income. On the other hand the awareness on pharmacological therapies is not satisfactory. Interestingly, patient satisfaction remained high under most sub categories. The accessibility of health care service need to be further improved. Finally, there was no association between high patient satisfaction and drug adherence.

By considering all the outcomes, formation of a well descriptive discharge plan will be important.

Considering above mentioned limitations, further study designs should take an account on time since stenting. Similarly, further studies are needed to assess the impact of medication adherence on clinical outcomes. Descriptive qualitative studies may provide further information on main obstacles to low medication adherence as well as opportunities for further increase of compliance.

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Disclosures

The Author (s) declare (s) that there is no conflict of interest.

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