

Research Article

Assessment of Knowledge, Attitudes & Awareness of Ischemic Heart Disease and Medication Adherence: A Descriptive Cross-sectional, Single-unit Study

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Abstract

Introduction: Ischemic heart disease (IHD) is a leading cause of morbidity and mortality worldwide. However, there is limited evidence-based data regarding medication adherence of IHD patients in Sri Lanka. This study aims to detect knowledge, attitudes & awareness of IHD and adherence to medication among IHD patients attending medical clinics at the Colombo South Teaching Hospital, Kalubowila, Sri Lanka.

Methodology: This descriptive cross-sectional study recruited consecutively selected participants for six months. The Morisky Medication Adherence Scale was applied to detect medication adherence and the reasons for non-adherence. The IHD Fact Questionnaire was used to evaluate the patients' awareness, attitudes, and knowledge regarding IHD.

Results: Among 402 participants, the majority were Sinhala (91.3%, n=366) and male (62.1%, n=249), and had good knowledge (80%, n=330). Most the patients were aware of the modifiable (n=402, 100%) and non-modifiable (n=401, 99.8%) risk factors of IHD. Knowledge and awareness regarding the role of physical activity and healthy dietary practices were satisfactory (n=364, 90.5%). Adherence to medication was approximately 100% during the past month, week as well as the day before. Knowledge showed significant positive associations with, Education level (P<0.0001) and BMI (P=0.002), while cholesterol levels (P=0.002) and diabetes (P=0.016) were the most significant negative variables for knowledge.

Conclusion: The participants' overall knowledge and awareness about the disease condition was satisfactory. However, gaps in knowledge and awareness were detected regarding epidemiological factors and dietary practices.

Keywords: Ischemic heart disease, knowledge awareness and attitudes, medication adherence

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Introduction

Cardiovascular diseases (CVDs) encompass a group of disorders affecting the heart and blood vessels [1].

Ischemic heart disease (IHD) is a specific type of CVD where heart is damaged due to insufficient blood supply, commonly due to narrowed coronary arteries

[2]. According the Global Burden of Disease Study 2021 (GBD 2021), IHD remains the leading cause of death and illness worldwide, with 8.99 million deaths reported in 2021 [2]. CVDs have become the leading cause of global fatalities with considerable premature mortalities [1]. It has been extensively explored that 38% of premature deaths (under the age of 70) due to noncommunicable diseases, were attributed to CVDs, with 75% out of 17.9 million global CVD deaths in 2019 were from low- and middle-income countries (LMICs) [3,4].

In LMICs, particularly among males and younger population, continue to face rising CVD mortality driven by increasing rates of diabetes and obesity [5]. In these resource-limited regions, interventions at both the individual and population levels that aim for early identification and modification of key metabolic risk factors, which has been identified as primary drivers of CVD, represent a plausible and cost-effective solution [2]. While non-modifiable risk factors cannot be changed, modifiable risk factors such as hypertension (HTN), Diabetes mellitus (DM), smoking, obesity, dyslipidemia, unhealthy diet, physical inactivity and harmful use of alcohol should be the focus of interventions [1,4].

Patient knowledge, attitudes, awareness and treatment adherence play a key role in disease management and risk modification. According to literature available from LMICs, patients with IHD were found to be more competent in their attitudes than in knowledge and practices [6]. Certain studies indicates that patients possess adequate knowledge and attitudes toward risk factors whereas other research reveals the understanding of CVD and its risk factors remains notably limited [7–10].

Evidence from Studies conducted in Sri Lanka indicates many patients with CVD often fail to reach treatment targets largely due to inadequate knowledge regarding the disease and treatment options [11,12]. Statistically significant correlations have been observed between general knowledge about CVD risk factors and compliance to certain lifestyle modifications [11]. Similarly, overall knowledge of CVD and self-reported compliance with secondary preventive strategies did not appear to be influenced by sociodemographic factors [13]. The lack of consistent associations between knowledge and adherence highlighted in these studies bring out the need for further research to establish a clearer consensus in low- and middle-income regions including Sri Lanka.

It is worth noting that attitudes among the Sri Lankan population towards CVD were high. On the other hand, the knowledge and practices on risk factors were moderate [7]. Overall knowledge among post-MI

patients was good, while a significant number had excellent knowledge despite only 1.7% having inadequate knowledge [13]. Conversely, the knowledge of prescribed medication among the majority is poor, while comprehensive knowledge, attitudes and practices regarding secondary prevention were inadequate [7,13]. Therefore, enhancing awareness and promoting positive behavioral changes are essential for improving outcomes. To achieve this, implementing advanced, community-directed IHD prevention programs in high-risk populations is crucial. Previous investigators have recommended effective health education interventions led by government hospitals and local doctors to address these gaps [6].

In addition to early identification and risk factor modification, Optimal treatment outcomes rely on medication compliance and persistence [14,15]. Compliance is used interchangeably with treatment adherence and describes the degree to which a patient follows the recommended treatment with regard to timing, dosage, and frequency of medication taking. Persistence on the other hand expresses the act of continuing to take any amount of the medication for the prescribed length of time [15]. Evidence highlights that poor adherence to cardiovascular medications alone accounts for a substantial proportion of CVD events, with meta-analyses shows that only about 60% of patients achieved good adherence [16]. Frequent daily doses, being younger, and having a job were strongly linked to non-adherence [17]. Place of residence, educational status, health insurance coverage, social support, knowledge of disease, distance from a health care facility, and number of medications are noted as independent predictors of medication adherence [18]. Most importantly, treatment simplicity is essential since optimal medical therapy necessitates greater dosages and more medications, which may directly affect adherence [17]. Given the adherence patterns and barriers vary across populations, identifying context specific determinants within the local setting is crucial for designing targeted interventions to improve drug adherence and consequently achieve better CVD outcomes.

Declining cardiovascular mortality rates in high income countries (HICs) are largely attributed to improved CVD care and effective risk factor management whereas limited resources, inadequate infrastructure and insufficient understanding of population-specific needs continue to sustain the high burden of CVD in LMICs. Unlike, Western nations where large longitudinal cohorts provide reliable, high-quality data on CVD, South Asia, particularly Sri Lanka, has not benefited from such practice. Despite the substantial Unfortunately, the enormous amount of medical data generated during patient care in daily basis in government hospitals in Sri Lanka, its utility remains

restricted, as institutional and population-based registries are either nonexistent or minimally developed. In this background the present study explores the knowledge, attitudes and awareness of IHD, as well as treatment adherence among a group of Sri Lankan population. This work seeks to generate insights relevant to locals with the aim of further contributing to the broader, global understanding of IHD and informing strategies for improved disease management in similar contexts.

Methods

Study Setting and Participants

A descriptive, cross-sectional study was done using an interviewer-administered questionnaire. Eligibility criteria for the study's participants were as follows: 1) age above 18 years; 2) mentally competent; 3) previously diagnosed as IHD by consultant physicians; 4) with at least 3 months of attendance to medical clinics of wards 3 and 4, Colombo South Teaching Hospital, Kalubowila, Sri Lanka.

Participants were selected consecutively between September 1, 2020, and March 1, 2021. The lead investigator discussed the aim, potential risks, and advantages of the study and received informed written consent from participants. Study participants who declined to provide written, informed consent were not included.

The Questionnaire

Data was collected using interviewer-administered questionnaires from the participants. The IHD Fact Questionnaire was created as a tool to assess the patients' knowledge, attitudes, and awareness of IHD by drawing on the body of existing research as well as the expertise of cardiologists and practicing clinicians. Initially created in English, the questionnaire was later translated into Tamil and Sinhala. It includes multiple questions with validated answers; The Morisky Medication Adherence Scale was used to assess medication adherence and to identify reasons for non-adherence [18,19]. A pilot study was conducted at Colombo South Teaching Hospital, Kalubowila, before the main study, and its data was excluded from the final analysis.

Data Analysis

Collected data was entered into Microsoft Excel and analyzed using a beta version of SPSS software. $P < 0.05$ was the threshold for significance. T-tests and Chi-square tests were used for bivariate analysis, and significant variables were included in the binary logistic regression to determine independent predictors of the knowledge. The model significance of the binary logistic regression was checked using the Hosmer and Lemeshow test.

Ethical Consideration

Ethical approval was obtained from the Ethical Review Committee of the Colombo South Teaching Hospital, Kalubowila and the Ethical Review Committee, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka (IERC/2020/882).

Results

A total of 402 individuals, ranging in age from 40 to 89 years, participated in the study. The majority of participants belonged to the 60–69 year age category (48.5%) and were male (62.1%). Most participants reported never smoking (80.5%) and never consuming alcohol (237; 59.3%). A significant proportion of participants (29.5%) had attained education up to the Advanced Level, a substantial number (153 individuals; 38.2%) were unemployed, and nearly half (45.8%) reported a monthly income of less than 14,999 Sri Lankan rupees.

The demographic characteristics, educational level, profession, the status of smoking and alcohol consumption of the patients are displayed in Table 1.

Notably, the majority of patients (69.4%) had both hypertension (HTN) and IHD. Diabetes mellitus was present as a co-morbidity in 56.1% of patients. Chronic kidney disease (CKD) and chronic obstructive pulmonary disease (COPD) were observed in 10.1% and 3.5% of patients, respectively.

The mean weight of the population was 67.7 kg ($SD = \pm 11.5$). With regard to BMI, the majority (64.4%) had a normal BMI, while 24.6% of participants were overweight. Only a few participants belonged to the obese (3.8%) category.

The mean blood pressure values for systolic and diastolic blood pressure were 136.1/67.5 mmHg. The mean total cholesterol level was 141.4 mg/dL. The mean fasting blood sugar level reported was 134.1 mg/dL, while mean serum creatinine level was 1.5 mg/dL.

Participants were surveyed on their knowledge, attitudes, and awareness of ischemic heart disease. Nearly all participants correctly identified both modifiable 100%, 95%CI [99.1, 100] and non-modifiable 99.8%, 95%CI [98.6, 100] risk factors for IHD (Table 2). However, fewer than half 45%, 95%CI [40.1, 49.9] recognized IHD as one of the leading causes of death worldwide.

While 99.3%, 95%CI [98.5, 100] of participants were aware that hypertension can lead to life-threatening conditions such as strokes, only 54.7%, 95%CI [50.0, 59.3] correctly identified the normal blood pressure level, and just 46.8%, (95%CI {42.0-51.6}) were able to identify the normal fasting blood glucose level. Over

80% of participants demonstrated awareness of healthy dietary practices and the recommended levels of physical activity.

Table 1: Frequencies of demographic factors in the study population

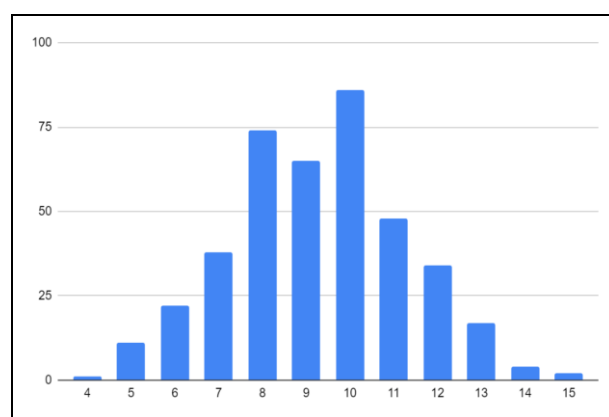
Demographic factors	Frequency (%)
Age	
40 - 49 Years	2 (0.5)
50 - 59 Years	22 (5.5)
60 - 69 Years	195 (48.5)
70 - 79 Years	148 (36.8)
80 - 89 Years	35 (8.7)
Gender	
Male	249 (62.1)
Female	152 (37.9)
Ethnicity	
Sinhala	366 (91.3)
Tamil	26 (6.5)
Muslim	9 (2.2)
Highest education	
No schooling	48 (12.0)
Primary level	65 (15.8)
Ordinary level	100 (24.8)
Advanced level	115 (29.5)
Undergraduate level	65 (15.8)
Postgraduate level	9 (2.3)
Smoking	
Never smoked	323 (80.5)
Ex-smoker	77 (19.2)
Current smoker	1 (0.2)
Mention pack years	23.9 ± 9.2
Alcohol	
Has never consumed	237 (59.3)
Ex Consumer	149 (37.3)
Current consumer	14 (3.5)
If currently consuming	
1-3 days/week	14 (51.9)
4-6 days/week	2 (7.4)
Mention units/week	17.69 ± 4.84
Occupation	
Housewife	131 (32.7)
Unemployed	153 (38.2)
Self-employed	68 (17.0)
Business	6 (1.5)
Officers	5 (1.2)
Professionals	2 (0.5)
Retired officers	36 (9.0)

Medication Adherence among the study participants is summarized in Table 3. Despite only one, 99.8%, (95%CI{98.6-100}) of patients had taken their medication regularly during the past week, past month, as well as the day before the clinic visit. Nearly half of

the patients reported they had not taken or not aware if they took their medication when they were outside the home. Only 5%, (95%CI {2.9-7.1}) of participants reported discontinuing medication due to side effects, while 3.5%, (95%CI {1.7-5.3}) stopped treatment under the belief that they had been cured, which suggests generally good medication adherence among the study population.

The Participants had 9.3 mean score for knowledge about IHD, with a standard deviation of 2.0. Over 80% of the patients scored above 6. The frequency distribution of knowledge scores is shown in Figure 1.

Figure 1: Distribution of patients' knowledge regarding IHD



The associations between knowledge scores and anthropometric measures, comorbidities and biochemical parameters were assessed. Knowledge was statistically significantly associated with body weight ($p < 0.001$) and BMI ($p = 0.002$). Patients with good knowledge had a mean weight of 69.1 kilograms, whereas those with poor knowledge had a mean body weight of 61.7 kilograms. However, there no significant association was found between knowledge and height ($P = 0.112$).

Notably, there was a statistically significant association between knowledge and DM ($p = 0.021$). The majority of patients with DM (58.7% = 193) had good knowledge, while 29 (%) DM patients had poor knowledge. However, there was no statistically significant association between the knowledge and other comorbidities such as HTN ($P = 0.472$), CKD ($P = 0.584$), COPD ($P = 0.056$). Furthermore, no statistically significant association was found between knowledge and systolic blood pressure ($P = 0.678$), diastolic blood pressure ($P = 0.161$), fasting blood sugar ($P = 0.354$), total cholesterol ($P = 0.715$), and serum creatinine ($P = 0.148$).

The independent predictors revealed during bivariate analysis were further analyzed using binary logistic regression, as shown in Table 4: Factors affecting knowledge (Logistic regression – Dependent variable is knowledge). The binary logistic model is significant in our study with the added variables. Thus, according to

this model, education levels, BMI, cholesterol levels, and diabetes are the independent predictors of knowledge ($P < 0.02$).

Table 2: Knowledge, attitudes, and awareness towards ischemic heart disease

Variable	Correct answer frequency (%)
Epidemiology	
Did you know that IHD is one of the leading causes of death in the world?	181 (45.0)
Did you know that the majority of deaths occur in low/middle-income countries?	20 (5.0)
Risk factors	
Modifiable risk factors	402 (100.0)
Non-modifiable risk factors	401 (99.8)
Knowledge of risk factors	
Do you know the normal values of blood pressure?	220 (54.7)
Do you know whether hypertension can lead to the following life-threatening conditions?	399 (99.3)
Do you know the normal blood sugar values?	188 (46.8)
Do you know that fruits, vegetables, legumes & fish help to maintain a healthy dietary pattern and reduce the risk?	364 (90.5)
Do you know that polyunsaturated fat is better than saturated fat?	34 (8.5)
Do you know the recommended level of physical activity that should be maintained?	358 (89.1)
Do you know whether the risk of developing IHD increases or decreases along with age?	326 (81.1)
Do you know which sex has a higher chance of developing IHD in old age?	191 (47.5)
Can medication alone control and improve IHD?	45 (11.2)
Are you aware of your most recent investigation results?	206 (51.2)
Do you know whether the following are symptoms/ signs of IHD?	402 (100.0)

Table 3: Patients' Medication Adherence

Variable	Yes	No	Don't know
Have you regularly taken your drugs during the last month?	401 (99.8)	0 (0.0)	1 (0.2)
Have you regularly taken your drugs during last week?	401 (99.8)	1 (0.2)	0 (0.0)
Have you regularly taken your drugs yesterday?	400 (99.8)	1 (0.2)	0 (0.0)
Have you stopped your drugs due to side effects?	20 (5.0)	381 (94.8)	1 (0.2)
Have you stopped your drugs thinking that your condition has returned to normal?	14 (3.5)	386 (96.3)	1 (0.2)
Have you taken your drugs when you were outside home?	198 (49.3)	94 (23.4)	110 (27.4)

Table 4: Factors affecting the knowledge (Logistic regression – Dependent variable is knowledge)

Variable	Coefficient	P-Value	Odds Ratio	95% CI	
				Lower	Upper
Education	-0.639	<0.001	0.528	0.417	0.668
BMI	-0.833	0.002	0.435	0.258	0.732
High cholesterol levels	0.960	0.002	2.611	1.413	4.825
Diabetes	0.713	0.016	2.040	1.142	3.646
Constant	-0.460				

Discussion

Our study aims to deliver a comprehensive analysis and interpretation of the research findings within the

framework of existing literature. This is crucial for understanding patient knowledge, attitudes, awareness and medication adherence to IHD and guiding future research. The implications of the findings improve the quality of care while enhancing patient participation in the management. There is a rich body of research on patient knowledge, attitudes, and practices and also to assess treatment adherence of IHD both internationally and locally. Based on prior data on knowledge, attitudes, and treatment adherence, there is a tremendous gap between different study populations, mostly due to variations in the study population, such as socio-demographic factors and study methodology-related factors, sample size, and the setting. Hence, navigating local studies is pivotal to better understanding individual patient cohorts.

In the Sri Lankan context, secondary prevention of CVD is barriers by poor patient knowledge, multiple medication regimes, poor treatment adherence and concurrent co-morbidities [20]. Although previous studies have yielded increased utilization of secondary preventive medications and improved laboratory parameters – likely reflecting better patient awareness – co-morbid conditions such as, DM and HTN have trended upward over time [21]. This indicates that awareness alone may not be sufficient to modify long-term cardiovascular risk, and behavioral, social, and healthcare system constraints may limit patients' capacity to adopt recommended preventive practices.

Smoking remains a well-established risk factor for IHD. A study conducted at Teaching Hospital, Karapitiya, Sri Lanka, reported that 36% of participants were former smokers, while 11% were current smokers [22]. In comparison, our study showed a lower proportion, with 19.2% identified as ex-smokers and only 0.2% as current smokers. Awareness of smoking risks was high, with 90% recognizing smoking as a modifiable risk factor and 80% acknowledging the importance of cessation which findings consistent with global literature [21,23,24]. Despite this high level of awareness, the overall knowledge score in our study remained moderate, at 5.8 out of 14, the mean pack-years smoked was 23.9. Importantly, no significant association between smoking status and knowledge level was detected. Cultural norms, addiction-related factors, limited access to cessation support, and economic stressors may weaken the link between awareness and preventive behavior, highlighting the complexity of modifying lifestyle risk factors in real-world settings.

Another study that highlighted dietary practices found a satisfactory level of knowledge of dietary practices in only 15.3% of patients. Despite 51% of the population being willing to change their dietary habits, low percentages were reported for the willingness of specific

dietary changes such as reducing salt (27%) and fat (50%). Willingness to increase the consumption of fruits and vegetables was shown by 75% of patients. Knowledge and attitudes regarding dietary management were significantly associated with the level of education and the monthly income, not only that but also with the nationality [25]. The assessment of dietary practices in IHD in our study revealed that 90.5% of the patients recognized the benefits of fruits, vegetables and fish in reducing the risk of IHD. However, the knowledge regarding fats were notably lacking with only 8.5% understanding that polyunsaturated fats are healthier than saturated fats. Additionally, 67.6% of the patients acknowledged that an unhealthy diet could contribute to IHD. Awareness of dietary practices is significantly associated with family history and higher education level [26]. Socioeconomic factors, cultural dietary preferences, and limited access to nutrition counseling likely contribute to this knowledge gaps. Evidence from prior studies suggest that structure interventions, such as supervised exercise programs and regular follow-up can enhance self-efficacy and encourage lifestyle modification [27], which could also be effective for the Sri Lankan population.

The geriatric population often suffers from multiple chronic diseases, including IHD, necessitating daily use of multiple medication regimes. Reliable medication adherence reduces disease-related morbidity and mortality while improving overall quality of life, reducing healthcare costs, and reducing the disease burden on the economy. Although good medication-adherence was observed in 45.1% of individuals in a previous study [28], the medication-adherence in our study was 100% in the past month and was almost 100% during the past week as well as the day before. About half of the participants in our study ensured they took their medications while away from home. Throughout the past week, medication adherence remained consistent among 99.3% of patients. This suggests that forgetfulness was not a common factor in non-adherence. Instead, carelessness emerged as the most frequently reported reason, while forgetfulness, previously identified as the least common cause, was less evident. Although overall medication adherence was not assessed in our study, adherence rates over the past month, week, and even the previous day were comparatively higher than those reported in other studies [29], which influenced by factors such as outpatient visit frequency, comorbidities, and hospital readmissions. Patients with poor adherence are known to have higher mortality risks, underscoring the critical importance of adherence in reducing disease burden.

Non-adherence was reported as 80% for combined therapy, while it was around 50% for single therapy. The adherence to medication significantly increased

with frequent outpatient visits while decreasing with the presence of comorbidities, especially chronic IHD and readmissions [30]. The risk of mortality was higher in the patients who were non-adherent to all medications. On the other hand, it was low in patients with good medication-adherence [31].

However, the exceptionally high self-reported adherence observed in this study, approaching 100% across all time frames, should be interpreted with caution. The Morisky scale relies entirely on patient self-report and is susceptible to both recall bias and social desirability bias, especially in clinic-based settings where patients may perceive pressure to report desirable behavior. Similar overestimation has been documented in other LMIC clinic populations. The lack of objective adherence measures such as pill counts, pharmacy refill data, or electronic monitoring may therefore have contributed to an inflated adherence estimate in our sample.

Research done in Northern Tanzania, based on factors like smoking status, body mass index, age, sex, blood pressure and the presence or absence of DM, found that the patients had a moderate level of knowledge regarding the disease. In contrast, the majority (65.8%) had a five-year cardiovascular risk of over 10% [7]. This gap between awareness and actual risk underscores that knowledge alone does not reliably translate into effective preventive behavior or risk reduction.

A study assessing medication-adherence further evaluates the patients' beliefs regarding medication used in IHD. Approximately half of the patients (50.4%) demonstrated poor adherence to medication. Female patients had strong beliefs regarding the specific needs of the medication; conversely, male patients had strong beliefs related to long-term side effects. The study revealed that the patients with low beliefs regarding specific concerns about medication had good compliance [32].

Adequate knowledge of IHD risk factors showed excellent compliance, leading to effective weight reduction, better compliance to lipid-lowering medications, healthy dietary practices, stress management and increased physical activity [33]. Even though the knowledge of all the participants in our study was satisfactory, no correlation between knowledge and medication adherence was detected.

Furthermore, the knowledge and attitudes regarding self-management of cardiac rehabilitation were improved in prior studies following patient education. The current study did not explore the impact of patient knowledge and attitudes on long-term management. This study evaluates the knowledge, awareness, attitudes and medication adherence of patients with ischemic heart disease in a tertiary care hospital in Sri

Lanka. The participants' overall knowledge and awareness about the disease condition was satisfactory. However, gaps in knowledge and awareness could be appreciated concerning several subcomponents, such as epidemiological factors and dietary practices. The patients' adherence to medication was good and forgetfulness was not a contributory factor. Extensive research with higher sample size is recommended to be conducted to identify the level of knowledge on sub-components of the disease and management, qualify the medication adherence and detect factors affecting poor adherence.

Limitations

There were a few limitations in our study. Mainly, the broad content of the topic could be more precise if narrowed down to a sub-component of knowledge and awareness regarding IHD, which would produce concise results and outcomes rather than assessing the knowledge as a whole. Also, Medication adherence was assessed solely using a self-reported scale without objective verification, which may have led to overestimation due to recall and social desirability bias. Our research only evaluated the factors for poor adherence confining to only forgetfulness or not. An extensive review of non-adherence factors would have benefitted the study population.

Conclusion

The study evaluates the knowledge, awareness, attitudes and the medication adherence of patients with ischemic heart disease in a tertiary care hospital in Sri Lanka. The participants' overall knowledge and awareness about the disease condition was satisfactory. However, gaps in knowledge and awareness could be appreciated in relation to several subcomponents such as epidemiological factors and dietary practices. The patient adherence to medication was good and forgetfulness was not a contributory factor. Extensive research with higher sample size is recommended to be conducted to identify the level of knowledge on subcomponents of the disease and management, qualify the medication adherence and detect factors affecting poor adherence.

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Author Contributions

Conceptualization: MP
Study design and planning: MP, SJ
Data collection: MP, SJ
Data analysis: MP, SJ, HW, JW

Writing – original draft preparation: MP, SJ, HW, SP, MS, MG
Writing – review & editing: SP, HW, MS, MG
Supervision: JW, HS

COPD – Chronic Obstructive Pulmonary Disease
CKD – chronic kidney disease
CVD– cardiovascular disease
HICs – High Income Countries
BMI – body mass index
LMICs – Lower- and Middle-income countries
MI - Myocardial Infarction

Abbreviations

DM – Diabetes mellitus
HTN – Hypertension
IHD – ischemic heart disease

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