



Proceeding Paper

Barriers to Accessing Medical Services and Adherence to Recommended Drug Regimens among Patients with Non-Communicable Diseases: A Study at Divisional Hospital Thalangama, Sri Lanka [†]

Haththotuwa Gamage Amal Sudaraka Samarasinghe ¹ , Devindra Arachchilage Thilanka Dileepa Sandaruwan Ranasinghe ², Weligamage Ranjan Jayasekara ², Senarath Arachchige Anusha Dulangani Senarathna ², Jayakodyge Dona Pavithra Madhushani Jayakody ², Piumi Madhusa Kalubovila ², Madhuka Deshani Edirisuriya ² and Nanayakkara Senarath Appuhamilage Samanthi Nisansala Senarath ^{2,*}

¹ Department of Medical Science in Acupuncture, Faculty of Health Sciences, KIU, Battaramulla 10120, Sri Lanka; amalsudaraka@gmail.com or amal@kiu.ac.lk

² Faculty of Nursing, KIU, Battaramulla 10120, Sri Lanka; dilnms5@gmail.com (D.A.T.D.S.R.); wranjanjayasekara@gmail.com (W.R.J.); dulanganianusha@gmail.com (S.A.A.D.S.); pavithrajayakody137@gmail.com (J.D.P.M.J.); piyumi.madhu1992@gmail.com (P.M.K.); madhuka@kiu.ac.lk (M.D.E.)

* Correspondence: samanthi@kiu.ac.lk or samanthi.nsas@gmail.com; Tel.: +94-766641841

[†] Presented at the 3rd International Electronic Conference on Nutrients, 1–15 November 2023; Available online: <https://iecn2023.sciforum.net/>.



Citation: Samarasinghe, H.G.A.S.; Ranasinghe, D.A.T.D.S.; Jayasekara, W.R.; Senarathna, S.A.A.D.; Jayakody, J.D.P.M.; Kalubovila, P.M.; Edirisuriya, M.D.; Senarath, N.S.A.S.N. Barriers to Accessing Medical Services and Adherence to Recommended Drug Regimens among Patients with Non-Communicable Diseases: A Study at Divisional Hospital Thalangama, Sri Lanka. *Biol. Life Sci. Forum* **2023**, *29*, 14. <https://doi.org/10.3390/IECN2023-15526>

Academic Editor: Maria-Luz Fernandez

Published: 31 October 2023



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Abstract: Noncommunicable diseases (NCDs) are a major global health concern, responsible for 71% of annual deaths, particularly impacting low- and middle-income countries. Medication non-adherence is a significant contributor to poor NCD control. This study, conducted at Divisional Hospital Thalangama in Sri Lanka with 400 NCD patients, reveals barriers to adherence and access to medical services. Participants were primarily female, elderly, and had limited education and income. Prevalent NCDs included type II diabetes, hyperlipidemia, and hypertension. Adherence to dietary guidelines and health-promoting practices was suboptimal. Addressing these barriers is essential for improving NCD management and reducing health disparities.

Keywords: noncommunicable diseases; medication nonadherence; healthcare access barriers

1. Introduction

Noncommunicable diseases (NCDs) account for 41 million annual deaths worldwide, or 71% of all fatalities [1,2]. Non-communicable diseases (NCDs), including hyperglycemia, cancer, hypertension, cardiovascular conditions, asthma, COPD, and respiratory complications, have a significantly high death rate, particularly in low- and middle-income countries, posing a substantial challenge to reducing health disparities between poor and developed nations [3]. Numerous non-communicable diseases (NCDs) can be mitigated through the reduction of prevalent risk factors like tobacco consumption, excessive alcohol consumption, sedentary lifestyles, and poor dietary choices, with NCDs encompassing various other significant conditions, including injuries and mental health disorders [2,4]. The rising burden of illness and death caused by noncommunicable diseases (NCDs) is primarily due to many people with NCDs not effectively controlling their conditions. This happens because of several factors, including healthcare systems not working together efficiently, patients not following self-care recommendations properly, and lack of medication adherence [5,6]. Medication nonadherence is one of these factors that contributes most frequently to insufficient control of NCDs and may be modified [5]. Compliance with

chronic illness treatment is generally 50% globally but notably lower in developing countries like India, Lebanon [7] and Nigeria [8], where various studies have reported varying levels of nonadherence among patients with NCDs [5,9–12]. This study was conducted to investigate barriers of access to medical services and adherence to recommended drug regimens among patients with NCDs in Sri Lanka, particularly among those attending Divisional Hospital Thalangama. The objectives included identifying barriers, assessing NCD prevalence, evaluating issues related to accessing medical services, examining drug regimen adherence, and identifying adherence-related obstacles in this patient population.

2. Methods

The [5] methodology was adapted for a descriptive cross-sectional study investigating access barriers and drug regimen adherence among NCD patients at Divisional Hospital Thalangama's NCD Clinics, a facility with 70 beds and an annual admission rate of approximately 3500. Data collection employed simple random sampling, resulting in a sample size of 400. Inclusion criteria comprised registered NCD Clinic patients willing to participate, while exclusion criteria included severe pain, acute psychiatric problems, cancer, speech or oral issues, or critical illness. Ethical approval was secured from KIU (KIU/ERC/22/095), with permissions from the Divisional Medical Officer and Consultant Family Physician. Participants provided consent and completed questionnaires in multiple languages, and data will be discarded after five years. Pre-testing involved 20 patients with NCDs which were not in the main sample. Data analysis used SPSS (version 25) and Excel for descriptive and inferential statistics.

Data were gathered through pre-tested interview-administered questionnaires, organized into five subsections. Section 1 covered demographic and baseline characteristics. Section 2 employed the Morisky Medication Adherence Scale (MMAS-8) to assess medication adherence. The Morisky Scale, a validated tool used globally, utilized questions designed to minimize "yes-saying" bias. Section 3 assessed patients' perceptions and experiences of treatment through the Drug Attitude Inventory (DAI-30), which categorized patients into adherent or non-adherent based on their responses. Section 4 focused on patients' psychological status using the Patients' Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder Scale (GAD-7). Finally, employed a self-developed questionnaire, based on the scientific literature, to address other barriers influencing access to medical services and adherence to recommended drug regimens.

3. Results

In this study, a sample of 400 NCD patients was enrolled, and it is important to note that all the variables in this study were distributed normally. The majority of participants were female (56%), followed by the Buddhist faith (95.75%), identified as Sinhalese (97.25%), and were married (94%). The mean age was 63.0 ± 10 years, with an age range spanning from 38 to 94 years. The average income level was LKR $34,462.65 \pm 16,496.7$ (USD $106.41 + 50.94$). Additionally, the mean number of children was 1.94 ± 0.95 , and the mean age of the youngest child was 33.11 ± 10.51 years. Regarding education and employment, 73.5% had primary education, and 53% were unemployed. Furthermore, the majority of participants reported never using alcohol (75.5%) or never smoking (81.25%). Among the prevalent NCDs, diabetes type II was observed in 69.3% of cases, hyperlipidemia in 79.3%, and hypertension in 84.3%. The mean disease duration for hypertension was 9.16 ± 6.29 years, with a range of 0.5 to 30 years, while for diabetes mellitus type II, it was 9.7 ± 7.13 years, with a range of 0.5 to 40 years. Commonly prescribed drug groups included Angiotensin II receptor antagonists (54.3%), Biguanides (64%), Sulfaurea (49.8%), and dyslipidemia drugs (82.3%).

A relatively low percentage of participants adhered to specific dietary guidelines, with only 22.5% following a diabetic diet and 25% opting for a low-sodium diet. In terms of physical activity, 21.3% engaged in aerobic exercises, while a more substantial 51% incorporated jogging into their routines. On the contrary, a significant majority of

respondents did not adopt certain health-promoting practices for the management of NCDs, including 31.3% who abstained from aerobics, 64.3% from regular exercise, 89% from sports participation, 96.8% from yoga, and 90.8% from Ayurvedic approaches. Further details on the frequency and percentage of participants involved in these healthy habits can be found in Table 1.

Table 1. Assessing patients’ practice of key healthy habits for NCDs.

Variable	Category	Never	Rarely	Occasionally	Sometimes	All the Time
Diabetic diet	F (%)	111 (27.8%)	58 (14.5%)	51 (12.8%)	90 (22.5%)	90 (22.5%)
Low Sodium diet	F (%)	105 (26.3%)	32 (8.0%)	43 (10.8%)	120 (30.0%)	100 (25.0%)
Normal diet	F (%)	143 (35.8%)	47 (11.8%)	17 (4.3%)	21 (5.3%)	172 (43%)
Exercise	F (%)	257 (64.3%)	57 (14.3%)	39 (9.8%)	31 (7.8%)	16 (4.0%)
Sports	F (%)	356 (89.0%)	17 (4.3%)	17 (4.3%)	10 (2.5%)	-
Aerobics	F (%)	125 (31.3%)	34 (8.5%)	63 (15.8%)	93 (23.3%)	85 (21.3%)
Yoga	F (%)	352 (88.0%)	19 (4.8%)	10 (2.5%)	6 (1.5%)	13 (3.3%)
Dancing	F (%)	387 (96.8%)	4 (1.0%)	3 (0.8%)	3 (0.8%)	3 (0.8%)
Jogging	F (%)	139 (34.8%)	9 (2.3%)	10 (2.5%)	38 (9.5%)	204 (51.0%)
Ayurveda	F (%)	363 (90.8%)	16 (4.0%)	11 (2.8%)	-	10 (2.5%)

Associations between various healthcare-related factors and selected demographic characteristics were investigated in this study, and the results are summarized in Table 2, which includes the Chi-square tests at the 95% confidence interval. Regarding the shortage of medication, notable associations were observed with education, marital status, and individual income, while gender and age did not show significant association. Similarly, the high cost of medication was found to be associated with age, education, and marital status, with no significant association with gender, religion, nationality, or individual income. High travel costs were associated with age, religion, education, marital status, and individual income, but not gender or nationality. The high cost of healthy foods exhibited associations with age, religion, education, and marital status, excluding gender, individual income, and nationality. Suffering from multiple diseases simultaneously was associated with age and education, independent of gender, religion, nationality, or income. Waiting times for healthcare services were linked to age, religion, nationality, education, and marital status, with no significant associations with gender or income. Multiple locations for tests and specialists were associated with age, religion, nationality, education, and marital status, excluding gender and income. Lastly, continuity of care was linked to age, religion, nationality, education, and marital status, with no significant association with gender or income. Frequent dosing of medication was associated with age and education, independent of gender, income, religion, or nationality. These findings underscore the complex interplay between healthcare barriers and demographic characteristics, providing insights for targeted interventions and policy measures to enhance healthcare accessibility and affordability.

Medication adherence was assessed using the validated eight-item Morisky Medication Adherence Scale (MMAS-8) (Table 3). Among the study participants, 46.5% demonstrated higher drug adherence (MMAS-8 score > 8), while 13% exhibited moderate adherence (MMAS-8 score between 6 and 8), and 40.5% displayed low-level adherence (MMAS-8 score < 6).

Summary statistics for the Morisky Medication Adherence Scale are presented in the table as indicated in Table 4. The mean drug adherence level was calculated as 6.26 ± 2.2 , with drug adherence scores ranging from 0.25 to 8.

Furthermore, the attitudes towards the use of drugs were observed using the Drug Attitude Inventory (DAI-30) (Table 5). Summary statistics for the Drug Attitudes Inventory are presented in the table below. The mean scores for positive adherence and negative adherence were calculated as 25.52 ± 3 .

Table 2. Associations between selected demographic characteristics and commonly identified barriers.

Type of Barrier and Association	Age	Gender	Education	Religion	Nationality	Marital Status	Individual Income
Shortage of medication	18.34 (0.11)	2.82 (0.42)	52.92 (0.00)	8.52 (0.20)	6.82 (0.04)	18.41 (0.01)	26.42 (0.01)
High cost of medication	31.85 (0.01)	4.48 (0.35)	87.33 (0.00)	8.41 (0.40)	7.87 (0.45)	20.36 (0.01)	14.93 (0.25)
High travel cost	38.30 (0.00)	5.16 (0.27)	78.72 (0.00)	19.99 (0.01)	7.57 (0.48)	26.88 (0.01)	28.61 (0.03)
High cost of healthy foods	42.42 (0.00)	5.28 (0.26)	84.74 (0.00)	16.62 (0.03)	7.84 (0.45)	36.52 (0.00)	19.82 (0.03)
Suffer from more than one disease or condition at the same time	29.28 (0.02)	3 (0.56)	72.64 (0.00)	12.66 (0.12)	15.53 (0.05)	49.23 (0.01)	20.11 (0.22)
Waiting time	29.52 (0.02)	4.41 (0.35)	87.38 (0.00)	29.65 (0.00)	40.30 (0.00)	31.64 (0.01)	10.42 (0.84)
Multiple locations for tests and specialists	30.51 (0.02)	2.1 (0.72)	80.36 (0.00)	29.75 (0.00)	26.25 (0.01)	28.08 (0.01)	12.37 (0.72)
Continuity of care	46.74 (0.01)	5.17 (0.27)	90.22 (0.00)	18.88 (0.02)	25.84 (0.01)	30.44 (0.01)	21.98 (0.14)
Frequent dosing of medication	75.75 (0.01)	1.39 (0.85)	57.68 (0.00)	14.65 (0.07)	12.61 (0.13)	39.32 (0.00)	17.41 (0.36)

Table 3. MMAS-8 drug adherence levels.

Variable	Category	Frequency	Percent
MMAS drug adherence level	High adherence >8	186	46.5
	Moderate adherence 6–8	52	13.0
	Low adherence <6	162	40.5

Table 4. MMAS-8 summary statistics.

Total MMAS-8	
Mean	6.26
Median	7
Mode	8
Std. Deviation	2.2
Skewness	−1.11
Std. Error of Skewness	0.12
Minimum	0.25
Maximum	8

Table 5. DAI-30 summary statistics.

Total DAI-30	
Mean	25.52
Median	26.00
Mode	26.00
Std. Deviation	3.00
Skewness	−1.35
Std. Error of Skewness	0.12
Minimum	11.00
Maximum	30.00

Psychological distress was assessed using the Patient Health Questionnaire (PHQ-9) and the General Anxiety Disorder (GAD-7). The majority of participants exhibited minimal depression (71.5%), while 21.3% displayed mild depression, and 6.3% showed moderate

depression. Additionally, 1% of the participants, represented by four individuals, exhibited severe depression ($n = 4$). Summary statistics for the Patient Health Questionnaire are presented in Table 6, indicating a mean PHQ-9 score of 3.89 ± 3.87 , with depression scores ranging from 0 to 27.

Table 6. PHQ-9 summary statistics.

	Total PHQ-9
Mean	3.89
Median	3.00
Std. Deviation	3.87
Skewness	2.60
Kurtosis	11.41
Minimum	0.00
Maximum	27.00

4. Conclusions

This study provided valuable insights into the prevalence of NCDs within the study sample, shedding light on their dietary habits and physical activity patterns. Notably, a significant portion of the participants did not adhere to recommended dietary guidelines, with a low percentage following diabetic and low-sodium diets. Poor adherence to recommended drugs is common. The multiple barriers significantly contribute to access to medical services and adherence to recommended medication regimens in managing NCDs. This finding underscores the importance of investigating food consumption patterns, medication adherence, barriers access to medical services and their associated factors among Sri Lankan people to address the rising NCD burden effectively. Additionally, a substantial number of respondents did not engage in recommended physical activities, emphasizing the need for further research into physical activity habits. The limited availability of such studies in Sri Lanka highlights the urgency of deepening our understanding of the relationship between dietary choices, physical activities, and the prevalence of NCDs to inform targeted interventions and public health policies that can mitigate the growing NCD crisis in the country. Further research in this area is essential to promote healthier lifestyles and reduce the impact of NCDs on the Sri Lankan population.

Author Contributions: Conceptualization, N.S.A.S.N.S. and H.G.A.S.S.; methodology, N.S.A.S.N.S. and H.G.A.S.S.; software, H.G.A.S.S.; validation, N.S.A.S.N.S. and M.D.E.; formal analysis, H.G.A.S.S.; investigation, H.G.A.S.S., D.A.T.D.S.R., W.R.J., S.A.A.D.S., J.D.P.M.J., and P.M.K.; resources, N.S.A.S.N.S.; data curation, H.G.A.S.S.; writing—original draft preparation, H.G.A.S.S.; writing—review and editing, N.S.A.S.N.S.; visualization, H.G.A.S.S.; supervision, M.D.E. and N.S.A.S.N.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Ethical approval(KIU/ERC/22/095) was secured from the Ethics Review Committee of KIU, with permissions from the Divisional Medical Officer and Consultant Family Physician.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Summary data are available upon request.

Conflicts of Interest: The authors declare no conflict of interest.

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