

Factors Facilitating Adherence to Recommended Lifestyle-Modification amongst Hypertensive Clients at Malamulo Hospital, Thyolo, Malawi

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Abstract

Background: Adherence to recommended lifestyle modification regarding hypertension control remains a serious problem in Malawi, leading to poor blood pressure control. **Objective:** This study examined factors that facilitate adherence to recommended lifestyle modification among hypertensive clients' at Malamulo hospital in Thyolo Malawi. **Methods:** A descriptive cross-sectional quantitative study was conducted with 108 clients who were recruited through a systematic sampling method. Data were collected through face-to-face interviews using a pre-tested structured questionnaire. Using statistical Packages for Social Sciences (SPSS) version 22, Chi-Square (χ^2) test was applied to test each predictor variable for statistical significance. The significant predictors were entered into the logistic regression model to determine the independent predictors of recommended lifestyle modifications amongst clients. Odds ratio (OR) at 95% Confidence Interval (CI) was used to declare the independent effect of each variable on the outcome variable. **Results:** 108 respondents were enrolled in the study, the majority of who were women (60.2%). Findings demonstrated that clients had adequate knowledge of lifestyle modification with an overall knowledge rate of 92% though the overall adherence rate was poor at 53.8%. Having **family support (OR = 4.587, 95% CI: 1.625, 12.947, p = 0.004)** and **support groups (OR = 4.043, 95% CI: 1.496, 10.926, p = 0.006)** are more likely to facilitate adherence to recommended lifestyle modification unlike situations of non-involvement of family and lack of support groups. **Conclusion:** Clients demonstrated adequate knowledge of recommended lifestyle modifications with poor adherence to them. The presence of support groups and a strong family support system are important factors for fostering adherence to the recommended lifestyle mod-

ifications regarding hypertension control.

Keywords

Adherence, Lifestyle Modification, Hypertension, Non-Communicable Diseases

1. Introduction

Hypertension (HTN) is a recognized risk factor for stroke, chronic kidney disease, coronary heart disease, and heart failure, and a leading cause of death and disability worldwide. Its incidence has drastically increased during the past decades. If not well controlled, HTN leads to long-term health consequences. Lifestyle modification which involves making specific behavioral changes has proved to be significant in the successful control and treatment of HTN [1]. Its programs target reinforcement of adherence to drugs, eating habits, weight control and exercises [2]. Lifestyle modification approaches that focus on enjoyment, instilling a sense of competence in clients and social interaction are associated with greater participation in treatment and positive treatment outcomes.

HTN is responsible for 13% of total deaths, and 62% of all stroke deaths and disabilities [3]. It is the leading cause of high morbidity and mortality in the adult population worldwide [4]. The total number of hypertensive clients in Sub Saharan Africa (SSA) was estimated at 75 million approximating 16.2% in 2008, and further projected at 125.5 million by 2025 [5]. To prevent and control the burden which is fast increasing, World Health Organization (WHO) recommended comprehensive treatment of HTN which includes the provision of health education on adherence to medication and lifestyle modification [6]. Lifestyle modification is the most significant step in the management of HTN and includes the adoption of DASH (Dietary Approaches to Stopping Hypertension) diet, reducing salt and sodium intake, cessation of smoking, moderation of alcohol intake, exercises and weight control [7]. It is regarded as the first-line treatment in clients who are not on pharmacotherapy and an adjunct to drug therapy in clients who are already on therapy. In highly motivated clients, lifestyle modification can lead to well-controlled HTN, which may subsequently lead to drug step-down or treatment withdrawal [7].

A Step-Wise Approach Survey which was conducted in Malawi in 2010 [8] shows that health education on lifestyle modification regarding HTN control has been provided in many Malawian hospitals in order to engage clients and promote adherence behaviors. Despite the continuous provision of health education to clients on behavioral modification, evidence has shown that there is still poor blood pressure (BP) control in Malawi [9] [10]. Several explanations for diverging poor blood pressure control have been proposed. Among these are pressing effects of anti-hypertensive drugs, inappropriate drug prescription and poor adherence to treatment [7] [10]. Studies conducted in Africa and Malawi, in par-

ticular, have suggested ways to address these issues [7] [9] [10]. However, literature is scanty on factors influencing adherence to lifestyle modification, as part of comprehensive treatment of HTN.

Unpublished data from Malamulo Hospital also showed that between the months of June 2015 and December 2016, at least 55 clients, approximately 11% of all hypertensive clients, had already developed hypertension-related complications although they had been on treatment and received health education on adherence. This implied that there was still poor control of HTN which could be associated with poor adherence to lifestyle modification education. This study, therefore, aimed at examining factors that influence hypertensive clients' adherence to lifestyle modification regarding HTN control at Malamulo hospital to identify problems with current practice, so that appropriate judgments and decisions are made.

2. Methods

2.1. Study Design

The study adopted a descriptive, cross-sectional, quantitative approach to examine “*adherence to recommended lifestyle modification*” as a dependent variable and 34 items which were considered as “*independent variables*”. Out of the 34 independent variables, 8 items assessed respondents' knowledge on lifestyle modification, 12 items assessed respondents' practices regarding lifestyle modification, 7 items were the facilitating factors of adherence under assessment and the last 8 items were the barriers of adherence under assessment. All questions were close-ended (**Appendix A**).

2.2. Study Setting

The study was conducted at Malamulo Adventist hospital in Makwasa, Thyolo between 1st and 30th June 2017. The hospital is located in the southern region of Malawi, 22 kilometers away from Thyolo district council.

2.3. Study Population

The study considered all adult hypertensive clients above 18 years, who were mentally stable, willing to participate in the study, and had been diagnosed with hypertension at least one year prior to the study either at Malamulo or elsewhere, and they had been involved in counseling sessions on behavior modification and drug adherence.

2.4. Sampling Technique and Procedures

Using a Confidence Level of 95% (Z-score = 1.96), $P = 0.5$, level of precision (e) of 5% (0.05) and the population size (N) of 250, the study used the Slovin's formula ($n = \frac{N}{1 + Ne^2}$) to calculate the sample size, and the sample size was calculated at 154. The first participant was selected by simple random sampling and the rest

were recruited using systematic random sampling method which was calculated at an interval of 2 so that every second client attending the HTN clinic was recruited into the study.

2.5. Data Collection Tools and Procedure

The questionnaire used in this study was adapted from the non-communicable diseases WHO STEP wise Approach survey questionnaire so that crucial elements were captured. To ensure validity and reliability of the tool, it was given to the supervisors, statistician and “**subject-matter experts**” so that they would critique and modify it to capture other information specific to Malawian context. The questionnaire was developed in English and translated into Chichewa for effective expression and communication with the participants. It was then enhanced by pretesting at Thyolo District Hospital after which it was modified accordingly before the actual study begun. One research assistant fluent in the local language and familiar with the Lhomwe customs was recruited to help in collecting data. The research assistant was oriented to the study objectives, confidentiality of information and interview techniques by the principal investigator. During health education at the HTN clinic, nurses and clinicians who were briefed were inviting clients who met the inclusion criteria to participate in the study after receiving medical care. Clients who gave consent met the researcher in an identified room. Questionnaires were administered to those who could read and write, while the researcher filled the questionnaires for those who couldn't read and write during face to face interviews.

2.6. Data Analysis

Data collected in this study were entered in, and analyzed using statistical packages for the social sciences (SPSS) version 22. Descriptive analysis was applied to demographic data, clients' knowledge and practices on recommended lifestyles and the results were presented as frequencies, and percentages in a table. Chi-Square (χ^2) test was used to test each predictor variable for statistical significance. The significant predictors were entered into logistic regression model to determine independent predictors of recommended lifestyle modifications amongst clients. Odds ratio (OR) at 95%, Confidence Interval (CI) and the *p*-value above 0.05 was used to declare the independent effect of each variable on the outcome variable.

3. Results

A total of 109 respondents were interviewed using a structured questionnaire that was developed based on the study objectives. Almost all of the respondents, 99.1% ($n = 108$), responded to all the sections, and 0.9% ($n = 1$) respondent responded only to the demographic characteristics section.

3.1. Socio-Demographic Characteristics

By gender, the majority, 60.2% ($n = 65$) of respondents were females while 50.9%

($n = 55$), of the respondents were over 55 years of age. Respondents were predominantly from Lhomwe tribe, 60.2% ($n = 65$); 54.6% ($n = 59$) had never gone to school and the majority, 85.2% ($n = 92$), were unemployed. Over half of the respondents, 50.9% ($n = 55$), were subsistence farmers. Majority, 44.4% ($n = 48$) had lived with HTN for less than 5 years; while 32.4% ($n = 35$) of them had lived with it between 6 and 10 years with a median¹ of 6 years. **Table 1** summarizes the respondents' demographic characteristics.

Table 1. Respondents demographic characteristics.

Characteristic	Value	Sample size n (%)
Sex of participant	Male	43 (39.8)
	Female	65 (60.2)
Age of participants (in years)	18 - 25	1 (0.9)
	26 - 35	10 (9.3)
	36 - 45	9 (8.3)
	46 - 55	33 (30.6)
	over 55	55 (50.9)
Marital status	Single	11 (10.2)
	Married	50 (46.3)
	Divorced	16 (14.8)
	Widow/Widower	31 (28.7)
Tribe	Chewa	8 (7.4)
	Sena	1 (0.9)
	Lhomwe	65 (60.2)
	Mang'anja	20 (18.5)
	Others	14 (13.0)
Highest education level	None	59 (54.6)
	Primary	33 (30.6)
	Secondary	13 (12.0)
	Tertiary	3 (2.8)
Employment status	Employed	16 (14.8)
	Unemployed	92 (85.2)
Type of occupation	None	24 (22.2)
	Farmer	55 (50.9)
	Teacher	1 (0.9)
	Business	21 (19.4)
	Driver	7 (6.5)
Religion of participant	Christian	103 (95.4)
	Muslim	5 (4.6)
Years with Hypertension (in years)	Less than 5	48 (44.4)
	Between 6 - 10	35 (32.4)
	More than 10	25 (23.2)
	Median	6

¹This statistic was used because years with HTN were positively-skewed.

The Chi-square test was used to check the association between respondents' socio-demographic data and adherence to the recommended lifestyle modification (Table 2).

Sex ($X^2 = 24.481, p = 0.034$), education level ($X^2 = 65.852, p = 0.003$) and number of years one suffered from HTN ($X^2 = 24.148, p = 0.041$) were the variables which were associated with good adherence to recommended life style modification.

3.2. Respondent's Knowledge and Practices of Life Style Modification

Knowledge and practices on lifestyle modification were assessed concurrently in order to determine adherence rates of the respondents. Figure 1 presents the summary of the respondents' knowledge and their practices on recommended life style modification.

The majority of the respondents, 99% ($n = 107$), acknowledged to have heard about lifestyle modification; from health workers, 100% ($n = 108$). All respondents (100%) indicated that cutting down sodium and salt intake controls HTN although only 54% ($n = 58$) of them adhered to the recommended practice. Most

Table 2. Association between socio-demographic factors and adherence to recommended lifestyle modification.

Factor	X^2	Df	<i>p</i> -value
<i>Sex of participant (female vs male)</i>	34.481	1	0.034
<i>Age of participants</i>	1.710	1	0.301
<i>Marital status</i>	2.389	3	0.115
<i>Education level</i>	67.852	3	0.003
<i>Number of years suffered HTN</i>	24.148	1	0.041

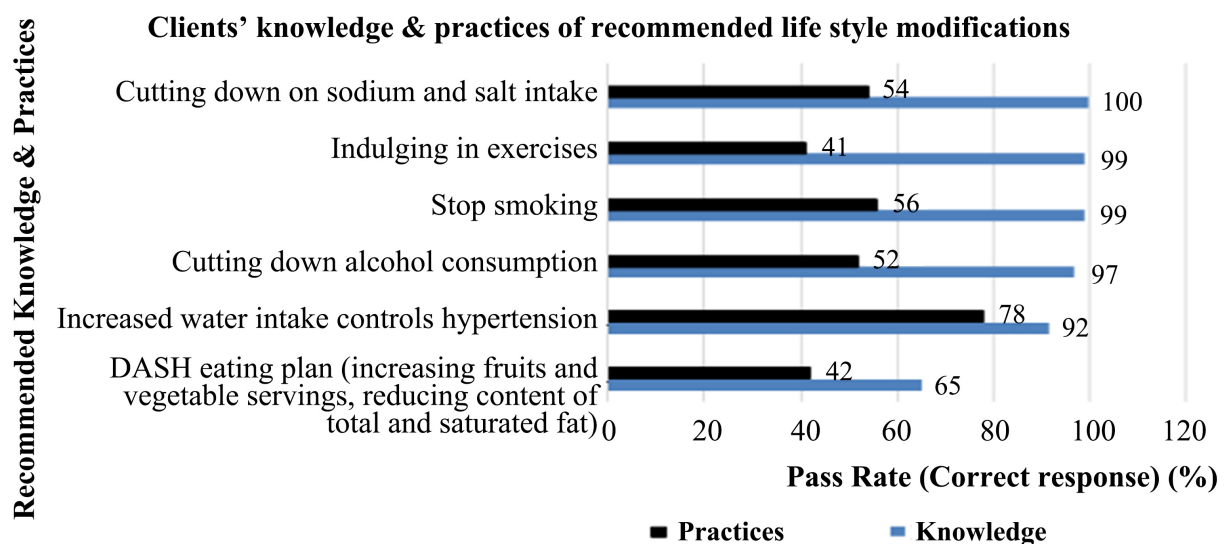


Figure 1. Respondents' knowledge & practices on recommended lifestyle modification ($n = 107$).

of them, 99% ($n = 107$), indicated that indulging in exercises controls hypertension; despite only less than half, 41% ($n = 44$), of the respondents adhering to the practice. 99% of the respondents also indicated that cessation of smoking controls hypertension. However, only 56% ($n = 61$) adhered to cessation of smoking as a recommended lifestyle modification. The majority, 97% ($n = 105$) also reported that cutting down alcohol consumption would control hypertension; only 52% ($n = 56$) of them adhered to it. More than half, 65% ($n = 70$) of the respondents agreed that adoption of DASH eating plan controls hypertension; whilst only 42% ($n = 45$) of them adhered to the practice. On average, this study found overall knowledge rate of 92%; with an overall adherence rate of 53.8%.

3.3. Factors Facilitating Adherence to Recommended Life-Style Modification

Facilitating factors associated with adherence to recommended lifestyle modification were entered into logistic regression model for analysis. Chi-square test was used to check the association between each factor and adherence to recommended lifestyle modification. **Table 3** presents the association between the facilitating factors and adherence.

Seeing positive result ($p = 0.033$), *adequate knowledge of recommended lifestyles* ($p = 0.023$), *family support* ($p = 0.019$) and *support groups* ($p = 0.020$) were the variables which were associated with adherence to recommended lifestyle modification at Malamulo hospital.

However, multivariate analysis of significant variables, in a logistic regression model, has shown that having *family support* was found to be nearly 5 times more likely to facilitate adherence to recommended lifestyle modification than in cases where families are not involved in the care of the clients (**OR = 4.587, 95% CI: 1.625, 12.947, $p = 0.004$**). Having *support groups* was also found to be 4 times likely to facilitate adherence compared to situations where there are no support groups (**OR = 4.043, 95% CI: 1.496, 10.926, $p = 0.006$**). **Table 4** summarizes the multivariate analysis of the significant facilitating factors of adherence.

Table 3. Association between facilitating factors and adherence.

Factor	χ^2	Df	p -value
<i>Seeing positive results</i>	5.020	1	0.033
<i>Adequate knowledge of recommended lifestyles</i>	5.424	1	0.023
<i>Understanding the need for adherence</i>	0.058	1	0.810
<i>Individual counseling</i>	2.401	1	0.121
<i>Family support</i>	5.476	2	0.019
<i>Support groups</i>	5.438	1	0.020
<i>Fixed routines for implementation</i>	1.071	1	0.301

Table 4. Multivariate analysis of significant facilitating factors of adherence.

Factor	Wald χ^2	Sig.	OR	95% C.I	
				Lower	Upper
<i>Family support</i>	7.804	0.004	4.587	1.625	12.947
<i>Support groups</i>	7.585	0.006	4.043	1.496	10.926
<i>Seeing positive results</i>	2.653	0.234	2.277	0.241	1.137
<i>Adequate knowledge of recommended lifestyles</i>	0.048	0.074	1.049	0.966	2.101

4. Discussion

4.1. Adherence

The study determined respondents' adherence to recommended lifestyle since successful management of chronic diseases like HTN essentially depends on adherence to therapy. On average, the study found an adherence rate of 53.8%, which was significantly lower than the expected adherence index of 80% (WHO, 2010). One study indicated that poor adherence is associated with fatalities, ineffective management of the diseases and decreased quality of life [11]. This explains why a significant percentage of clients at the study site had developed decreased quality of life and fatal hypertension-related complications. The poor adherence to lifestyle modification may be explained by provision of inconsistent or ambivalent information by health workers as evidence has shown that different health workers provide information which at times contradicts each other [12].

In addition, this poor adherence may also be explained by poor access to health care services. Literature recommends that health care services should be universally accessible in terms of affordability, physical accessibility and acceptability, not merely in terms of adequacy of supply [12]. The study setting however is a paying hospital surrounded by a largely poor population implying that services may not be fully accessible as they may be unaffordable for most. Further, physical accessibility to HTN services is also a challenge since most clients attending the HTN clinic at the hospital walk long distances or would need transportation to access the service. This forces clients to miss most medical appointments hence poor adherence.

4.2. Gender

The study found a significant association between gender and adherence level, with female respondents being more adherent than male respondents ($\chi^2 = 24.481$; p -value = 0.034). Similarly, a study conducted to assess adherence to hypertensive medication and associated factors among patients attending Renal Unit at Tikur Anbessa Specialized Hospital found an adherence rate of 40.9% among female respondents compared to 28.3% of male respondents' adherence [12]. Comparable results came out of an Ethiopian study [13]. These results could be explained by the fact that men are burdened by the outdoor activities

which make them busy and forget to practice the recommended lifestyles in regards to HTN control [14] [15] [16] [17]. Further studies need to be conducted to establish more reasons for this difference in adherence rates between male and female populations.

4.3. Experience with Hypertension

Number of years with HTN was also significantly associated with adherence level at Malamulo hospital. The study has shown that patients who had less than 5 years with HTN ($\chi^2 = 34.148$; p -value = 0.041) were associated with good adherence to lifestyle modification as compared to those who had more than 5 years with the condition. These results are congruent with studies in India [18] and in Ethiopia [19]. In contrast, other studies [20] [21] found that lower periods since diagnosis with HTN were significantly associated with poor adherence. The results may be reflecting that people from poor socio-economic statuses are associated with good adherence when they spend fewer years with the diagnosis. This may also be explained by the fact that people in the higher socio-economic class do not perceive HTN as a major threatening condition as concluded in other studies [15].

It is essential, therefore, to continuously remind and motivate hypertensive clients to practice the recommended lifestyles so that the adherence behaviour is reinforced. Still, the variations in findings need to be researched further.

4.4. Level of Education

The study also indicated that respondents who attained some level of education were more adherent to recommended life style modification than those without any formal education ($\chi^2 = 67.852$; p -value = 0.003). These results are consistent with another study conducted in a developed country which reported that educational level is significantly associated with healthful behaviors [22]. Regardless of differences in the socioeconomic statuses, some level of education may help clients to understand and comprehend medical information given. Furthermore, people who are educated may have better attitude and beliefs towards disease and its management which influence the extent to which they engage in lifestyle modification [23].

Despite these conclusions however, other researchers found that low level of education was associated with good adherence to treatment [24] [25]. This means that while education may lead to better understanding of the practices and the risks of poor adherence, one's level of education does not automatically produce and sustain a healthy behaviour. Motivation is still a key to maintain adherence practices. It may be necessary to further explore the influence of education on adherence considering the variation in results.

4.5. Facilitating Factors of Adherence to Recommended Lifestyle Modification

This study confirms that clients' efforts to adhere to HTN treatment directives

usually take place in social settings and can alter family and social dynamics [26]. The study has demonstrated a strong association between good adherence to recommended lifestyle modification and family support (**OR: 4.587; CI: 1.625; 12.947, $p = 0.004$**), and support groups (**OR: 4.043; CI: 1.496; 10.926, $p = 0.006$**). It is evident that supportive families and friends promote clients' optimism and self-esteem when managing and adhering to lifestyle changes which in turn buffers the clients' stress of being ill. Moreover, social support helps clients to change their affective states, increase self-efficacy and influence change in negative health behaviors [27] [28]. Some clients' decision making abilities, thoughts and behaviors are also positively influenced by the opinions and perceptions of their family's friends, partners or other influential community members as opposed to their in-ward looking conceptions [29].

Furthermore, social support provides an interpersonal support which becomes a significant catalyst for self-efficacy and sustained motivation for clients [30]. With social support, weak non-adherent clients learn from the strong and adherent clients, through discussion and sharing of experiences surrounding their condition, hence re-enforcing behavior changes.

Literature however has also shown results to the contrary, highlighting that social support can be a significant barrier to client's self-management [26]. It is indicated that with family support clients feel nagged, criticized and even feel guilty [31] which demotivates them from being committed to the lifestyle changes hence yielding negative health outcomes. This calls for motivation and love from care givers when providing the needed support so that clients engage fully in their own self-management, hence adhering to treatment.

5. Conclusion

The presence of support groups and a strong family support system will foster adherence to recommended lifestyle modifications, hence controlling the HTN burden in Malawi. In addition, further studies need to be conducted to explore the influence of education and experience with hypertension on adherence, and also determine why there are differences in adherence among male and female populations.

Study Limitations

Only 109 participants were recruited out of the planned 154, some being lost to follow-up, death or development of serious complications which may have affected the results. Additionally, this was a small-scale study limited to just one hospital, therefore generalization of study results may be limited.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix A

The Questionnaire (English version): **Respondent code:** _____

Topic: “Factors influencing adherence to recommended lifestyle modification amongst hypertensive clients at Malamulo Hospital, Thyolo, Malawi”.

Section A: Demographic characteristics

Instruction: Tick against a box that applies to you, and where you are required to specify, write a brief answer.

Sex: Male Female

Age (in years): 18 - 25 25 - 35 35 - 45 45 - 55 above 55

Marital status: Single Married Divorced

Tribe: Chewa Tumbuka Lhomwe Ngoni Yao Other: _____

Highest education level: Primary Secondary Tertiary None

Employment status: Employed Unemployed

If employed, what is your occupation?

Farmer Driver Teacher Business other: _____

Religion: Christian Muslim Other (specify): _____

Time since diagnosis with hypertension: _____ Year (s)

Section B: Clients' knowledge of Lifestyle modification

Instruction: circle the number that applies to each statement:

1) I have been taught/heard about lifestyle modification i. Yes ii. No

2) Where did you hear about lifestyle modification? i. health workers ii. elsewhere

Due to your high blood pressure (Hypertension) have you ever been told to:

3) Adopt DASH eating plan (diet rich in fruits, vegetables, reduced content of total and saturated fat)? i. Yes ii. No

4) Cut down on salt intake in your diet? i. Yes ii. No

5) Control/lose your weight? i. Yes ii. No

6) Indulge in exercises? i. Yes ii. No

7) Cut down on alcohol consumption? i. Yes ii. No

8) Stop smoking? i. Yes ii. No

Section C: Clients' Practices on lifestyle modification

9) Do you practice as recommended? a. Yes b. No

10) Are you now practicing DASH eating plan? i. Yes ii. No

11) Are you now cutting down salt in your diet? i. Yes ii. No

12) Are you controlling/losing your weight now? i. Yes ii. No

13) Do you exercise more now? i. Yes ii. No

14) How frequent have you been exercising for the past 3 months? i. Daily ii. Alternate days iii. Weekly iv. Monthly v. I don't know

15) How long do you exercise per each exercising session? i. At least 30 minutes ii. More than 1 hour iii. Decided by the owner iv. I don't know

16) Are you now cutting down on alcohol consumption? i. Yes ii. No

17) How much alcohol do you take per day? i. Specify _____ ii. Not applicable

18) Have you stopped/reduced smoking? i. Yes ii. No

19) If you have reduced, how many cigars do you smoke per day now? i. Specify ____ ii. Not applicable

Sections D: Facilitating factors of adherence to lifestyle modification

The following factors would facilitate adherence behaviors to lifestyle modification

20) Seeing positive results i. Yes ii. No

21) Adequate knowledge on lifestyle modification i. Yes ii. No

22) Understanding the need for compliance and adherence i. Yes ii. No

23) Holding individual counselling i. Yes ii. No

24) Involving guardians in the health education session i. Yes ii. No

25) Family support i. Yes ii. No

26) Support groups i. Yes ii. No

Section E: Barriers of adherence to lifestyle modification

The following factors would bar clients from adhering to lifestyle modification

27) Forgetfulness i. Yes ii. No

28) Economic constraints i. Yes ii. No

29) Being away from home i. Yes ii. No

30) Complexity of the information given i. Yes ii. No

31) Poor client-health worker relationship i. Yes ii. No

32) Patient's age (old age) i. Yes ii. No

33) Lack of motivation due to the incurable nature of the disease i. Yes ii. No

34) Asymptomatic nature of the disease i. Yes ii. No

THE END