

ANTI-HYPERTENSIVE TREATMENT AND LIFESTYLE COMPLIANCE ON PRASLIN ISLAND, SEYCHELLES

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ABSTRACT

Ensuring patients' compliance with treatment to effectively manage hypertension remains a major challenge to public health in the Seychelles. Non-compliance with treatment is the most important single reason for uncontrolled hypertension. Thus it is essential to identify factors that influence adherence negatively, and to develop strategies to improve compliance.

This quantitative, descriptive and correlation study identified and explained factors associated with treatment compliance among diagnosed hypertensive patients attending outpatient clinics on the Island of Praslin, Seychelles. The results indicate a high prevalence of obesity and uncontrolled hypertension. Reasons for anti-hypertensive treatment non-compliance include patients' preferences for and beliefs in herbal medications, alcohol abuse, failure to stop smoking and/or to lose weight and disregard for dietary restrictions of salt and animal fat. The research results can be used to devise strategies to enhance patients' compliance with their anti-hypertensive treatment and lifestyle adaptations in the Seychelles.

Keywords: Health Belief Model (HBM); hypertension lifestyle modifications; hypertension treatment compliance in the Seychelles

INTRODUCTION AND BACKGROUND INFORMATION

The Seychelles island group comprises an archipelago of various coral islands. The high level of sanitation coupled with free healthcare and education have resulted in a relatively high standard of living among the population (Ministry of Health, 2004:2). The demographic profile of the Seychelles is characterised by low infant mortality, declining total fertility rates and an increased life expectancy (WHO, 2005:5&7).

The ageing population and high national immunisation coverage have led to the preponderance of non-communicable diseases (MoH, 2004:2). The prevalence of hypertension remains high in the Seychelles. Bovet, Shamlaye, Gabriel, Riesen and Paccaud (2006:9) reported a hypertension prevalence of 43.6% among men and 35.5% among women (BP \geq 140/90 mmHg or taking anti-hypertension treatment) during 2004. This indicated that there was no substantial change since 1989 (Bovet, Romain, Shamlaye, Mendis, Daroli, Riesen, Tappy & Paccaud, 2009:34).

Hypertension and related cardiovascular diseases constitute the leading cause of morbidity, disability and mortality in the Seychelles. Between 1995 and 2005, mortality due to hypertension oscillated between 14.0% and 19.0% against total mortality. When combined with diabetes and other cardiovascular diseases, the total mortality approached 40.0% (MoH, 2005:14; National Statistics Bureau of the Seychelles, 2007:12).

Factors responsible for the high prevalence of hypertension in the Seychelles include an epidemiological transition in the early 1970s (WHO, 2005:6). As a result of increased longevity, improved standard of living, and the influence of western lifestyles, hypertension has become a major public health challenge. Risk factors for hypertension such as a sedentary lifestyle, obesity and the consumption of fatty foods are prevalent in the Seychelles (Bovet et al., 2009:34).

The high prevalence of hypertension in the Seychelles causes concern because the relatively small population requires a healthy workforce as the economic driving force and chronic debilitating illnesses affect productivity negatively. Healthcare is offered free of charge to all citizens. The government remains the main provider of healthcare in the Seychelles, financed mainly by general taxation (MoH, 2005:23). The cost of treatment to reduce these conditions in the population exceeds the normal budget of most low- and middle income countries (Bovet et al., 2006:9).

Hypertension is amenable to control by appropriate medication and adopting relevant lifestyle modifications (Lewanczuk, 2006: 615). Non-compliance with anti-hypertension medications hampers the management of hypertension. During 2001, Bovet, Burnier, Madeleine, Waeber, and Paccaud (2002:33-39) monitored hypertensive patients' medication compliance in the Seychelles for one year. Only 46.0% (n=1067) of these patients complied during the first month and this decreased to 26.0% by the twelfth month. Similar findings were reported by a systematic review (Addo, Smeeth & Leon, 2007:1016), revealing that the high prevalence of hypertension in Sub-Saharan Africa (SSA) is accompanied by low detection, treatment and control levels.

According to McDonald, Garg and Haynes (2002:2869), compliance is a complex multidimensional phenomenon, involving various personal and social factors, which are not clearly understood. It is essential to improve compliance amongst hypertension patients by identifying underlying contextual factors militating against compliance

and developing effective interventions to overcome these barriers (Thrall, Lip & Lane, 2004:595).

RESEACH PROBLEM

While various explanations for the occurrence of non-compliance elsewhere had been identified through research, there was a lack of data on the reasons specific to the hypertension sufferers on Praslin Island. Factors affecting compliance behaviour are unique to individuals and are context specific, and therefore studies done in other countries might not apply to circumstances on Praslin Island, necessitating a study among hypertensive patients on this island.

RESEARCH PURPOSE AND QUESTIONS

This research was conducted in two public health institutions on Praslin Island, with more than 7000 inhabitants (National Statistics Bureau of the Seychelles, 2007:4). The research purpose was to describe the compliance (to the drug and lifestyle modification regimens) of diagnosed hypertensive patients and to identify the factors that influenced their compliance behaviour in order to identify the reasons for non-compliance and predictors of compliance. The central question, guiding this study was: “Which factors influence compliance with medication and lifestyle modification regimens among hypertensive patients on Praslin Island?” The relationships between compliance and the theoretical variables of the Health Belief Model (HBM) were investigated by addressing the following research questions:

- How compliant are the respondents with their hypertension drug and lifestyle modification regimens?
- What is the relationship between treatment compliance (lifestyle modification and anti-hypertension drug treatment adherence) and the following variables among patients diagnosed with hypertension on the Island of Praslin: socio-demographic factors (age, gender, ethnic background; marital status, educational status, work status, household income); physiological factors (weight status); duration of illness; number of medications prescribed; doses of medication skipped; and alcohol intake per week?
- What is the relationship between treatment compliance and the following variables among patients diagnosed with hypertension on the Island of Praslin: perception of severity, perception of risk, perception of benefits, perception of barriers, internal factors, healthcare provider factors; and cues to action?
- Which of the HBM’s variables are predictor variables for treatment compliance?

Definitions of concepts

Compliance is the extent to which a person's behaviour (taking medicines, or executing lifestyle changes) consistently coincides (persistence) with medical or health advice (adherence) (Corrao, Parodi, Nicotra, Zambon, Merlino, Cesana & Mancina, 2011:611).

Blood pressure was measured using a standardised technique in accordance with the WHO/MONICA Project's recommendations. Blood pressure was measured on the right arm by using a random zero or traditional mercury sphygmomanometer after seating the participant for five minutes. Systolic and diastolic blood pressures were recorded (Tunstall-Pedoe, Connaghan, Woodward, Tolonen & Kuulasmaa, 2006:1).

Hypertension, for the purpose of this study was accepted as any blood pressure reading of 140/90 or more, or any patient who is using anti-hypertensive treatment. (The blood pressure recording must be taken while the patient is lying down).

RESEARCH METHODOLOGY

Research design

A descriptive-correlational study was conducted to examine the level of compliance with the anti-hypertension treatment of the respondents, the factors which influenced compliance and the relationships existing between these variables.

Sample selection

The accessible population comprised all hypertensive persons who received treatment at one of the two healthcare organisations on Praslin Island. Registered hypertension outpatients, aged 18-80, who had been on treatment at least one year prior to data collection, qualified for inclusion in the study.

A systematic probability sampling technique was applied involving a list of 660 registered patients. The resultant sample comprised 102 persons, namely 58 females and 44 males. The respondents were vulnerable because they relied on the clinics for their free treatment. They might have felt obliged to participate and the researcher took care to avoid any coercion when informed consent was obtained. External validity is of particular importance in descriptive-correlational studies and requires a representative sample (Burns & Grove, 2005:218-219).

Data collection

Structured individual interviews were conducted in the homes of the respondents between November 2008 and January 2009. This ensured that compliant and non-compliant persons were reached. Each respondent's blood pressure was measured prior to the interview.

The structured interview schedule comprised 4-point Likert scales, derived from the HBM (Glanz, Rimer & Lewis, 2002:46-48) and a literature review (see table 1). For a newly developed instrument, a reliability coefficient of 0.70 is acceptable (Burns & Grove, 2005:365). Table 1 indicates a high reliability coefficient for all the sections except section D. The interview schedule was pre-tested on five patients and also submitted to field experts to judge its face validity. The items that were unclear were either modified or excluded.

Document analysis, involving the respondents' clinical records, was also conducted. The data were recorded on a checklist. The focus was on medical diagnosis, prescriptions, reported medication side-effects, evidence of co-morbidity, non-compliance, and uncontrolled hypertension. The variables were measured on the nominal level.

Table 1: The structure of the interview schedule

Section	Variables	Response options	Cronbach (α) coefficient
A	Biographical (17 items)	-	-
B	Compliance with medication regimen (14 items)	Daily, frequently, rarely, never	0.86
C	Compliance with lifestyle modification regimen (11 items)	Daily, frequently, rarely, never	0.73
D	Perception of severity (4 items)	Strongly agree, agree, disagree, strongly disagree	0.38
E	Perception of risk (9 items)	75-100%, 50-74%, 25-49%, 0-24% chance	0.98
F	Perception of benefits (7 items)	Extremely beneficial, beneficial, somewhat beneficial, not at all beneficial	0.95
G	Perception of barriers (7 items)	Extremely problematic, problematic, somewhat problematic, not at all problematic.	0.85

H	Internal factors (14 items)	Strongly agree, agree, disagree, strongly disagree	0.89
I	Healthcare provider factors (13 items)	Strongly agree, agree, disagree, strongly disagree	0.91
J	Cues to action (12 items)	Strongly agree, agree, disagree, strongly disagree	0.88

Permission to conduct the interviews and use the clinical records was received from the Ministry of Health and the respondents. The records were handled in accordance with the institutional protocol. Anonymity and confidentiality were maintained by assigning codes to the respondents and their corresponding medical records, storing the data in a secure place and refraining from sharing the data with others.

Data analysis

Descriptive statistics were calculated and utilised to describe the data. Correlational analyses were done, using Pearson's correlation analysis technique. The significance level was pegged at $p \leq 0.05$.

The Chi-square test indicated whether significant relationships existed between specific biographical variables and compliance. The Chi-Square test is a nonparametric procedure used to test a hypothesis about the proportion of cases that fall into different categories when a contingency table has been created (Polit & Beck, 2008:493). The significance level was accepted as $p \leq 0.05$.

The one-way analysis of variance (ANOVA) test was used to compare compliant and non-compliant respondents to identify possible reasons for non-compliance. This test is a parametric statistical test, which assesses the significance of differences between the means of two variables or two or more groups involving a single variable (Burns & Grove, 2005: 529). The responses on several items on the Likert scales were summed and treated as interval data to be used in this test. The significance level was pegged at $p \leq 0.05$.

Stepwise multiple regression analysis was used to investigate the relative contributions of individual predictor variables to compliance behaviour. Regression analysis is a parametric test that uses known values of an independent variable to predict the values of a dependent variable (Argyrous, 2000:201).

RESULTS

Characteristics of the respondents

The mean age of respondents was 52.5 years. Only 8.8% (n=9) of the respondents had no formal education, 46.1% (n=47) had completed primary and 45.1% (n=46) had completed secondary school education or had attained some tertiary level education.

Of the respondents, 60.8% (n=62) were diagnosed more than five years prior to data collection, and 65.7% (n=67) used combined drug therapies, while 96.1% (n=98) were on single dose regimens. Increased numbers of pills and daily dose frequencies contributed to medication non-compliance (Al-Yahya, Al-Mehza & Al-Ghareeb, 2006:30).

Of the respondents, 50.0% (n=51) were obese ($BMI \geq 30 \text{ kg/m}^2$), and 37.3% (n=38) were overweight ($BMI \geq 25 \text{ kg/m}^2$). Altogether 38.2% (n=39) females and 27.5% (n=28) males presented with elevated blood pressure readings ($\geq 140/90$ mmHg) during data collection. The clinical records of 60.8% (n=62) of the respondents had evidence of uncontrolled hypertension. Most (78.4%; n=80) respondents rarely and 4.9% (n=5) never monitored their blood pressure. Routine blood pressure monitoring is important for hypertension management (Chobanian, Bakris, Black, Cushman, Green, Izzo, Jones, Materson, Oparil, Wright & Rocella, 2003:1250).

Respondents reported health complaints related to cardiovascular conditions (43.1%; n=44) and visual impairments (11.8%; n=12). Their clinical records indicated the presence of cardiac failure (16.7%; n=17), visual impairment (12.8%; n=13), chronic renal failure (7.8%; n=8), angina (7.8%; n=8) and coronary artery disease (5.9%; n=6).

Compliance

Compliance was measured in relation to the patients' adherence to their clinical appointments, anti-hypertensive medications, and lifestyle modifications.

Compliance with clinical appointments

The interviews revealed that 78.4% (n=80) of the respondents complied with clinic appointments. The clinic records revealed that 72.6% (n=74) were compliant and 27.5% (n=28) were non-compliant with follow-up visits over three appointments (9 months duration). This level of compliance is problematic, considering the evidence of uncontrolled hypertension, co-morbidities and health complaints reported by the respondents.

Compliance with anti-hypertension medications

Data obtained from the “compliance with the medication regimen” section of the questionnaire indicated that the respondents were generally compliant with their medication regimens. Many respondents (70.6%; n=72) indicated that they did not miss any dosages during the preceding three days. The medical records of 71.6% (n=73) of the respondents also had no entries of non-compliance during the past three clinical appointments. However, only 63.7% (n=65) of the respondents reported (during the interviews) that they consistently took their medications daily.

The most cited reasons for medication non-compliance were patient-related, such as failure to seek a refill (21.8%; n=22), forgetfulness (18.8%; n=19) and carelessness (16.8%; n=17), preferring to use alternative remedies (12.9%; n=13) and because they felt better (11.9%; n=12). Non-compliance was also attributed to medications’ side-effects (9.9%; n=10), beliefs that the medications were ineffective (5.9%; n=6) and fears of becoming addicted (5.9%; n=6). Treatment factors, namely frequent change of medications (4.0%; n=4) or dosages (3.0%; n=3), were also mentioned by a few respondents.

Medication side-effects are significant reasons why patients do not comply with their medication regimens (Fongwa, Evangelista, Hays, Martins, Elashoff, Cowan & Morisky, 2008:162). However, in this study, there was no evidence of reported medication side-effects in the clinical records of 91.2% (n=93) of the respondents. This finding might indicate a relative tolerance to the prescribed anti-hypertension medications among the respondents.

Compliance with the lifestyle modifications regimen

The respondents complied with eating fruits (94.1%; n=96) and vegetables (92.2%; n=94) and relaxation (68.6%; n=70). However, their reported compliance with physical exercise (50.0%; n=51), weight loss (46.1%; n=47) and sufficient sleep (28.4%; n=29) was lower. Some respondents persisted with eating foods high in animal fat (27.5%; n=28) and salt (24.5%; n=25), and drinking alcohol (21.6%; n=22). Some respondents (15.8%; n=16) also reported that they smoked. Many clinical records (63.7%; n=65) had no entries regarding non-compliance with lifestyle modifications.

Socio-demographic factors and compliance: comparative analyses

Respondents, aged 44 and older, were more compliant with treatment than their younger counterparts ($\chi^2=11.51; p=0.0032$) and females were more compliant than males ($\chi^2=4.11; p=0.043$). Respondents who were overweight ($BMI \geq 25 \text{kg/m}^2$), were more compliant than those with normal weight ($BMI \leq 24.9 \text{kg/m}^2$). Respondents who

had been employed during the past 12 months were less compliant with treatment than unemployed respondents ($\chi^2=5.43$; $p=0.0198$).

The time since initial hypertension diagnosis appeared to influence compliance. Respondents who had been diagnosed with hypertension for five years and longer, were more compliant than those who had been diagnosed less than five years ago ($\chi^2=16.02$; $p=0.0001$).

Lifestyle factors appeared to influence compliance. There was a strong relationship between doses of medication skipped during the last three days and compliance ($\chi^2=35.15$; $p=0.0001$). Respondents who admitted skipping one or more doses of medications during the previous three days were less compliant with treatment than those who reported compliance. Respondents who reported drinking alcohol a few times per week, were less compliant than those who seldom used alcohol ($\chi^2=15.89$; $p=0.0012$).

Respondents' perceptions about various factors associated with hypertension

The World Health Organization (WHO, 2003:35) describes uncomplicated hypertension as an asymptomatic disorder, and primary hypertension as incurable. Summative analysis of the "perception of severity" variable revealed that the respondents underestimated the severity of their hypertension. As many as 61.8% ($n=63$) of the respondents did not consider their blood pressure to be serious and 43.1% ($n=44$) did not worry about their blood pressure in the absence of symptoms. Some respondents (25.5%; $n=26$) thought that they had been cured and 37.3% ($n=38$) felt relaxed in the absence of symptoms.

The "perception of risk" variable revealed that the respondents underestimated their risk of developing physical, social and economic complications. They perceived themselves to be most at risk of developing kidney problems (49.0%; $n=50$). This was followed by social problems, namely becoming a burden for their families (46.1%; $n=47$), and having a disrupted family life (45.1%; $n=46$), career life (44.1%; $n=45$) and social life (45.1%; $n=46$). They were also concerned about physical problems, namely paralysis (44.1%; $n=45$), stroke (41.2%; $n=42$), heart problems (41.2%; $n=42$) and visual problems (37.3%; $n=38$).

The "perception of benefits" variable revealed that the respondents perceived the benefits of anti-hypertension treatment favourably. The most important benefit was indicated as protection from complications (87.1%; $n=88$), followed by keeping blood pressure under control (83.2%; $n=84$), increasing the quality of life (78.2%; $n=79$), avoiding an added financial burden to treat complications (77.2%; $n=78$), an increased sense of well-being (75.2%; $n=76$), a decreased chance of dying (75.2%; $n=76$) and having peace of

mind (71.3%; n=72). However, it is noteworthy that between 12.9% (n=13) and 28.7% (n=29) were not convinced about the benefits of their hypertension treatment.

The “perceptions of barriers” variable revealed that the respondents generally had a low perceptions of barriers. The most important individual barriers to compliance were the lack of discipline to comply with the required dietary restrictions (56.4%; n=57), lack of time to exercise (54.9%; n=56), ineffectiveness of the medicine to stabilise their blood pressure (53.9%; n=55), lack of motivation because they could not be cured (53.9%; n=55), lack of time to relax (52.9%; n=54) and sleeping problems (48.0%; n=49). The least cited barrier was a lack of discipline to stop smoking (36.3%; n=37).

The respondents scored relatively low on the “internal factors” variable. They generally understood their condition (96.0%; n=98) and the management thereof (92.2%; n=93). They were aware of their subjective state of health (91.2%; n=92). However, there appeared to be insufficient understanding about their medications’ functions (63.7%; n=65), the meaning of their blood pressure readings (57.8%; n=59) and what caused their hypertension (54.9%; n=56). Most respondents (76.5%; n=78) indicated that they were primarily responsible for their hypertension control, while some (33.3%; n=34) indicated that the doctor was primarily responsible. Many respondents (68.6%; n=70) lacked confidence about their ability to manage their hypertension. Of particular concern were the number of respondents (30.4%; n=31) who were not convinced of this latter ability and those (65.7%; n=67) who believed that their hypertension could be cured with local herbs.

The respondents had generally positive perceptions as measured by the “healthcare provider” variable. They indicated that they had confidence in their doctors (97.1%; n=99). They perceived the respectful attitudes (96.1%; n=98), knowledge (82.4%; n=84), experience (80.4%; n=82), and interpersonal skills of their doctors positively. The availability of medicines at the clinic (88.1%; n=89), the effectiveness of the medicines (88.1%; n=89) and the waiting times at the clinic (65.7%; n=67) were perceived positively. However, some respondents (34.3%; n=35) reported that waiting times at the clinics were too long.

The respondents scored relatively low on the “cues to actions” variable. Their responses on the individual items indicated that they regarded advice from the doctor (90.2%; n=92) and other healthcare workers (88.2%; n=90) as important motivators to comply with treatment. Health education strategies such as television (86.3%; n=88) and radio (82.4%; n=84) programmes, health education leaflets (69.6%; n=71) and posters on display (64.7%; n=66) were important motivators. Feeling ill (66.7%; n=68) and the death of a family member or friend (64.7%; n=66) also served as motivators. Less important motivators were information obtained from articles (46.1%; n=47) and the Internet (33.3%; n=34). These findings differed from those obtained by Oliveria, Chen,

McCarthy, Davis and Hill (2005:224). In the latter study only 74.0% of respondents (n=1250) awarded importance to doctors and other healthcare workers, 55.0% to the mass media (radio, television, newspaper and magazines) and 30.0% to advice from friends or family members.

Relationships between treatment compliance and the variables of the Health Belief Model

The presence of cues to action (advice, health education, feeling ill and death of a friend/relative) ($r=0.45$; $p=0.0001$) significantly contributed to treatment compliance.

Cochrane (2008:543), states that high internal factors' scores are associated with treatment compliance, as supported by this study. Pearson's correlational analysis indicated a strong positive relationship between internal factors (knowledge, internal locus of control and self-efficacy) ($r=0.37$; $p=0.0001$) and treatment compliance.

The HBM hypothesises that, for health behaviour changes to occur, perceived benefits must outweigh perceived barriers to performing that behaviour. The perception of susceptibility to develop complications is also a motivating force (Fongwaet al., 2008:162). In this study, Pearson's correlation analysis indicated that the respondents who considered the treatment to be beneficial ($r=0.46$; $p=0.0001$) and considered themselves at risk of developing complications ($r=0.30$; $p=0.0020$) tended to comply with their treatment. However, a weak statistical association was found between perceived barriers and treatment compliance.

Predictor variables of treatment compliance

Simple regression analysis demonstrated that the combination of perception of benefits, perception of barriers and cues to action formed the best predictive model in this study and explained over 31.0% of the variance in treatment compliance (see table 2).

Table 2: Regression analysis summaries of predictor variables for treatment compliance (medication and lifestyle modification)

Variable	Estimate (β)	Std error of β	t-Ratio	p-value
Perception of benefits	0.181	0.050	3.64	0.0004
Cues to action	0.239	0.077	3.10	0.0025
Perception of barriers	-0.118	0.046	-2.56	0.0120

$R^2=0.31$, R^2 adjusted=0.29, $p<0.0001$

DISCUSSION OF THE RESULTS

Compliance with the medication and lifestyle modification regimens were generally favourable but insufficient, considering the high levels of uncontrolled hypertension, co-morbidities, overweight and obesity among the respondents. Many respondents reported non-compliance and underestimated the severity of their disease and their risk of developing complications.

The respondents had positive perceptions about the benefits of compliance but some barriers hampered compliance despite the overall low score for barriers. The respondents insufficiently benefitted in terms of improved quality of life, well-being, peace of mind and reduced anticipation of dying. The most cited healthcare system contributor to non-compliance was the unacceptable waiting times at the clinics.

The respondents insufficiently translated their general understanding of hypertension and the importance of compliance into compliance behaviours. This may be due to their insufficient understanding of the causes of hypertension, how their medications worked and the meanings of their blood pressure readings. Many respondents believed that local herbs could cure hypertension and were not convinced that they could manage their condition.

CONCLUSIONS

This quantitative descriptive-correlational study on compliance with the anti-hypertension treatment (medication and lifestyle modification regimens) revealed insufficient levels of compliance and consequently high levels of uncontrolled hypertension, obesity and co-morbidities. The results show that the interplay between various variables of the HBM influenced compliance behaviour.

The respondents' compliance levels were favourable, but not sufficient to manage their hypertension effectively. This was due to multiple reasons, including inadequate knowledge about hypertension and anti-hypertensive medications, inadequate adherence to lifestyle modifications, beliefs in local herbs, alcohol abuse, and long waiting times at clinics. Perception of benefits, perception of barriers and cues to action were the predictor variables for compliance.

RECOMMENDATIONS

The recommendations, based on the research findings, will be presented in relation to health education, the removal of barriers and further research.

Health education

Health education campaigns ought to be delivered through the mediums of radio and television, posters and pamphlets. This should be supplemented with health education and advice by doctors and other healthcare workers. It is necessary to target the families and friends of hypertensive patients who may be sources of advice and support. Presentations should cover the nature of hypertension with specific emphasis on its causes, its severity and the potential complications. The necessity to comply with the prescribed medications and required lifestyle modifications ought to be emphasised. Health education should assist patients to clearly understand how their medications work and the consequences of non-compliance. Healthcare workers should stress the benefits of compliance and assist patients to overcome barriers which could affect their compliance levels.

Healthcare workers should follow up consultation sessions with regular cues to action to counteract forgetfulness, carelessness and failure to promptly obtain refills. Persons who developed complications because of non-compliance and those who lost loved ones because of hypertension could serve as important compliance motivators.

Messages on blood pressure control should be specifically directed at females. Lifestyle changes education should specifically be directed at newly diagnosed, young males who smoke and consume alcohol. For both groups, healthcare workers need to stress the importance of treatment compliance despite the absence of symptoms. Patients should be discouraged from ingesting local herbs as the actions of these herbs are unknown and interactions with anti-hypertensive medications cannot be excluded.

Removal of barriers

Healthcare workers ought to assist patients to remove identified barriers that prevent them from making required lifestyle changes, such as complying with dietary restrictions, prohibition of smoking, exercise, relaxation, and sufficient sleep, avoidance of alcohol, reduction of salt intake and remaining motivated. It is also necessary to stabilise the patient's blood pressure as soon as possible to optimise the patients' faith in the medication.

Waiting times at clinics should be reduced.

Further research

Population-based surveys on the prevalence of hypertension and uncontrolled hypertension should be conducted in the country to demonstrate the effectiveness of the hypertension lifestyle modifications and medication regimens with regard to improved

prognosis. Evidence from such studies would act to motivate not only patients to comply, but also healthcare professionals to intensify strategies to improve compliance.

Research should be conducted on the local herbs used by hypertension patients so that scientifically founded information about the active ingredients' potential effect could be shared with these patients.

LIMITATIONS OF THE STUDY

Section C of the interview schedule had low reliability and this might be due to too few items. Only diagnosed hypertensive patients, registered at the government owned clinics, were interviewed. It cannot be assumed that the responses expressed by respondents in this study could be generalised to patients attending private clinics. Only patients willing to be interviewed participated in the study. There can be no guarantee that those patients who refused to be interviewed encountered similar compliance challenges as those who agreed to be interviewed.

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