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# Evaluation of medication adherence in Lebanese hypertensive patients

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**Abstract** Controlling hypertension is essential in cardiovascular diseases. Poor medication adherence is associated with poor disease outcomes, waste of healthcare resources, and contributes to reduced blood pressure control. This study evaluates treatment adherence to antihypertensive therapy in Lebanese hypertensive patients by estimating the proportion of adherent hypertensive patients using a validated tool and investigates what factors predict this behavior. A questionnaire-based cross-sectional study was conducted on a random sample of 210 hypertensive outpatients selected from clinics located in tertiary-care hospitals and from private cardiology clinics located in Beirut. Adherence level was measured using a validated 8-item Modified Morisky Medication Adherence Scale (MMMAS). Among 210 patients, 50.5% showed high adherence, 27.1% medium adherence, and 22.4% low adherence to medication. Mean MMMAS score was $6.59 \pm 2.0$. In bivariate analyses, having controlled blood pressure ($p = 0.003$) and taking a combination drug ($p = 0.023$) were predictors of high adherence. Forgetfulness ($p < 0.01$), complicated drug regimen ($p = 0.001$), and side effects ($p = 0.006$) were predictors of low adherence after multiple liner regression. Logistic regression results showed that calcium channel blockers ($p = 0.030$) were associated with increased adherence levels. In conclusion, developing multidisciplinary intervention programs to address the factors identified, in addition to educational strategies targeting healthcare providers, are necessary to enhance patient adherence.


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## 1. Introduction

Hypertension is a worldwide epidemic causing 7.1 million premature deaths each year and accounting for 13% of all deaths globally [1]. Kearney et al. [2] reported that overall prevalence of hypertension in 2000 was estimated to be 26.4% of the world population and predicted that the burden of hypertension would increase by 60% to approximately 1.56 billion in the year 2025. Also, hypertension results in an economic burden of $47.5 billion annually in direct medical expenses and $3.5 billion each year in lost productivity [3].

According to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7), hypertension is defined as a systolic blood pressure (SBP) of 140 mmHg or higher, or a diastolic blood pressure (DBP) of 90 mmHg or higher [1].

Hypertension is reported to be the leading cause of cardiovascular disease worldwide [4]. Additionally, uncontrolled blood pressure (BP) increases the risk of ischemic heart disease three- to fourfold [5] and overall cardiovascular risk by two-to threefold [6].

Among hypertensive patients who have poor BP control, poor drug adherence is one of the causes and accounts for an increasingly significant and substantial public health burden [7]. Only 29% of hypertensive patients in the United States achieve adequate control and even fewer have been reported in Canada and Europe (17% and $\leqslant$10%, respectively) [8].

The term ''adherence'' is defined by the World Health Organization (WHO) as the extent to which a person's behavior taking medication, following a diet, and/or executing lifestyle change corresponds with agreed recommendations from a health care provider [9]. The WHO describes poor adherence as the most important cause of uncontrolled blood pressure [9] and estimates that 50—70% of people do not take their antihypertensive medication as prescribed [10].

In a meta-analysis of literature on medication nonadherence rates in the elderly, it was shown that from 29% to 59% of outpatients do not take medications as prescribed [11]. In another study done on hypertensive patients in primary health care centers and hospitals in Saudi Arabia, 53% were found to be adherent and, consequently, the mean SBP and DSB were found to be significantly lower in adherent patients relative to those nonadherent [12].

Numerous factors influence treatment adherence, including demographic characteristics (gender, age, education, etc.), psychosocial factors (quality of life), socioeconomic status and disease severity, class of drug prescribed, patient understanding of disease and importance of treatment, co-morbid medical conditions, patient—healthcare provider relationship, drug cost, forgetfulness, and presence of psychological problems, specifically depression [13—16].

Based on this, our study objective is to evaluate treatment adherence to antihypertensive therapy in Lebanese hypertensive patients by estimating the proportion of adherent hypertensive patients using a validated tool and to investigate what factors predict this behavior.

## 2. Methods

### 2.1. Patients and methods

A cross-sectional design utilizing a convenient sample and a well-designed questionnaire was adopted to address the study objective. Patients recruited for this study were randomly selected from those visiting the external (outpatient) clinics located in tertiary care hospitals and from private cardiology clinics located in Beirut. In fact, interviewers visited the location on randomly selected dates and recruited all patients present in these clinics.

An oral informed consent was obtained from each patient. All patients interviewed agreed to participate in this study. The Institutional Review Board of the Lebanese University stated that approval was not necessary, since the study was an observational one and not experimental, clinical, or interventional.

### 2.2. Inclusion and exclusion criteria

Eligible patients were Lebanese adult outpatients ($\geqslant$18 years). They were diagnosed with essential (primary) hypertension by a cardiovascular physician and taking at least one antihypertensive medication. Patients with co-existing medical conditions were also included. Excluded subjects were those with secondary hypertension, pregnant women, or taking other drugs that could increase BP. Hypertensive patients taking no medication were also excluded.

### 2.3. Sample size

We used the following formula for sample size calculation: $n = \frac{Z^2.p(1-p)}{d^2}$, where $Z$ is a standard normal variate ($Z = 1.96$ when the confidence interval is 95%), $p$ is the expected proportion of outcome in