


## Impact of Ambulatory Blood Pressure Monitoring on the Health of Patients in Remote Areas: the Role of the Community Pharmacy

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### KEYWORDS

Community Pharmacy, Ambulatory Blood Pressure Monitoring, Consensus Guideline

### ABBREVIATIONS

**ABPM:** Ambulatory Blood Pressure Monitoring

**BP:** Blood pressure

**CPS:** Community Pharmacy Services

**CVD:** Cardiovascular diseases

**DBP:** Diastolic blood pressure

**HTN:** Arterial hypertension

**PPCA:** Personalized Pharmaceutical Care Area

**SBP:** Systolic blood pressure

### ABSTRACT

**Introduction:** Cardiovascular disease remains the leading cause of death. Arterial hypertension is the main avoidable risk factor. Scientific societies advise control methods such as Ambulatory Blood Pressure Monitoring (ABPM) but this technique is not usually available in rural settings.

The aim of this study was to evaluate the effectiveness of pharmaceutical intervention using ABPM in community pharmacies.

**Material and Method:** Observational study conducted in a rural community pharmacy between July 2021 and December 2023. Patients over 18 years of age who were normotensive or had a previous diagnosis of hypertension were selected. They were fitted with a MicrolifeWatch BPO3 device for 29 hours. Patients with results compatible with HT were referred to their primary care physician.

**Results:** Twenty-one patients were included, of whom 20 were referred to the physician and treatment adjustments were made. Patient satisfaction was high, highlighting the accessibility of the service in the community pharmacy.

**Conclusion:** the accessibility and proximity of community pharmacies, especially in rural areas, facilitates the application of MAPA, improving the control of HTN.

### INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of mortality worldwide. In Spain, they account for almost 30% of all mortality, and there is a direct relationship between arterial hypertension (HTN) and the incidence of cardiovascular events.

HTN remains the most important preventable factor in CVD. There is ample evidence that lowering blood pressure (BP) slows the progression of atherosclerotic disease and its complications.<sup>(1)</sup>

Scientific societies recommend methods such as ambulatory blood pressure monitoring (ABPM) for clinical decision making because they allow more accurate identification of the relationship between HTN and the presence of cardiovascular disease or target organ damage.<sup>(2)</sup>

There is little evidence of the use of ABPM in community pharmacies, although more and more pharmacists are offering this professional service, which is particularly important in areas where an ABPM monitor is not available in the clinic or the nearest hospital is far from the patient's home.

The main objective of this study was to evaluate the effectiveness of pharmaceutical intervention in HTN using ABPM in community pharmacies. Secondary objectives are to analyze the results of monitoring according to the sociodemographic characteristics of the patients, to evaluate the rate of referral to the primary care physician, and to observe changes in pharmacological treatment after the intervention.

Cite this article as: Díaz-Jiménez C. Impact of ambulatory blood pressure monitoring on the health of patients in remote areas: the role of the community pharmacy. 2025 Jan 15;17(1):40-44. doi: [10.33620/FC.2173-9218.\(2025\).07](https://doi.org/10.33620/FC.2173-9218.(2025).07)

Financing: None.

Conflict of interest: None.

Additional information: None.

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Received: 25/09/2024

Accepted: 30/12/2024

Available online: 15/01/2025

## MATERIAL AND METHODS

The observational study was conducted from July 2021 to December 2023 in a community pharmacy located in a rural area with difficult access to hospitals and serving approximately 900 residents.

### Inclusion criteria:

Patients over 18 years of age, normotensive or with a previous diagnosis of hypertension, who agreed to participate in the study by signing the informed consent form.

### Exclusion criteria:

Pregnant patients and those who did not sign the informed consent.

Patients were informed about the availability of the Community Pharmacy Services (CPS) in the pharmacy and those who agreed to participate were given written information about the description of the ABPM method and their questions were answered through a pre-device interview in the personalized pharmaceutical care area (PPCA).

The general practitioner was informed of the objectives of the study and the possibility of referring patients.

BP readings were taken over a 29-hour period using the MicrolifeWatch BPO3 device, which recorded BP every 20 minutes during the activity period and every 60 minutes during the rest period, allowing identification of cases of uncontrolled HTN, white-coat HTN, or masked HTN.

Professional training was provided through the *Impachta* training; *refresher course on hypertension and vascular risk for community pharmacists of the Spanish Society of*

*Clinical, Family and Community Pharmacy (Sefac).*(3)

The results of the pharmaceutical interventions were recorded and subsequently provided to each patient in the form of two reports; one for the patient him/herself and another for referral to the general practitioner, if necessary. Both reports were generated using the Sefac Expert CPS registration platform.(4)

## RESULTS

A total of 21 patients who underwent ABPM were included in the study, 20 of whom were referred because their mean blood pressure values were outside the ranges specified in the guidelines that establish the criteria for the diagnosis, treatment, and control of hypertension in patients.(2)

The profiles found in the patients in the study included masked hypertension, white coat hypertension and resistant hypertension.

The results of these interventions from the community pharmacy and in collaboration with the physician were as follows:

- Medication adjustments.
- Lifestyle recommendations and health education.
- Improved patient follow-up.
- Increased adherence to treatment.

Patient satisfaction was high, demonstrating the accessibility of the CPS in the community pharmacy.

The following table shows the data of the 21 patients according to: age, sex, reason for inclusion in the study, result of the ABPM and subsequent intervention from the pharmacy:

**Table 1.**

PATIENT	AGE	SEX	REASON FOR INCLUSION	ABPM (mmHg)	INTERVENTION
1	60	M	BAD CONTROL	Daytime readings $\geq$ 135/85 11.9% Nighttime readings $\geq$ 120/70 65.0% Dipper percentage SBP 0.9%, DBP 6.1%	REFERRAL
2	51	F	SCREENING	Daytime readings $\geq$ 135/85 3.4% Nighttime Readings $\geq$ 120/70 0.0% 0.0% Dipper percentage SBP 11.8%, DBP 15.6%	ANNUAL CONTROL
3	75	M	BAD CONTROL	Daytime readings $\geq$ 135/85 4% Nighttime Readings $\geq$ 120/70 85.0% Dipper percentage SBP -5.1% (riser), DBP -2.8% (riser)	REFERRAL
4	85	M	BAD CONTROL	Daytime readings $\geq$ 135/85 10.8% Nighttime Readings $\geq$ 120/70 5.3% Dipper percentage SBP 10.3%, DBP 14.8%	REFERRAL
5	71	F	BAD CONTROL	Daytime readings $\geq$ 135/85 27.8% Nighttime Readings $\geq$ 120/70 42.1% Dipper percentage SBP 6.9%, DBP 5.3%	REFERRAL
6	69	F	SYMPTOMS	Daytime readings $\geq$ 135/85 75.6% Nighttime Readings $\geq$ 120/70 94.7% Dipper percentage SBP 7.2%, DBP 17.6%	REFERRAL

SBP: systolic blood pressure, DBP: diastolic blood pressure.  
Own elaboration.

**Table 1.** (Continued).

PATIENT	AGE	SEX	REASON FOR INCLUSION	ABPM (mmHg)	INTERVENTION
7	83	F	BAD CONTROL	Daytime readings $\geq$ 135/85 88.9% Nighttime Readings $\geq$ 120/70 57.9% Dipper percentage SBP 18.6%, DBP 16.8%	REFERRAL
8	72	F	BAD CONTROL	Daytime readings $\geq$ 135/85 60.0% Nighttime Readings $\geq$ 120/70 80.0% Dipper percentage SBP 5.4%, DBP 10.9%	REFERRAL
9	80	F	SYMPTOMS	Daytime readings $\geq$ 135/85 5.0% Nighttime Readings $\geq$ 120/70 74.4% Dipper percentage SBP -4.1% (riser), DBP -17.8% (riser)	REFERRAL
10	67	M	BAD CONTROL	Daytime readings $\geq$ 135/85 14.1% Nighttime Readings $\geq$ 120/70 0.0% Inverted Dipper	REFERRAL
11	88	F	BAD CONTROL	Daytime readings $\geq$ 135/85 38.5% Nighttime Readings $\geq$ 120/70 26.7% Dipper percentage SBP 14.5%, DBP 23.0%	REFERRAL
12	42	M	SYMPTOMS	Daytime readings $\geq$ 135/85 56.8% Nighttime Readings $\geq$ 120/70 69.2% Dipper percentage SBP 5.9%, DBP 0.3%	REFERRAL
13	55	M	BAD CONTROL	Daytime readings $\geq$ 135/85 64.1% Nighttime Readings $\geq$ 120/70 40.0% Dipper percentage SBP 13.5%, DBP 16.9%	REFERRAL
14	42	M	BAD CONTROL	Daytime readings $\geq$ 135/85 28.9 % Nighttime Readings $\geq$ 120/70 53.8% Dipper percentage SBP 7.3%, DBP 4.2%	REFERRAL
15	89	F	BAD CONTROL	Daytime readings $\geq$ 135/85 28.6 % Nighttime Readings $\geq$ 120/70 41.2 % Dipper percentage SBP -0.6% (riser), DBP 10.6%	REFERRAL
16	77	M	BAD CONTROL	Daytime readings $\geq$ 135/85 12.8% Nighttime Readings $\geq$ 120/70 94.1% Dipper percentage SBP -12.3% (riser) DBP -18.6% (riser)	REFERRAL
17	74	F	BAD CONTROL	Daytime readings $\geq$ 135/85 8.5% Nighttime Readings $\geq$ 120/70 11.8% Dipper percentage SBP 6.2%, DBP 1.3%	REFERRAL
18	67	M	BAD CONTROL	Daytime readings $\geq$ 135/85 27.6% Nighttime Readings $\geq$ 120/70 73.7% Dipper percentage SBP -8.8% (riser), DBP 1.8%	REFERRAL
19	42	F	BAD CONTROL	Daytime readings $\geq$ 135/85 34.0% Nighttime Readings $\geq$ 120/70 6.7% Dipper percentage SBP 19.3%, DBP 20.9%	REFERRAL
20	53	M	BAD CONTROL	Daytime readings $\geq$ 135/85 63.0% Nighttime Readings $\geq$ 120/70 12.5% Dipper percentage SBP 17.9 %, DBP 20.2%	REFERRAL
21	61	M	BAD CONTROL	Daytime readings $\geq$ 135/85 11.6% Nighttime Readings $\geq$ 120/70 36.8% Dipper percentage SBP 1.1%, DBP 6.5%	REFERRAL

SBP: systolic blood pressure, DBP: diastolic blood pressure.

Own elaboration.

## DISCUSSION

The results of this study demonstrate the efficacy of ABPM in the management of HTN in rural areas from the community pharmacy, where access to specialized medical services is limited and may pose an additional difficulty for patients.

The accessibility and proximity of community pharmacies facilitates the implementation of these interventions, which could not only reduce the burden on the healthcare system, but also promote better control of blood pressure in the general population through appropriate screening programs and the prevention of related cardiovascular complications.

These results are consistent with previous studies that have demonstrated the usefulness of ABPM in identifying blood pressure patterns that may not be apparent in health centers.<sup>(5)</sup>

A high percentage of referrals is observed, reinforcing the importance of teamwork in controlling blood pressure and improving patients' quality of life.

In addition, the results of this study support previous research that underscores the fundamental role of the pharmacist in the management and control of hypertension in the primary care setting.<sup>(1)</sup>

## CONCLUSIONS

The availability of professional services such as ambulatory blood pressure monitoring in community pharmacies can make a significant difference in the screening, prevention and control of HTN, especially for patients living in areas far from hospital centers.

The main results of this study support the effectiveness of pharmaceutical intervention in these aspects, since 95% of the patients, of whom 48% were women and the mean age was 67 years, were referred to the general practitioner for both pharmacological and non-pharmacological adjustments to achieve more adequate BP control. ABPM allowed the detection of specific patterns of HTN, such as uncontrolled, masked, and white-coat hypertension, contributing to a more accurate diagnosis.

Observation of BP changes following the pharmaceutical intervention allowed for better control and follow-up of the intervention.

This study highlights the importance of multidisciplinary work in the appropriate management of arterial hypertension and the need to integrate the community pharmacist into the primary care team.

Implementation of similar programs in other contexts, such as urban or rural pharmacies with better access to specialized medical services, would allow validation and extrapolation of the conclusions of this study.

## ACKNOWLEDGMENTS

I would like to express my sincere gratitude to my colleague Oscar Penín Álvarez for the opportunity to collaborate as a co-author in the preparation of the Guide for the Approach to Hypertension by the Community Pharmacist in Primary Care. Thanks to this guide, community pharmacists have established protocols for an adequate approach, screening, management, and follow-up of blood pressure in our patients. It has been a privilege to contribute to this project under your expert guidance and within the framework of the SEFAC Hypertension and Vascular Risk working group.

We extend our profound gratitude for the trust you have demonstrated and for your exemplary leadership in this significant undertaking.

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