



Contents lists available at ScienceDirect

Journal of the American Pharmacists Association

journal homepage: www.japha.org

TOOLS FOR ADVANCING PHARMACY PRACTICE

Medication adherence and activity patterns underlying uncontrolled hypertension: Assessment and recommendations by practicing pharmacists using digital health care

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ARTICLE INFO

Article history:

Received 15 December 2015

Accepted 23 January 2016

ABSTRACT

Objectives: This report summarizes the first use of a digital health feedback system (DHFS) by practicing pharmacists to establish evidence-based blood pressure (BP) management recommendations.

Setting: Fifteen commercial pharmacies and 39 patients in the Isle of Wight participated.

Practice description: The pharmacists were experienced in providing New Medicine Services to patients in their communities.

Practice innovation: The pharmacists utilized a commercially available DHFS. The DHFS utilized FDA-cleared and CE-marked class 2 medical devices passively captured and shared information about medication-taking using an ingestible sensor, and daily patterns of rest, activity, and exercise using a wearable patch that incorporates an accelerometer.

Interventions: Pharmacists provided targeted counselling for BP management as guided by the digital information.

Evaluation: Blood pressure was measured serially, and patient and provider experiences with DHFS use were assessed using satisfaction surveys.

Results: The mean change in SBP over the 2-week evaluation period was -7.9 ± 22.1 ; mean change in DBP was -2.8 ± 12.9 . A root cause for persistent hypertension was determined for all of these 34 patients: 68% had pharmaceutical resistance, and 32% had inadequate medication use. Specifically, 29% were found to be capable of achieving blood pressure control on their currently prescribed medications, 68% were found to have a need for additional pharmacological treatment, and 3% needed additional adherence support. Pharmacists found that the DHFS helped in targeting specific recommendations, and to create a collaborative experience with their patients. Patients found the experience to be positive and helpful.

Conclusion: DHFS that provides confirmation of medication taking and objective measures of lifestyle patterns can help pharmacists to identify specific factors contributing to uncontrolled hypertension, to make evidence-based prescribing and lifestyle recommendations for achieving treatment goals, and to create a collaborative experience for patients in the management of their self-care.

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Objectives

This report summarizes the first use of a digital health feedback system (DHFS) by practicing pharmacists experienced in providing New Medicines Service (NMS) for community patients. The DHFS was used by them to establish

evidence-based blood pressure (BP) management recommendations. Patient and provider questionnaires were used subsequently to assess their experience with DHFS.

Setting

One-third of adults in the United Kingdom have hypertension.^{1,2} Elevated BP exhibits a strong, positive, and dose-dependent relationship with the risk of cardiovascular disease throughout its entire range. The relationship is independent from other risk factors, shows no evidence of a

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<http://dx.doi.org/10.1016/j.japh.2016.01.005>

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Key Points**Background:**

- The pharmacists of today have become essential care providers and integral to the patient care team practice model.
- Community pharmacists are actively involved even now in initiatives such as the New Medicines Service for the management of chronic conditions such as hypertension.
- A digital health feedback system is available for providing an objective evidence base that can be used to make individually tailored medication and lifestyle recommendations to manage persistent blood pressure elevation. No extra pharmacist certifications or training is required.

Findings:

- Community pharmacists evaluated its use for providing targeted counselling for blood pressure management as guided by the digital information.
- The system helped pharmacists to identify specific factors contributing to uncontrolled hypertension, to make evidence-based prescribing and lifestyle recommendations for achieving treatment goals, and to create a collaborative experience for patients in the management of their self-care.
- This paradigm fits well with the National Health Service Right Care agenda to deliver value from health care over the remainder of this decade through evidence-based planning, delivery and monitoring of health care delivery.

threshold for risk, and applies to all major manifestations of cardiovascular disease.³ Current control rates are below the Healthy People goal of 50%, which was originally set as the year 2000 goal and has since been extended.⁴ Poor adherence to antihypertensive therapy is a major cause of lack of BP control. A similar problem exists in incorporating lifestyle modification for BP management. In a European survey involving patients with established heart disease from 15 countries, only 66% practiced a physical activity.⁵

DHFS has been used previously in primary care practices for assessing and making evidence-based modifications in the treatment of 151 patients with uncontrolled BP while prescribed 2 or more antihypertensives. A root cause for uncontrolled BP was identified in 95% of patients: 57% had pharmaceutical resistance, and 43% had inadequate medication use. Overall, 38% were found to be capable of achieving BP control on their currently prescribed medications. Primary practices found the offering easy to use, and the majority of patients expressed a positive and collaborative experience in using it.⁶

The NMS is a National Health Service (NHS) community pharmacy service that provides support for people with long-term conditions newly prescribed a medicine to help improve medication adherence. Since the introduction of the

NMS in October 2011, more than 90% of community pharmacies in England have provided it to their patients. The goals of the NMS include supporting patients in making decisions about their treatment and self-management, reducing medicine wastage, receiving positive assessment from patients, improving the evidence base on the effectiveness of the service, and supporting the development of outcome and/or quality measures for community pharmacies.⁷

Among the challenges in meeting these goals is awareness of actual utilization of prescribed medicine. The NHS is looking to improve prescribing and dispensing systems, and is encouraging rational cost-effective prescribing.⁸ Core to meeting the objective of evidence-based prescribing is identifying and targeting those patients who do not take their medicines appropriately.⁹ This is a significant challenge because practitioners are unaware of how patients actually take their medications outside of the clinic.¹⁰

Of additional importance is the incorporation of lifestyle advice for BP control. National Institute for Health and Care Excellence (NICE) guidelines advise that ascertainment of exercise pattern and lifestyle advice should be offered initially and then periodically throughout the life cycle of BP management.¹¹ Yet, other than self-report, practitioners do not routinely determine how much patients are actually exercising, much less achieving the British Heart Foundation's recommended goal of 10,000 steps daily.¹²

Practice description

This service evaluation occurred in 15 community pharmacies in the Isle of Wight and included 39 patients with uncontrolled BP. Pharmacists performed an initial assessment of needs, made lifestyle recommendations, and administered antihypertensive therapy that was prescribed per NICE guidelines. The participating pharmacists who elected to introduce the DHFS into their practices did not have any extra certifications, training, or prior utilization of DHFS, and they had no characteristics that would differentiate them from the remainder of the general pharmacist population.

Practice innovation

The DHFS (Proteus Digital Health, Redwood City, CA) uses Conformité Européenne—marked type 2 medical devices consisting of a poppyseed-sized ingestible sensor made of foodstuff and a wearable sensor (also called “patch”) that may be utilized for 7-day wear during all activities, including exercising and bathing.

Description of the ingestible sensor

After entering the stomach, the ingestible sensor uses the gastric fluid to send a tiny and brief biogalvanic signal. The signal contains no radiation, is not pH dependent, and lasts approximately 7 minutes. The remainder of the ingestible sensor is then inactive and is eliminated like a poppyseed husk in the feces. More than 500 subjects have ingested more than 20,000 ingestible sensors in clinical studies that have included subjects with bipolar disorder, diabetes, heart failure, hypertension, renal transplantation, schizophrenia, tuberculosis,

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