Community Preventive Services Task Force

Cardiovascular Disease Prevention and Control: Interactive Digital Interventions for Blood Pressure Self-Management

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Finding and Rationale Statement
Ratified August 2017

Table of Contents

CPSTF Finding and Rationale Statement

Intervention Definition

Interactive digital interventions for blood pressure control provide self-management information and support to patients who have high blood pressure.

- Content must be accessible through a computer, smartphone, telephone, or other hand-held device.
- The digital component must be interactive (i.e., patients enter personal data or make choices).
- Patients must receive personally relevant, tailored information and feedback that can be provided without direct input from a health professional.
- Digital content may be provided as a computer program, a web-based program, or an application (app) that can be used on- or offline.
- Interventions may include additional activities such as self-measured blood pressure monitoring, counseling, or follow-up from a health professional.

CPSTF Finding (August 2017)

The Community Preventive Services Task Force (CPSTF) recommends interactive digital interventions for patients who have high blood pressure based on sufficient evidence of effectiveness in reducing blood pressure. Evidence was considered sufficient based on studies that demonstrated improvements in patients' blood pressure measurements over intervention periods of 6 weeks to 24 months (median 6 months).

Rationale

Basis of Finding

The Community Preventive Services Task Force (CPSTF) uses recently published systematic reviews to conduct accelerated assessments of interventions that could provide program planners and decision-makers with additional, effective options. The following published review was selected and evaluated by a team of specialists in systematic review methods, and in research, practice, and policy related to cardiovascular disease prevention.

> McLean G, Band R, Saunderson K, Hanlon P, Murray E, et al. Digital interventions to promote self-management in adults with hypertension: systematic review and meta-analysis. *Journal of Hypertension* 2016;34(4):600-12.

The team examined each of the studies included in the systematic review and abstracted supplemental information about study, intervention, and population characteristics.

The CPSTF finding is based on results from the published review, additional information from the included studies, and expert input from team members and the CPSTF.

The published systematic review included seven randomized controlled trials (search period through 2014). Included trials examined the impact of digital interventions on systolic and diastolic blood pressure among recruited patients with high blood pressure. The CPSTF conclusion of sufficient evidence was based on the magnitude of effect estimates, number of studies, and consistency of effects (see Table 1 below).

Table 1: Blood Pressure Outcomes

Outcomes Considered in the Systematic Review	Weighted Mean Difference in Blood Pressure (95% Confidence Interval)
Systolic Blood Pressure	-3.7 mmHg (95% CI -5.3 to -2.2) 6 studies
Diastolic Blood Pressure	-2.4 mmHg (95% CI -4.4 to -0.04) 5 studies

One included study also examined the proportion of patients achieving or maintaining blood pressure control. At 24 month follow-up, intervention group participants were significantly more likely to have their blood pressure under control (odds ratio 1.52; 95%CI [95%CI 1.01-2.30]).

The included studies evaluated a number of additional outcomes including quality of life, satisfaction with care, medication adherence, physical activity, and dietary changes. Conclusions were limited by the small numbers of studies and mixed or inconsistent results. Included studies did not evaluate differences in morbidity or mortality.

Evaluated interventions were of short duration (median 6 months; interquartile interval: 3 months to 10 months). Interventions used mobile phones (3 studies), web-based programs (3 studies), or telephones (1 study). Included studies provided limited information about the digital content, but all of the interventions included health education related to blood pressure self-management. Patients interacted with digital components daily (3 studies) or weekly (3 studies). Interactions were variable in the remaining study. In five of the seven studies, digital components were part of self-measured blood pressure monitoring (SMBP) interventions. Three studies offered contact or appropriate follow-up with a health professional or community health worker.

Review authors conducted stratified analyses to evaluate differences in effectiveness based on intervention characteristics including program duration, interaction frequency, combination with SMBP, and follow-up. Conclusions were limited by the small number of studies for each characteristic and inconsistent results.

Applicability and Generalizability Issues

Three of the included studies were conducted in the United States. The remaining studies were conducted in Canada (1 study), Finland (1 study), Korea (1 study), and Honduras and Mexico (1). Patients were recruited in healthcare settings (6 studies) and workplaces (1 study).

Two U.S. studies included clinics that served urban, low-income communities. In one of these studies, recruited patients were primarily African-American (72%) or Hispanic (14%). While additional research is warranted, the CPSTF finding should be applicable to the use of these interventions in U.S. healthcare settings for adults who have high blood pressure.

Data Quality Issues

The published systematic review included only randomized controlled trials. Study quality was evaluated using the Cochrane risk of bias assessment tool (Higgins et al. 2011). Limitations in the body of evidence included failure to conduct intention to treat analyses (3 studies), and failure to control for potential confounders (3 studies).

Other Benefits and Harms

The review by McLean et al. did not report information regarding additional benefits or potential harms of these interventions. Use of digital interventions might reduce the number of in-person clinic visits needed to encourage patient self-management and achieve blood pressure control. The CPSTF did not postulate any harms of these interventions.

Considerations for Implementation

The review by McLean et al. did not summarize information on intervention implementation, and the included studies provided only cursory descriptions. The rapid evolution of mobile device technology is likely to provide newer studies with opportunities for substantially enhanced or personalized message content and interactivity.

The CPSTF also recommends self-measured blood pressure (SMBP) monitoring interventions when used alone [www.thecommunityguide.org/findings/cardiovascular-disease-self-measured-blood-pressure-when-used-alone] or with additional support [www.thecommunityguide.org/findings/cardiovascular-disease-self-measured-blood-pressure-with-additional-support] based on evidence of effectiveness for patients with high blood pressure. Interactive digital interventions can be a central component of SMBP monitoring or provide additional support for patients.

The Million Hearts Initiative® includes tools and resources to help organize health system and public health improvement strategies for blood pressure management. Strategies may include the use of interactive digital interventions:

- Self-Measured Blood Pressure Monitoring [millionhearts.hhs.gov/tools-protocols/smbp.html]
- Medication Adherence [millionhearts.hhs.gov/tools-protocols/medication-adherence.html]

Implementers should understand state policies regarding application of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) [www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/index.html] to electronic communications with patients.

Evidence Gaps

McLean et al. suggested a need for additional studies to inform policy and practice decisions. Future research should address the following questions:

- Are interventions effective in helping patients control their blood pressure over longer periods of time (1-2 years)?
- Are these interventions effective in reducing morbidity, mortality, and health care utilization associated with hypertension?
- What factors influence intervention effectiveness?
    - Use with or without self-measured blood pressure monitoring?
    - Use with or without additional counseling or interpersonal contact?
    - Setting (i.e. workplaces or community)?

- Patients' race, ethnicity, or socioeconomic status?
- Length of time since hypertension diagnosis?
- Level of blood pressure control at enrollment?
- Use with novel or existing smartphone applications?

References

McLean G, Band R, Saunderson K, Hanlon P, Murray E, Little P, et al. Digital Interventions to promote self-management in adults with hypertension: Systematic review and meta-analysis. *Journal of Hypertension* 2016;34(4):600-12.

Higgins JP, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0. Updated March 2011: The Cochrane Collaboration, 2011. Available from URL: http://handbook-5-1.cochrane.org/.

The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.

Disclaimer

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