Research Brief

Mobile Apps for the Dietary Approaches to Stop Hypertension (DASH): App Quality Evaluation

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ABSTRACT

Objective: To identify the availability and quality of apps supporting Dietary Approaches to Stop Hypertension (DASH) education.

Methods: The researchers identified DASH apps over 1 month in the Apple App Store. Five registered dietitians used the App Quality Evaluation (AQEL) to evaluate app quality on 7 domains. Interrater reliability was tested using intraclass correlations.

Results: One paid and 3 free DASH apps were evaluated. Interrater reliability (n = 5) was good for 3 apps and fair for 1 app. Only the paid app scored high (>8 of 10) on most AQEL quality domains.

Conclusions and Implications: Based on lower quality found among the included free apps, further development of free apps is warranted. Whereas the paid app may be useful in supporting DASH education, future research should determine whether improvements in clinical outcomes are found and whether this app should be improved to address AQEL domains better.

Key Words: evaluation, hypertension, mobile apps, smartphone (*J Nutr Educ Behav*. 2018;■■:■■–■■.)

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INTRODUCTION

Smartphones are widely used in the US; 77% of US adults owned a smartphone in 2016.[1] Health app use by smartphone owners has been demonstrated: 58% of US mobile phone users (934 of 1,604) reported that they downloaded a health app, and 66% of those opened the health app at least once daily (612 of 934).[2] The most common reasons cited for using apps include tracking physical activity and diet.[2] When examining commercially available apps, it was noted that most nutrition apps focus on weight loss, which limits the use of apps in other practice areas such as chronic disease management.[3] Clinicians reported using apps in nutrition education to support diabetes and obesity management (62%; n = 445).[4] With regard to chronic diseases, hypertension has been identified as an attractive target for the use of health apps because there are no symptoms, but morbidity is significant if hypertension is left untreated.[5] Research has been called for focusing on the use of apps in managing hypertension,[3] with a specific emphasis on incorporating current knowledge of effective interventions in face-to-face counseling into mobile platforms.[6]

Dietary Approaches to Stop Hypertension (DASH) has been shown to be an effective plan for reducing blood pressure[7,8] when participants properly adhered to it.[9] The DASH eating plans provide recommendations for a dietary pattern based on caloric needs. The DASH diet emphasizes grains, fruits, vegetables, lean meat, fish, dairy, nuts, and limited sweets. The diet was originally designed to increase fiber, calcium, magnesium, and potassium intake, and to decrease cholesterol intake.[10] Although apps are a viable strategy to improve patient engagement in dietary interventions,[11] a 2013 review of cardiovascular disease apps showed that whereas many apps were available for cardiovascular disease in general, there was a lack of apps for managing specific cardiovascular conditions.[12] A 2016 review found only 3 of 175 studies reviewed related to apps and hypertension.[13] In addition, many concerns were identified regarding the evaluation and selection of apps for use in interventions. App store ratings emphasize downloads and popularity, which creates a misleading atmosphere that could encourage attractive apps with poor content quality.[14] These apps are often developed by third-party companies with a focus on business needs with

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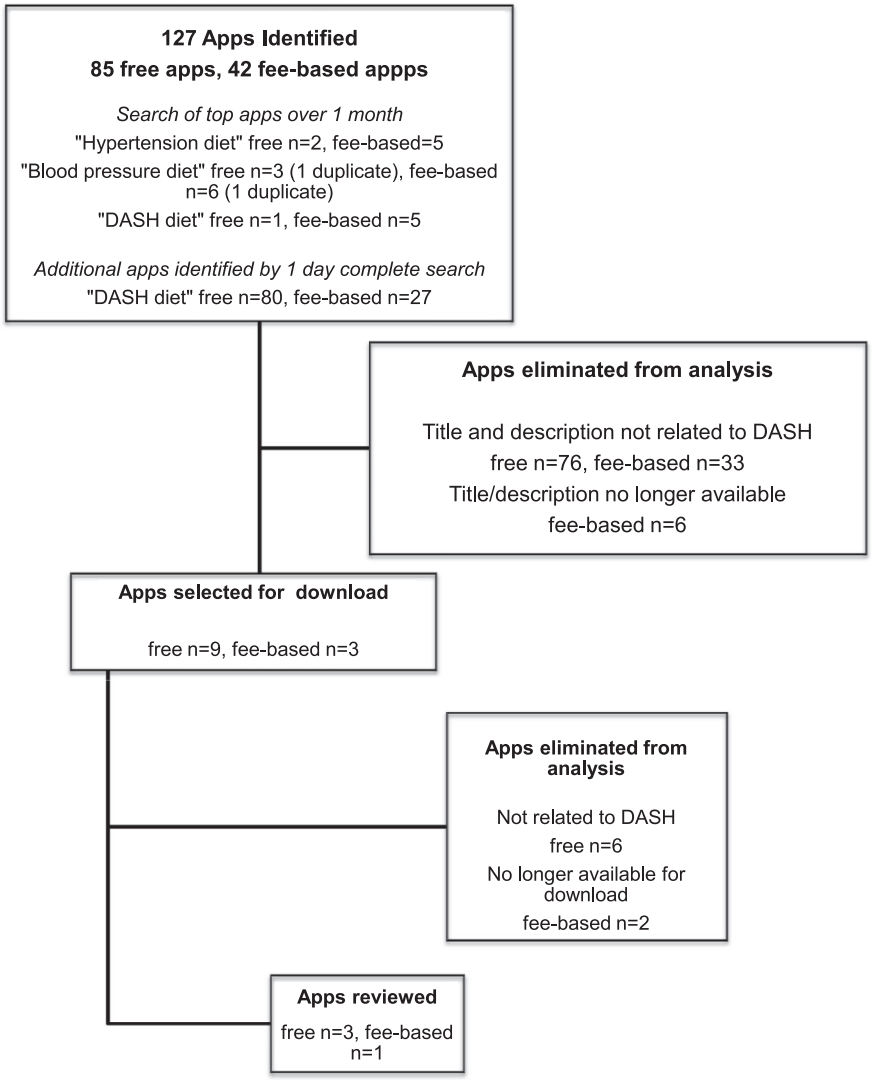

Figure. Flowchart of app selection for quality review.

little to no input from content experts.[14] Many previous studies that reviewed apps chose not to list the reviewed apps, or reviewed apps based on their description rather than the experience of using the app.[15] Finally, emphasis has been placed on the need for a systematic framework for app evaluation for health apps in general,[15-17] and for hypertension apps in particular.[14] Specifically, app evaluations should identify the apps being reviewed,[15] provide input from professionals,[17] and include an assessment of apps' usability, their potential to promote behavior change, and their content quality.[16] In light of the lack of research on hypertension and apps, and to move forward with incorporating quality educational content into highly functional apps, this study aimed to identify the availability and quality of apps for supporting DASH education using the previously validated App Quality Evaluation (AQEL).[18]

METHODS

App Identification

The Apple App Store (Apple, Inc., Cupertino, CA) was searched daily between October 11 and November 11, 2016, using the search terms *DASH diet*, *hypertension diet*, and *blood pressure diet* to identify a pool of app titles related to the DASH diet. The top 6 apps identified in the Apple App Store for each search were recorded daily. In addition, all apps under the search for *DASH diet* were recorded on November 1, 2016, to identify additional DASH diet–related app titles. Apps that did not require a fee to download were retained. In addition, 1 app with a fee of $1.99 to download was retained. This app was listed more often than any other app under *DASH diet*. A *post hoc* review of fee-based apps included all paid apps identified in both the daily searches of the top 6 apps and the 1-day search of all apps under *DASH diet*. Fee-based apps whose titles were relevant to the DASH diet were retained. Two researchers then reviewed descriptions of the remaining titles to identify fee-based apps relevant to the DASH diet. Then the 2 researchers downloaded the apps. Each app was reviewed for relevance to the DASH diet by each researcher independently, and both researchers agreed regarding which apps to exclude from further analysis (Figure). App inclusion criteria were apps that provided information or tracking specific to the DASH diet. Exclusion criteria were apps that were not related to the DASH diet, apps that provided recipes with no additional information, and apps that provided information on a wide variety of diets in which DASH was not the focus.

App Evaluation

Five registered dietitians recruited from Nutrition Education for the Public, a dietetics practice group of the Academy of Nutrition and Dietetics, evaluated each app using AQEL.[18] To be included, app evaluators had to be a registered dietitian who worked with patients or clients to manage or prevent cardiovascular disease for ≥1 year, and who reported using apps either personally or professionally. The institutional review board at the University of Illinois approved this research as exempt with a waiver of documented consent. Participants were compensated for the cost of downloading the fee-based app and received a $20 gift card to an online store. The AQEL is a previously validated tool for evaluating nutrition app quality using 7 domains. Face and content validation were completed by app users, technology experts, and nutrition professionals. Reliability testing involved nutrition professionals evaluating a variety of nutrition apps. The