

# Current Status and Quality Assessment of Cardiovascular Diseases Related Smartphone Apps in China

Qian XIAO<sup>a</sup>, Yanling WANG<sup>a</sup>, Liu SUN<sup>a</sup>, Sai LU<sup>b</sup>, Ying WU<sup>a,1</sup>

<sup>a</sup>School of Nursing, Capital Medical University, Beijing, China

<sup>b</sup>College of Health and Biomedicine, Victoria University, VIC, Australia

**Abstract.** To examine current status and quality of CVD related apps available for download in China, a total of 151 apps from the top popular six app stores were analyzed. Data analysis uncovered a range of issues including missing of key variables in the pre-formatted daily records, no platform for interaction with relevant healthcare professionals and undesirable user-interface design. More importantly, these apps had low levels of adherence to internationally recognized guidelines in CVD management. Overall quality score of these apps was below the average (8.08/20). This study identified areas for improvement concerning the existing CVD related apps. Information may guide the further advancement of CVD related apps and benefit CVD management in China.

**Keywords.** Application, Cardiovascular disease, Quality assessment, Mobile health

## 1. Introduction

Smartphone apps have become useful tools to support self-management of chronic diseases including cardiovascular diseases (CVD). While reliability and coverage are considered as the key parameters for the quality of apps, no relevant information is available concerning current status and the quality of current CVD related apps in China. Hence, this study aimed to examine the current status and quality of current CVD apps in China.

## 2. Methods

The top six most popular app stores were searched using CVD related key words in both Chinese and English languages in September 2015. The frequency of the download was recorded. The functions and contents of the top 5 downloaded CVD related apps were further compared against what are recommended by international CVD related guidelines. The selected apps were also assessed with a seven-dimension quality assessment scale with 20 items derived from the modified Silberg scale<sup>[1]</sup> (for four quality categories: Authorship, Attribution, Disclosure and Currency) and Technology Acceptance Model<sup>[2]</sup> (for three quality categories: Ease to Use, Usefulness

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<sup>1</sup>Corresponding author: Ying Wu, RN, PhD, School of Nursing, Capital Medical University, Beijing, China. Tel. 8610-8391-1766. Email: helenywu@vip.163.com.

and Privacy). One point is awarded for the presence of each item, and the maximum possible quality score is 20 points with a higher score indicating a better quality.

### 3. Results

151 apps were selected and the majority of them (82.1%) had been downloaded for less than 500 times (Figure 1). Take the top 5 downloaded apps as an example, most of them did not have the function for friends sharing and online Q&A(Figure 2). None of the apps had ‘regular medical follow-up’ and ‘smoking cessation’ listed in their preformatted daily records despite both were recommended by CVD guideline [3] (Table 1). The interface of most of these apps did not have the features that cater the needs of elderly patients. Overall quality score of the apps was only 8.08 of a possible 20(ranged from 1 to 12). Of the seven quality dimensions, the average scores of authorship, attribution, disclosure and currency were lower than that of the other three dimensions (Figure 3).

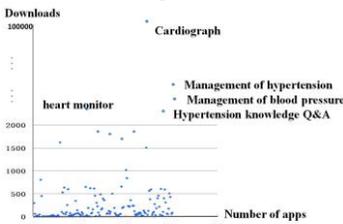


Figure 1- Downloads of the CVD related apps in China

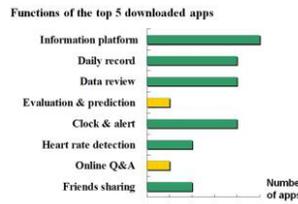


Figure 2- Analysis of functions among the top 5 downloaded CVD related apps in China

Table 1-Comparison of the top 5 downloaded apps with internationally recognized CVD guideline

Items recommended by the guidelines	Top 5 downloaded CVD related apps				
	Top1	Top2	Top3	Top 4	Top5
Vital signs	Yes	Yes	Yes	Yes	Yes
Symptoms	No	Yes	Yes	No	No
Medication taking	No	Yes	Yes	No	No
Diet	No	No	Yes	No	No
Exercise	No	No	Yes	No	No
Psychological states	No	No	Yes	No	No
Medical follow-up	No	No	No	No	No
Smoking cessation	No	No	No	No	No

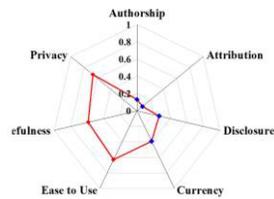


Figure 3- The quality of the CVD related apps in China

### 4. Discussion

The findings of this study showed a range of drawbacks of these CVD apps, which may result in limited usage of these apps. The quality of the existing apps could be further improved by more efforts made to address issues related to the coverage and reliability and by better integration with the needs of patients and guidelines of clinical practice.

### References

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