Limitations of existing dialysis diet apps in promoting user engagement and patient selfmanagement: quantitative content analysis study

ABSTRACT

Background: With the unprecedented growth of mobile technology, a plethora of dialysis diet apps have been developed to promote patient dietary self-management. Nevertheless, the utility of such apps remains questionable. Objective: This study aimed to evaluate the content, features, and quality of commercial dialysis diet apps for adult dialysis patients. Methods: This study consisted of a quantitative content analysis of commercial dialysis diet apps downloaded from Google Play and the Apple App Store available in the Asian marketplace, searched for using the following keywords in English: dialysis diet and diet for kidney disease. Free and paid apps available in English that provide nutrition information for adult dialysis patients were included. Apps that were not relevant to the dialysis diet, not meant for patient self-management, or redundant were excluded. Apps were evaluated for language medium (subscore=1), credibility (subscore=1), food database (subscore=1), valuable features (subscore=12), health-behavior theory constructs (subscore=60), and technical quality (subscore=25). The relationships among the variables of interest were determined by Pearson correlation. Stepwise multiple linear regression analysis was performed to identify the features that contribute to greater technical quality of dialysis diet apps. Statistical significance was defined as $P < .05$. Results: A total of 22 out of 253 apps (8.7%) were eligible for evaluation. Based on a 100-point scale, the mean overall score of the apps was 31.30 (SD 14.28). Only 5% (1/22) of the apps offered relevant language options, and 46% (10/22) contained food databases. In addition, 54% (12/22) of the apps were not credible. The mean score for valuable features was 3.45 (SD 1.63) out of 12, in which general education (16/22, 73%), free download (15/22, 68%), and usability (13/22, 59%) were the three most popular features. However, the apps scored a mean of 13.41 (SD 11.56) out of 60 for health-behavior theory constructs. The overall app technical quality was considered poor, with a mean score of 2.70 (SD 0.41) out of 5. The scores of valuable features ($r=.65$, $P=.001$) and health-behavior theory constructs ($r=.55$, $P=.009$) were positively correlated with the overall technical quality of the commercial dialysis diet apps. Features such as free download ($\beta=.43$, $P=.03$) and usability ($\beta=.41$, $P=.03$) could significantly determine the functional quality of the apps. Health-behavior theory constructs such as self-monitoring could significantly predict both the subjective quality ($\beta=.55$, $P=.008$) and the engagement quality ($\beta=.66$, $P=.001$) of the apps, whereas the information quality domain could be determined by plan or orders ($\beta=.48$, $P=.007$) and knowledge ($\beta=.45$, $P=.01$). Conclusions: Although most of the available commercial dialysis diet apps are free and easy to use, they are subject to theory deficiency, limited language options, and a lack of food databases, credibility, tailored education, and overall technical quality.

Keyword: Renal apps; Nutrition; Dialysis; Self-management; Mhealth