Diet and Exercise Apps: How's That Working For You?

There has been a large increase in the number of available software apps for smartphones, tablets and computers aimed at improving nutrition and physical fitness. The simplification of recording dietary intake and physical activity is important and useful both for self-monitoring and for coaching individuals in behavior change for weight management.

Recording dietary intake is key in weight management and in efforts to improve the quality of the diet in terms of desirable intakes of foods and nutrients including fruits and vegetables, fiber, sodium, and low fat protein sources. There at two general types of methods used for collecting food intake data. The 24-hour food recall and the food frequency questionnaire or FFQ. These methods require recalling foods eaten in the past. On the other hand, a second type of record called the Food Diary requires reporting foods eaten at the time they are consumed. Traditionally this was done using paper and pencil and was tedious. At most these methods were used for 4 to 7 days. Both types of methods can be applied using digital technology to make them simpler but they still require some effort and have some drawbacks. Food selection for recording is typically accomplished via text search and barcode scanning. Portion size selection is typically conducted by selecting text describing the foods. The ability to record typical foods eaten and to reuse these as entry items simplifies the input of data. However, the information input is usually limited to nutrition label information which does not fully describe food quality and does not account for variation in portion sizes in foods that are not processed and packaged.

Physical activity can also be subject to the same types of methods as dietary records using paper and pencil or digitalization to record usual leisure time physical activities and specific exercises using either recall methods or exercise records at the time the activity is performed. There are also passive methods for recording physical activity. For several decades pedometers that recorded steps based on the movement of the body up and down have been available and quite inexpensive. They were used by millions of people in monitoring their accomplishment of a daily goal of 10,000 steps. Today similar sensors are built into smartphones and will record number of steps per day. The key function of the apps is to estimate how many calories are burned in each activity. However, this varies by the body weight of the individual. The greater the weight the more energy is expended at any level of external work. A big football player cycling at a slow pace on a bicycle will burn more energy than a small individual doing the same amount of cycling.

Using a combination of information from the dietary record and physical activity record, an energy balance estimate is typically peformed by apps to balance the energy content of diets with energy expended each day. Data from the diet diary is used as the estimated energy intake. Energy expended is the sum of the resting metabolism estimated from the height and weight of the individual, and the energy expended through physical activities as the energy expended. The major emphasis of these apps has been in weight management even when the emphasis of the weight management effort is through physical activity. Personalized nutrition advice is limited with some apps providing encouraging messages via e-mail or the internet.

The future directions of app development include technology advances. For example, the global

positioning system (GPS) can be used for measuring physical activity. Cameras could be used for image recognition in order to recognize foods and estimate portion sizes. Apps could use messaging to encourage behavior changes that combine health behavior theories and persuasive technology. These advances could go a long way towards modifying unhealthy habits, but would need to be tested in field research in the real world. Measurement of body composition using bioelectrical impedance would improve estimates of lean body mass and energy expenditure for individual resulting in more personalized information. In the future, look for improvements of these apps to include individualized feedback, diet plans, or nutrition education on a personalized basis for individuals and for health professionals and coaches advising them on diet and lifestyle change.