



# A Narrative Review of Social Media and Game-Based Nutrition Interventions Targeted at Young Adults



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## ABSTRACT

The increased popularity of social media and mobile gaming among young adults provides an opportunity for innovative nutrition programs. This review evaluated the efficacy of these strategies in interventions targeted at 18- to 35-year-olds. The protocol was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Ten scientific databases, information technology conference proceedings, and gray literature were searched. Two reviewers conducted screening, data extraction, and quality assessments. Interventions were included if they used social media or electronic games. Comparisons were made pre- to post-intervention, or between intervention and control arms. Outcomes of interest included change in nutrition knowledge, attitudes, behavior, or weight and/or body composition. Eleven social media-based (randomized controlled trials [RCT] n=7) and six game-based [RCT n=1]) interventions were included. Overall quality of studies was low. Social media-based strategies included forum/blogs (n=5), Facebook (n=5), Twitter (n=1), YouTube (n=1), and chat rooms (n=1). Eight (RCT n=6) of 11 social media-based studies demonstrated improvements in outcomes. Findings suggested that social media may be more effective when combined with other strategies. Virtual reality games (n=3), web-based games (n=2), and a mobile application (n=1) were used in the gaming interventions. While a significant increase in knowledge was reported by three gaming studies (RCT=1), two used non-validated tools and longer-term measures of weight and behavioral outcomes were limited. The use of social media and gaming for nutrition promotion is in its infancy. Preliminary evidence suggests that these strategies have some utility for intervening with young adults. Further research using high-quality study designs is required, with measurement of outcomes over longer time periods. The systematic review protocol is registered with PROSPERO (registration number: [CRD42015025427](https://www.crd42015025427)). *J Acad Nutr Diet.* 2017;117:735-752.

OPTIMIZING NUTRITION IS ESSENTIAL IN THE PREVENTION of chronic diseases and the maintenance of good health and well-being.<sup>1</sup> “Young adulthood,” defined as 18 to 35 years old, is a transitional stage during which individuals gain independence and are likely to form life-long eating habits.<sup>2</sup> This population group is generally unaware of, or less concerned with, the relationship between diet and health.<sup>2-4</sup> Their typical diet is high in sodium, sugar-sweetened beverages, and foods prepared outside the home, and is low in fruits and vegetables.<sup>5-9</sup> Such dietary patterns increase disease risk factors,<sup>10-12</sup> yet population-wide nutrition campaigns do not usually target young adults.<sup>13</sup> An opportunity exists for interventionists to positively influence nutrition habits during young adulthood to reduce future disease burden.

The current generation of young adults has grown up alongside rapid progression in technology. Conventional methods of communication technology have changed and young adults commonly read material on, and share

information through, social media sites, such as Facebook, YouTube, and Twitter.<sup>14</sup> The popularity of social media has created a wide-reaching communication platform for health promotion and an opportunity to facilitate lifestyle behavior change. Using social media channels for the delivery of health information may reduce the time burden of traditional interventions, such as in-person or group consultations. Previous systematic reviews have explored the effectiveness of social media-based interventions in children, adolescents, and adults,<sup>15-19</sup> but not in young adults specifically. Of concern in these studies was the absence of high-quality study designs using behavioral theory-based frameworks.<sup>17,18</sup>

In addition to the well-known social media channels mentioned, there is an increasing trend toward gaming in health interventions.<sup>20</sup> Gamification, also known as experimental or serious games, is defined as the use of game components in a non-game context to motivate users.<sup>21</sup> One component of games is the concept of rewards that promote continuous participation.<sup>22</sup> Such a concept can be used not

only for engagement, but also as a technique for behavior change. Rewards have been shown to reinforce positive behaviors enabling change,<sup>23</sup> habit formation, and maintenance of new behaviors.<sup>24</sup> Given the popularity of social media<sup>25</sup> and gaming<sup>26</sup> among young adults, appropriate application of these strategies provides a potentially more accessible and flexible method to disseminate dietary behavior change interventions.

The primary aim of this systematic review was to evaluate the efficacy of social media and game-based interventions in nutrition promotion and behavior modification. More-specific objectives were to describe the social media and gaming nutrition campaigns/interventions, according to content, strategies, duration, and frequency of contact; and assess the efficacy of the social media- and game-based strategies in supporting changes in weight or body composition and/or dietary behavior change and enhancing engagement with the intervention.

## METHODS

### Design

This systematic review was conducted based on the methods described in the Cochrane Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions<sup>27</sup> and reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol.<sup>28</sup> The review protocol was registered with PROSPERO (registration number: [CRD42015025427](https://doi.org/10.1111/1743-1243.12427)).

### Definitions

In this review, the following definitions were assumed: Social media are Internet-based platforms that allow the publication of information and interaction between the content creator and recipients.<sup>29</sup> Popular social media platforms include blogs/forums, chat rooms, Facebook, Instagram, Twitter, and YouTube. Other electronic technologies that involve little or no interaction among users were excluded under this definition. For instance, text messages and websites solely for information-delivery purposes were not categorized as social media. Gamification (experimental or serious games) is the use of game components in a non-game context (eg, nutrition education) to motivate users.<sup>21</sup> This review focused on game-based interventions delivered via digital sources. Young adults were defined as those aged 18 to 35 years, based on the National Institutes of Health cut point.<sup>30</sup>

### Search Strategy

A comprehensive search strategy was developed in consultation with two experienced librarians and was used to identify eligible articles from the following electronic databases: CINAHL, the Cochrane Library, Embase, Lilacs, MEDLINE, PubMed, PsycINFO, Science Direct, Scopus, and Web of Science. Reference lists, government reports, and unpublished proceedings from information technology and computer-human interaction conferences were hand searched to obtain additional articles relevant to the review topic. These included the Ubiquitous Computing (UbiComp) Conference; the Computer Human Interaction Conference; and the Conference on User Modelling, Adaptation and Personalization held in the past 5 years (2011 to 2015). Databases were searched from 1990 to March 2016. This period was chosen to

reflect the advent of social media.<sup>31</sup> A combination and broad coverage of search terms and MEDLINE thesaurus Medical Subject Headings (MeSH) were selected, including young adults, social media, blogging, telemedicine, experimental game, serious game, gamification, diet, obesity, weight loss, and body mass index (BMI, calculated as kg/m<sup>2</sup>). Appropriate indexing, truncations, and synonyms were used for each database to maximize sensitivity. The search strategy is presented in [Table 1](#) (available at [www.andjrn.org](http://www.andjrn.org)) with results from one database, MEDLINE included.

### Study Selection

Studies were downloaded to Endnote X7 citation management software<sup>32</sup> and duplicates removed before screening. Two reviewers independently screened the articles by title and abstract, then by full text to determine eligibility. A third reviewer was consulted for articles with uncertainties. There was no limitation on country of publication, but non-English publications were excluded. Articles with no accessible full text were excluded after attempts to contact authors and retrieve them using library request were unsuccessful.

### Participants

Articles were included if interventions were targeted at young adults aged 18 to 35 years. A more lenient criterion was applied for the game-based studies due to the minimal availability of articles and, as such, studies were included if the majority of participants ( $\geq 90\%$ ) fell within the age range of 18 to 35 years and mean age was younger than 35 years. Study participants had to be generally healthy, nonpregnant, and have no illnesses that could impact normal dietary behavior. There were no limitations concerning sex, ethnicity, education, or socioeconomic status.

### Interventions

Eligible articles made use of social media- or electronic-based experimental games to promote good nutrition. These digital strategies were either the main component of an intervention or used as one part of a combination of intervention strategies.

### Comparisons

Comparisons varied based on study type and included pre- and post-intervention, or intervention and control arm.

### Outcomes

The outcomes of interest included nutrition knowledge; attitude or behavior change; and/or change in weight, fat mass, and BMI. Outcomes pertaining to user engagement were also of interest, including frequency of interaction with or usage of social media or gaming program components.

### Study Designs

To improve the comprehensiveness of the review, and considering that such social media and gaming strategies are not commonly trialed using a controlled experimental design, no limitation was placed on study design.

### Data Extraction

Data were extracted from eligible studies to a data extraction sheet. Information collected included study details (author,

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