Adolescent Females’ Consumerism of Social Media’s Health-related Content: A Mixed Methods Pilot Study

Miriam P. Leary¹, Emily N. Clegg¹, Madison E. Santella¹, Pamela J. Murray², Julie S. Downs³, Melissa D. Olfert¹

¹West Virginia University, Davis College of Agriculture, Natural Resources, and Design, Division of Animal and Nutritional Sciences; 4100 Agricultural Sciences Building, PO Box 6108, Morgantown, WV 26506-6108

²West Virginia University, School of Medicine Morgantown, WV; 1 Medical Center Drive, PO Box 9100, Morgantown, WV 26506-9600

³Carnegie Mellon University, Social and Decision Sciences, Dietrich College of Humanities and Social Sciences; 5000 Forbes Ave., BP 208, Pittsburgh, PA 15213

Authors Email Addresses:
miriamleary@mail.wvu.edu; enclegg@mix.wvu.edu; mesantella@mix.wvu.edu; pmurray@hsc.wvu.edu; downs@andrew.cmu.edu; melissa.olfert@mail.wvu.edu

Correspondence:
Melissa D. Olfert, DrPH, MS, RDN, LDN
Associate Professor, Human Nutrition and Foods
Division of Animal and Nutritional Sciences
Davis College of Agriculture, Natural Resources, and Design
West Virginia University
G25 Agriculture Sciences Building
1194 Evansdale Dr.
Morgantown, WV 26506
(304) 293 - 1918
(304) 293 - 2232 (Fax)
Melissa.olfert@mail.wvu.edu (E-mail)
Abstract

Background: Consumption of health and fitness-related social media content is a predominant behavior of teenage girls, putting them at risk for consuming unreliable health-related information.

Objective: Using mixed methods (qualitative and quantitative), this study assessed health behavior attitudes and practices, as well as social media use, in adolescent females. Additionally, similar practices and behaviors of adults regularly interacting with this population were studied.

Methods: Girls age 12-18 were recruited to complete a 28 item survey and participate in a 45-60-minute focus group. Adults who regularly interact with adolescent females, including parents, teachers, and healthcare professionals, were recruited from the local community and given a link to complete online consent and survey.

Results: A total of 27 adolescent females participated in one of 9 focus group. Participants included 18 high school (age: 16.1 ± 1.3 years; BMI: 22.8 ± 3.6 kg/m²) and 9 middle school (age: 12.4 ± 0.7 years, BMI: 24.6 ± 8.7 kg/m²) girls. Eleven adults completed the online survey. Among teenagers, social media is used for communicating and connecting with friends, rather than a source of health information. While teenagers may see health-related content most aren't following health-related pages or sharing it themselves, and fewer are actively searching for it. They tend to trust information that comes from familiar sources, and participants report that they do not follow official news accounts. Adults considered modeling and discussing healthy behaviors important, and reportedly expect that teenagers do see some level of health-related, and especially fitness related, content on social media.

Conclusions: These findings set a broad, informed, and meaningful foundation for any future research aimed at changing or influencing social media and its effects on health behavior.

Keywords: adolescent; female; social media; health information; health behaviors
Introduction:

More than one in five teenagers in the U.S. is obese [1], which could be attributed, at least in part, to unhealthy lifestyle behaviors such as inadequate physical activity and a poor diet. Indeed, only 17% of high school girls report levels of physical activity that meet aerobic guidelines; unfortunately, these levels are lower than male counterparts [2]. Further, high school girls consume high amounts of sugar, practice fad dieting, and have demonstrated weak nutritional knowledge and unhealthful eating habits [3]. The transformative period of adolescence is an ideal time for individuals to begin adopting positive health behaviors, especially in regards to eating and activity. Making positive health-related choices during adolescence can prepare an individual for a lifetime of health and wellness. Conversely, if poor eating habits and sedentary behavior are adopted during adolescence and practiced over decades, significant health-related complications, such as cardiovascular and metabolic diseases could manifest.

Increasingly, public health messages have targeted children and teenagers, but mass media efforts that have previously proved effective (i.e. newspapers, television, etc.), may no longer be culturally relevant in today's society. Indeed, most (92%) adolescents search health-related information online [4], but far less (10%) said that they reference more dated sources such as books, TV news (9%), and newspaper (3%) [5]. In fact, one focus group study involving adolescents indicated that teenagers search for a wide range of health topics on the internet, including nutrition [6]. Therefore, public health and health care related practices and research targeted to adolescents must recognize that teens are at the forefront of the transition from traditional to electronic media, especially social media.

Independent of general online activity, 71% of teenagers report using more than one social networking site [7], and 45% of teenagers report using social networking sites every day [8]. The majority of studies investigating adolescent use of social media focus on the impact of psychological well-being. The results from these studies have found unfavorable effects, especially related to posting and viewing photos, of social media use on mental health, including: negative mood self-objectification, body dissatisfaction, social comparison, eating behaviors, decreased self-esteem, weight dissatisfaction, drive for thinness, and peer competition [9-19]. Even “fitspiration” images and posts that aim to inspire people to live healthy and fit lifestyles reinforce the over-valuation of physical appearance, eating concerns, and excessive exercise that could have serious negative implications on adolescents psychological and emotional health [20].

To date, the relationship between teenagers use of social media and health-related information has been minimally investigated. Teenagers have access to a variety of health information via social networking sites [7]. In terms of seeking health-related information, most teenagers do not turn to social networking sites for health information, but this should not be generalized for the whole population [5]. One in ten said they get “a lot” of health information from social networking sites and 23% said they get at least “some” from such sites. Some teenagers simply come across health information through links on social networking sites (6%) [5]. In general, teenagers tend to be wary of posting health-related questions or viewing health-related information on social media, especially when their names can be associated with such information [5, 21].

Adolescent females appear to be at greater risk for consuming unreliable health-related information on social media than their male counterparts. Age, gender, race, physical activity level, and overall health are significant predictors of the amount of information teenagers report getting from social media sites. Indeed, those who are older, female, more active, and in better health are more likely to use social networking sites for health information [5]. Further, consuming (liking or following) health
and fitness-related social media content is done predominantly by teenage girls [22]. Many of these findings have come from simple, straight-forward surveys, but the relationship between adolescent girls use of social media and the effects on health behavior is likely complex and multifactorial. Understanding these relationships requires more qualitative formative research. Therefore, this mixed methods pilot research study examined adolescent girls' use of and exposure to social media in regards to health-related content, with the goal of informing the creation of materials aimed at increasing safe consumer practices of social media use among this population.

**Methods:**

**Design**

This pilot study assessed adolescent females' attitudes, practices and social media use around health behavior, as well as practices and behaviors of adults who regularly interact with them, using qualitative and quantitative methods. This study was approved by the Institutional Review Board of West Virginia University (#1711839385). Parents and/or guardians of participants gave written informed consent and participants gave informed assent.

**Participants**

Adolescent females, aged 12-18 years old, from local middle schools (MS) and high schools (HS) were invited to participate in 45- to 60-minute focus groups and complete an anonymous survey. Recruitment emails were sent to local principals and school administrators and personnel asking them to invite girls ages 12-17 to participate in this study. Principals and administrators who agreed were provided an email to send to students and their parents. Adolescent participants were compensated $25. Independently, we recruited adults from the same schools where adolescents were recruited who regularly interact with adolescent females, including parents, teachers, and healthcare professionals, providing them a link to an online consent form and 10-minute, anonymous survey. Adults were not compensated for participating in the online survey. All those interested in completing the survey had the option to do so after providing consent. Adults and youth participants were not necessarily related. There was no bias against ethnicity or race.

**Instruments**

Adolescent girls completed a 28-item Qualtrics survey gathering demographic information (e.g. age, year in school, height, weight) and other responses as detailed below, and then participated in a focus group discussion. Adults completed a 13-item Qualtrics survey, as described below. Numerical response scores were used for quantitative analysis.

**Adolescent Survey:**

BMI was calculated by dividing self-reported weight (kg) by squared height (m²). Four BMI categories were used: normal weight (BMI < 25.0), overweight (BMI = 25.0 – 29.9), obese class I (BMI = 30.0 – 34.9), and obese class II (BMI > 35.0). To investigate the levels of physical activity, participants were asked whether they have physical education (PE) class (score 1 = yes and 2 = no), and how much activity was done outside of PE (score to 1= every day from 5=never). To investigate sedentary behavior, questions asked if participants felt that the word "sedentary" described them (score 1=describes me extremely well to 5=does not describe me). Participants also estimated the hours spent in sedentary activities such as sitting or not moving, and were asked to attribute reasons for periods of non-activity (boredom, laziness, fatigue, time limitations, physical limitations, financial limitations, activities enjoyed
are sedentary, and other). Six questions assessed hours spent on social media, device used (computer, tablet and/or cell phone), and timing (day, weekend).

**Adult Survey:**

The survey investigated health behaviors, efforts to model healthy behaviors and have health-related conversations with teenagers, use of social media, and perceptions of teenagers' use of social media. Adult survey questions were independent of adolescent survey questions.

**Focus Groups**

Trained female researchers moderated focus groups and took notes. A semi-structured protocol following standard focus group guidelines [23] was administered by trained researchers [24, 25]. Focus group participants were asked questions designed to explore their attitudes toward social media-related topics, identify physical activity and sedentary behaviors, and discover how they use technology and social media. A trained note taker took comprehensive notes on a laptop computer at each focus group and proceedings were digitally audio recorded. Within 48 hours of the end of each focus group, a second note taker transcribed the digital recording. These notes were reviewed by the focus group moderator for clarity, thoroughness, and accuracy.

**Analysis**

Descriptive statistics summarizing numerical questionnaire data was analyzed using Microsoft Excel and reported as means ± SD. Content analysis to identify common themes was conducted by two independent researchers with a tiebreaker when necessary. The researchers discussed independent content analysis findings and data were constantly analyzed and compared to determine saturation of repetitive concepts (i.e., point at which no new information, trends, or themes emerge from data).

**Results:**

A total of 27 adolescent females participated in one of 9 focus group (4 MS, 5 HS) consisting of 2 - 5 girls each, including 18 HS (age: 16.1 ± 1.3 years; BMI: 22.8 ± 3.6 kg/m\(^2\)) and 9 MS (age: 12.4 ± 0.7 years, BMI: 24.6 ± 8.7 kg/m\(^2\)) teen participants. Eleven adults completed the online survey.

**Teen survey (Table 1)**

High School participants reported spending an average of 3 hours and 23 minutes daily on social media. Most (94%) accessed social media on their phone. They reported being on social media mostly late at night during weekdays and during the day on weekends, using Instagram (89%), SnapChat (89%), YouTube (74%), and Pinterest (61%), with most SM time related to Instagram and SnapChat. Half reported participating in a PE class and almost all (94%) reported physical activity outside of PE more than twice a week. Periods of inactivity were attributed to boredom, tiredness, or laziness (56%, 78%, and 39% of respondents, respectively).

Middle School participants reported spending an average of 1 hour and 14 minutes daily on social media, using both phone and computer. They reported being on social media mostly after school on weekdays and during the day on weekends, using YouTube (100%), Instagram (70%) and SnapChat (50%), with most SM time related to YouTube (32%) and Instagram (30%). One subject did not respond
to physical activity related survey questions. Of those that did respond, all reported participating in a PE class and all most all reported participating in physical activity outside of PE at least twice a week. Periods of inactivity were attributed to tiredness, boredom, and physical limitations (50%, 20%, and 20% of respondents, respectively).

Table 1. Teen Survey Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Choices</th>
<th>High School</th>
<th>Middle School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age:</td>
<td></td>
<td>16.1 ± 1.3</td>
<td>12.4 ± 0.7</td>
</tr>
<tr>
<td>Grade:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6th grade</td>
<td></td>
<td>4 (44%)</td>
<td>8 (89%)</td>
</tr>
<tr>
<td>7th grade</td>
<td></td>
<td>4 (44%)</td>
<td></td>
</tr>
<tr>
<td>8th grade</td>
<td></td>
<td>1 (11%)</td>
<td></td>
</tr>
<tr>
<td>9th grade</td>
<td></td>
<td>3 (17%)</td>
<td></td>
</tr>
<tr>
<td>10th grade</td>
<td></td>
<td>5 (28%)</td>
<td></td>
</tr>
<tr>
<td>11th grade</td>
<td></td>
<td>6 (33%)</td>
<td></td>
</tr>
<tr>
<td>12th grade</td>
<td></td>
<td>4 (22%)</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td></td>
<td>22.8 ± 3.6</td>
<td>24.6 ± 8.7</td>
</tr>
<tr>
<td>Do you have PE class?</td>
<td>Yes</td>
<td>9 (50%)</td>
<td>8 (89%)</td>
</tr>
<tr>
<td>Do you participate in physical activity outside of PE class?</td>
<td>Everyday</td>
<td>8 (44%)</td>
<td>2 (22%)</td>
</tr>
<tr>
<td></td>
<td>4 or more</td>
<td>4 (22%)</td>
<td>3 (33%)</td>
</tr>
<tr>
<td></td>
<td>2-3 times</td>
<td>5 (28%)</td>
<td>2 (22%)</td>
</tr>
<tr>
<td></td>
<td>Less than 2</td>
<td>1 (6%)</td>
<td>1 (11%)</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>How well does “sedentary” describe you?</td>
<td>Extremely</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Very well</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Moderately</td>
<td>6 (33%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Slightly</td>
<td>6 (33%)</td>
<td>4 (44%)</td>
</tr>
<tr>
<td></td>
<td>Does not describe me</td>
<td>6 (33%)</td>
<td>4 (44%)</td>
</tr>
<tr>
<td>Periods of inactivity attributed to:</td>
<td>Boredom</td>
<td>10 (56%)</td>
<td>2 (22%)</td>
</tr>
<tr>
<td></td>
<td>Laziness</td>
<td>7 (39%)</td>
<td>1 (11%)</td>
</tr>
<tr>
<td></td>
<td>Too tired</td>
<td>14 (78%)</td>
<td>5 (56%)</td>
</tr>
<tr>
<td></td>
<td>No time to be active</td>
<td>4 (22%)</td>
<td>1 (11%)</td>
</tr>
<tr>
<td></td>
<td>Physical limitations</td>
<td>2 (11%)</td>
<td>2 (22%)</td>
</tr>
<tr>
<td></td>
<td>Financial limitations</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Activities I enjoy are sedentary</td>
<td>6 (33%)</td>
<td>7 (78%)</td>
</tr>
<tr>
<td></td>
<td>Others (school/homework)</td>
<td>5 (28%)</td>
<td>3 (33%)</td>
</tr>
<tr>
<td>Time spent on Social Media (hours:min):</td>
<td>3:23 ± 0.11</td>
<td>1:14 ± 0.03</td>
<td></td>
</tr>
<tr>
<td>How do you access Social Media?</td>
<td>Cell phone</td>
<td>17 (94%)</td>
<td>8 (89%)</td>
</tr>
<tr>
<td></td>
<td>Computer</td>
<td>9 (50%)</td>
<td>8 (89%)</td>
</tr>
<tr>
<td></td>
<td>Tablet</td>
<td>3 (17%)</td>
<td>6 (67%)</td>
</tr>
<tr>
<td>Time spent on Social Media:</td>
<td>Weekdays</td>
<td>Late night</td>
<td>After school</td>
</tr>
<tr>
<td></td>
<td>Weekends</td>
<td>During the day</td>
<td>During the day</td>
</tr>
<tr>
<td>Which apps do you use?</td>
<td>Instagram</td>
<td>16 (89%)</td>
<td>7 (78%)</td>
</tr>
<tr>
<td></td>
<td>SnapChat</td>
<td>16 (89%)</td>
<td>5 (56%)</td>
</tr>
<tr>
<td></td>
<td>YouTube</td>
<td>14 (78%)</td>
<td>10 (100%)</td>
</tr>
</tbody>
</table>
Teen focus groups

Teen girls self-described use of social media.

Snapchat and Instagram provide social connections for HS participants, e.g., “it’s nice to see other people and what’s happening in their lives,” with each providing a different type of opportunity, e.g., "Snapchat is for funny posts, Instagram is where you try and look good - your best life". Although most have Twitter accounts, they do not use it as much. Facebook is not used and considered “out of date” and “a platform for older people”. Many girls use YouTube and have a Pinterest account, but don’t report using either frequently. Middle school girls also report using similar platforms, with more time spent on YouTube because “it’s fun to waste time on”. MS participants also stated that Facebook is more common among older generations, “my grandma has Facebook.”

For both middle and high school girls, all social media is used for communicating and connecting, “to check up on people”, primarily with friends, often in place of texting. One individual explained that social media is used to "post for everyone rather than text all of my friends". Similar social media applications are used among groups of friends with little differences between teenagers in the same social circles, “I feel like we use Instagram and Snapchat more because most people have those. If I got Twitter or something, I wouldn’t be on it as much and it wouldn’t be as interesting, because not all of my friends would be on it to interact with and see what they are doing.” Teenagers use social media because “if [they] don’t get on for a few days then [they] will miss out on jokes” and "feel behind". Social media also allows teenagers to connect with a larger online audience, including strangers, as a way to convey updates about their lives. Specifically, teenagers report Instagram “is just for fun” and allows them to connect with people while Snapchat is considered more personal, “Snapchat is more personal than texting because you can see your friends’ faces". Teenagers are motivated to use Snapchat by "maintaining streaks", or sending Snapchats back and forth for consecutive days without breaking the chain of communication, which creates a sort of record that becomes important to keep. Other forms of social media are used as entertainment (“Pinterest draw you in with crafts and stuff”), access to what’s going on in the world (“Twitter is to see the bigger world”), and as a source of information, but this is often in relation to what their friends or celebrities are doing. The present group primarily follows friends on social media but also follow celebrities, athletes, and health-related pages and they “find people on [their] own or hear about from friends who to follow”.

Posts seen on social media by high school girls are typically life updates from friends sharing what they’re doing, pop culture, or current events from well-known figures, including the president or celebrities. Snapchats are sent back and forth as a form of conversation. Posts seen on SM include
memes/funny images, advertisements, and posts from celebrities. Occasionally, high school girls see information regarding current events and advertisements, while many middle school girls see posts about sports they are involved in. A few participants mentioned that social media posts are often fake news, music-related, or videos. HS participants reported posting on social media to share something funny, like memes, or a life update that shows and/or describes what they're doing, who they're with, and may include a picture or selfie. Teenagers will also share about events, including sporting events and life updates (e.g. achievements or activities that they engage in).

Many teenagers admit to not following official news sources. So, regarding the reliability of social media content, teen girls are more likely to trust information on social media if the source is a verified account, if they've seen it posted repeatedly, or if it is posted by someone they know personally, “I'd definitely trust my friends more than celebrities although I do aspire and like them.” They do not trust information if it is paid/sponsored or if they have seen contradicting information, “Maybe I saw something that was happening and later I found out from the news that it was wrong.” Teenagers recommend researching independently, asking others, or fact checking to validate untrusted information.

**Teen girls’ exposure to health-related information on Social Media.**

Many participants reported seeing health or nutrition-related posts from friends or official accounts including recipes, pictures of food, or workout posts. Most teenagers reported that they do not follow health or nutrition accounts on social media, but that they do see advertisements related to fitness, weight loss, and supplements that they knew were unreasonable - “I usually ignore the ads. They say stuff about ‘take this pill and make your body look better’, ‘Ten foods that can kill you’ I didn’t believe it.” For those that do follow health-related accounts or people on social media, many of the posts are for healthy recipes or fitness related content. Further, some teenagers admitted to searching for health-related content, including workouts and healthy recipes. Both groups reported infrequent posting of health or nutrition-related information on social media. If such a post is made, it typically relates to sports performance or sharing pictures of food that looks good, is home-made, or from a cool place. Activity related searches were done by HS participants to find information on healthy nutrition and workouts. Some teenagers search for sport-specific workouts or exercises, conditioning programs, stretches, and/or drills. It was briefly mentioned that sometimes foods or recipes are investigated to determine the healthfulness.

**Teenagers girls self-reported lifestyle behaviors.**

Participants believe that activity is important for a healthy lifestyle. Specifically, it is important for physical and mental health, reporting that “it’s not just the foods you eat, even if you eat super healthy, you have to keep your body in shape to keep your muscles strong”. Physical activity was said to be important in order to allow optimal performance in sports, and also because it makes you feel good. Many engage in physical activity through sports (“sports are a fun and good way to stay active”), working out on their own, and through general physical activities like walking the dogs and doing chores like yard work. Younger girls report spending their leisure time “playing outside”. Many related activity to maintaining a slim figure with some stating that “sports help them lose weight” and this topic provoked some concerning reasons for being active including guilt - “sitting around makes me feel guilty, so I’ll work out”. Some expressed pressure to maintain a healthy weight for fear of being bullied. Girls recommend finding an enjoyable activity, establishing a routine, and incorporating both exercise and healthy eating. Teenagers report not using phones during physical activity, especially during team practices, but when phones are involved they are typically used for counting steps, tracking time or distance, and playing music. Some teenagers, use apps that prescribe specific workouts or training
programs, "I don't usually use a phone unless I'm following a workout." While online, some teenagers will screenshot a workout or routine to reference later when they're more motivated to be active.

Sedentary behavior seemed to be an unfamiliar topic for this audience, but when defined and explained, participants cited social media (via phone or computer), school work, and television as the primary reasons for being sedentary, often doing many things at once, "I just lay in bed and scroll through Instagram" or "normally, I watch TV while on the phone". Fewer high school participants than middle schoolers reported being sedentary while reading. Some of the younger participants also reported being sedentary while listening to music or playing an instrument. Recommendations to reduce sedentary behavior while still participating in preferred activities included things such as multitasking (e.g. play with the dog while watching television).

Social media pages and people that emphasize health lifestyles and fit bodies can leave teenagers feeling discouraged and envious, but also sometimes encouraged, inspired, and motivated. One individual explained, "sometimes I'm like, not really envious, but it pushes me to want that more". HS girls are aware that many ads and posts are photo-shopped or manipulated, and acknowledge that attaining the same physique is often unrealistic, "Guys with really big muscles, that's not aspirable, but people that are just fit and slim and eat healthy, that's helpful." These teenagers felt "it is important for girls their age to hear about body empowerment from celebrities" but also recommended using these individuals as motivation to work out or eat healthy - "keep pictures of your goals".

Adult survey
The majority of adult respondents were parents and teachers of teen girls and reported limiting their own sedentary behaviors, getting regular exercise, and healthy nutrition as at least moderately important. Further, these adults feel that it is very important to model health behaviors for teen girls: most model limiting social media, but only about half model healthy eating, activity, and limiting sedentary behavior. Adults believe it is important to discuss healthy behaviors with teenagers and most do so by discussing food choices, portion sizes, daily activity, social media use and healthy body image. Less than half of adults discuss limiting sedentary behavior. For accessing health-related information, almost all recommend talking to parents and 2/3 answer questions directly or encourage teenagers to talk to a healthcare practitioner. Only one third of adults direct teenagers to reliable online sources. Adults do expect that teenagers see some level of health-related, but especially fitness-related, content on social media.

Table 2. Adult Survey Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Choice</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which of the following applies to you?</td>
<td>Parent/guardian of a teen</td>
<td>6 (55%)</td>
</tr>
<tr>
<td></td>
<td>Parent/HCP</td>
<td>1 (9%)</td>
</tr>
<tr>
<td></td>
<td>Parent/Teacher</td>
<td>2 (18%)</td>
</tr>
<tr>
<td></td>
<td>Teacher only</td>
<td>2 (18%)</td>
</tr>
</tbody>
</table>

How important is it to you that you lead a healthy lifestyle? (0 = not important; 10 = extremely important) | Regular exercise | 5.9 |
| | Healthy Nutrition | 7.6 |
| | Limit Sedentary Behavior | 6.9 |

How many times per week do you exercise for at least 20 minutes? | Never | 6 (55%) |
1-2 times/wk  1 (9%)
3-4 times/week  2 (18%)
Most days      2 (18%)

How active is your job?
Sedentary      2 (18%)
Lightly active  5 (45%)
Moderately active 4 (36%)

About how much time do you think teen girls spend on social media each day?  3.4 (1.5-5.5) Hours

How does SM influence: (-5 = very negative, 0 = no influence, 5 = very positive influence)
Healthy eating  0.1
Activity        -1.4
Sedentary behavior -0.25
Body image      -1

Importance of modeling healthy behaviors? (0 = not important; 10 = extremely important)  9.3

How do you role model healthy behavior?
Healthy eating  5 (45%)
Limit Social media  8 (73%)
Healthy activity  6 (55%)
Limit Sedentary behavior  5 (45%)

Importance of discussing healthy behaviors with teenagers? (0 = not important; 10 = extremely important)  9.1

Which do you discuss with teenagers?
Food choices  9 (82%)
Portion sizes  7 (64%)
Daily activity  8 (73%)
Sedentary behavior  5 (45%)
Social media  10 (91%)
Healthy body image 11 (100%)

How do you encourage teenagers to access health-related info?
Encourage talking to parents  9 (82%)
Answer directly  7 (64%)
Encourage them to talk to HCP  7 (64%)
Direct to reliable online sources  4 (36%)

How much health-related info do you think teenagers see on SM? (0 = NONE; 10 = A LOT)
Nutrition  3.0
General activity  4.8
Fitness  6.1
Sedentary behavior  2.9

Discussion:

Teenage girls report using social media, specifically Snapchat and Instagram, to communicate and connect with friends. These applications (apps) are mostly utilized to interact with their peers in place of traditional communication methods such as texting, and to share posts that are comical, sports-related, or display an aspect of their daily life. While teenagers may see health-related content, most aren't following health-related pages or sharing it themselves, and fewer are actively searching for it.
They tend to trust information that comes from familiar sources, and report that they do not follow official news accounts. Overall, among both middle and high school girls, social media is used for communicating and connecting with friends, rather than a source of health information.

Adults influence teenagers' adoption of healthy habits; therefore, it is critical that they be aware of the nature of teen social media (SM) use and encourage healthy use by limiting time spent on SM. Adequate physical activity, limiting sedentary behavior, and proper nutrition are critical health behaviors that if adopted during adolescence can contribute to lifelong health. As role models and rule enforcers, parents are a critical piece in promoting teenagers' healthy habits. Adults in this study indicated that limiting their own sedentary behaviors, getting regular exercise, and healthy nutrition were at least moderately important. However, they felt it was extremely important to model healthy practices and have conversations about health behaviors with teen girls. These practices could lay the foundation for establishing habits necessary for a lifetime of healthy behaviors.

Research shows that exposure to social media and "fitspiration" posts lead to more body comparisons and lower self-esteem, specifically in women [11, 12, 20]. With the increase in the number of social media outlets and time spent on them, the reach of SM is expanding to include younger adolescent girls [22]. In the present study, all adults reported having conversations with teen girls about health body image, and in focus groups, the teenage girls were aware that many ads and posts are photo-shopped or manipulated and that attaining the same physique is often unrealistic. Paired with the girls' insistence that teenagers should hear about body empowerment suggests the conversations adults have with teenagers are effective in promoting healthy body image.

Adults in this study ranked physical activity as moderately important, and most discuss its importance with teenage girls. While only one third of adults met physical activity recommendations, almost all teenagers engage in regular physical activity outside of physical education classes. Adults efforts to emphasize activity to teenagers appears to be effective in promoting healthy behaviors. However, despite rating the importance of limiting their sedentary behavior higher than that of obtaining regular exercise, more adults discuss the importance of daily activity (73%) than limiting sedentary behavior (45%) with teen girls.

Despite considering limiting sedentary behavior as important for their own health, less than half of adults reported having these conversations with teenage girls. In teen surveys and focus groups, the phrase "sedentary behavior" needed to be explained, confirming that this audience is missing out on this important health information. While this population understands the importance of physical activity, interventions and public health messages to limit sedentary behavior are warranted. Indeed, obesity is a well-documented outcome of screen media exposure, and in the present study, social media use accounted for approximately half of the time adolescent girls spent being sedentary outside of school. Importantly, adults' estimates of teen social media use (~3.4 h of use daily) are in line with teenagers self-reported social media use; however, adults do not think SM significantly influences health behaviors. Adolescents may benefit from interventions that replace social media with less sedentary activities, while adults may benefit from information connecting social media use and sedentary behavior with adverse health outcomes, including obesity.

Using social media gives adolescents access to content about health information of varying degrees of trustworthiness. Girls reported seeing health, nutrition, and fitness-related content on social media, often in paid advertisements, and recognize the potential to encounter false information. Though
verifying (e.g. fact checking) was recommended, teen girls rely on less stringent methods for determining what to trust (e.g. posts from people they knew personally). These findings indicate that teenagers are consuming and sharing related information uncritically on social media which could leave them with misinformation about health habits. These findings underscore the importance of developing and disseminating materials aimed to increase safe consumer practices of social media use in this audience.

Further, few adults (36%) in the present study directed teenagers to reliable online sources of health information. Viewing unverified health-related information on social media, without adult recommendations for accessing reliable online sources, could put teen girls at risk for unsafe health practices. Future interventions should be aimed at providing adults with educational materials for reliable, online health information to share with teenage girls.

Using a mixed methods (qualitative and quantitative) approach, this pilot study assessed health behavior attitudes and practices, as well as social media use in adolescent females. Additionally, these practices and behaviors among adults regularly interacting with this population were examined. Although the sample size was small, the data generated are rich and informative, and the focus group data reached the saturation point prior to terminating data collection. Results from the present study offer several potential avenues for targeting adolescent girls' use of social media and its effects on health behavior, including education interventions for both teenagers and the adults that they are regularly in contact with, in the areas of sedentary behavior, accessing reliable online health-related information, and being judicious consumers of online health information. The state and use of social media are ever-changing, but the potential to use social media as a form of promotion for healthy behaviors, especially among teenagers, will continue to offer promise. Social media campaigns that target this population could provide evidence-based, peer-reviewed information in a culturally relevant and age-appropriate format that could favorably impact teenagers at a transformative time. However, the success of any social media based intervention will depend on a thorough, comprehensive understanding of the current state of social media use and behavior. Otherwise, any potential benefits of direct social media campaigns are likely to be missed. Therefore, the findings of the current pilot study set a broad, informed, and meaningful foundation for any future research aimed at changing or influencing social media and its effects on health behavior.

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