Willingness of African American Men to Participate in mHealth Weight Management Programs

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Abstract

The high rate of smartphone ownership as well as the high prevalence of obesity among African American men (AAM) offer opportunities to recruit them into gender-specific, tailored mobile health (mHealth) weight management programs and research. This study examined weight status, smartphone usage, and willingness to participate in mHealth weight management research among AAM. A self-administered survey was completed by a convenience sample of 311 AAM in north central Florida, United States. Participants received a $5 grocery store gift card. The mean BMI was 28.33 (SD, 6.7). Most (65.7%) were trying to lose weight or actively trying to not gain any more weight. Some (23.3%) reported that a physician told them to lose weight, and these men had a higher mean BMI than those who were not told to lose weight (p<0.0001). Most (65.0%) owned smartphones and used Facebook (72.0%) and YouTube (67.8%). Several (43.1%) expressed a willingness to participate in mHealth weight management research. Men who expressed a willingness had significantly higher BMI than those who did not (p<0.0001). Men also expressed willingness to participate in mHealth research that used text messages (62.0%), smartwatches/health trackers (55.0%), smartphone apps (51.4%), health tracking websites (32.8%), and online group support (21.5%). BMI was higher among those willing to participate in text-based research than those who were not (p=0.045). This study highlights the potential for recruiting AAM into mHealth weight management using a variety of tools and digital devices.

Keywords: Men's health, mHealth, African Americans, weight management

Introduction

Obesity contributes to several of the leading causes of death among Americans (Department of Health and Human Services [DHHS], 2009). According to the National Center for Health Statistics, African Americans (AAs) have the highest prevalence of overweight and obesity by race/ethnicity and sex in the United States (U.S.), with 82% of women and 70% of men being overweight or obese (National Center for Health Statistics [NCHS], 2017). This high prevalence of obesity greatly increases their risk for higher rates of chronic diseases (e.g. type 2 diabetes, heart disease, and hypertension), lower life expectancy, and other negative economic, social, and psychological outcomes compared to their non-obese counterparts (DHHS, 2009; NCHS, 2018).

Non-surgical interventions aimed at preventing obesity primarily target food intake, physical activity, and behavior modification (National Task Force [NTF], 2000). Studies suggest that advances in mobile health (mHealth) tools delivered via smartphones have great potential to educate and empower individuals to self-manage their weight and reduce their risk for obesity-related diseases (Hebden, Cook, van der Ploeg, Bauman, & Allan-Fainelli, 2014, Nundy, Dick, Solomon, & Peek, 2012; Siopis, Chey, & All-man Farinelli, 2014; Al Ayubi, Parmanto, & Branch; Bert, Giacometti, & Gualan, 2014; Gorton, Dixon, Maddison, & Mhurchu, 2011). According to data from Pew Research Center (2018), most American adults (77%) own smartphones and use them as their primary mode of communication. Smartphone ownership is high among all groups regardless of income, age, sex, and race/ethnicity (Pew, 2018). In fact, 67% of low-income Americans own smartphones. Smartphone ownership is highest among 18-29 years old (93%), but it has also dramatically increased among 50-64 years old (74%) and 65 years and older (42%). Men have a slightly higher ownership than women (80% vs. 75%). The rate of smartphone ownership among AA increased from 70% to 75% from 2015 to 2018 (Pew, 2018).

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Therefore, there are unprecedented opportunities to engage AAM in mHealth research that focuses on disease prevention, risk reduction, and self-management of chronic diseases such as obesity. The potential advantages of mHealth interventions over traditional in-person clinical research include cost-efficiency, convenience, ease of access, and a more favorable retention rate (Campbell, Nunes, Miele, Matthews, Polsky *et al.*, 2012). mHealth approaches via smartphones may be especially suited for self-monitoring and self-management of obesity since they allow for real time tracking, monitoring, and syncing of data. In addition to researchers, clinicians and other health professionals (e.g. registered dietitians and certified health coaches) can also respond in a timely manner and provide tailored feedback to a diverse patient population (James, Harville, Whitehead, Dodani, Sears, 2016 *et al.*; Allen, Stephens, & Patel, 2014).

AAs remain underrepresented in all types of research despite the mandate of the 1993 National Institutes of Health Revitalization Act to include minorities in all federally-funded research (National Institutes of Health [NIH], 1993). Additionally, AAM are more likely than their female counterparts to be underrepresented in mHealth research (James, Harville, Sears, Efunbumi, & Bondoc, 2017). Studies show that AAM have high ownership of smartphones, access to the internet from a variety of sources, and possess the skills to text and navigate the internet (James & Harville, 2017; Smith 2015; Zicuhr & Smith, 2012). Thus, opportunities exist to target AAM for mHealth weight management programs and interventions. This cross-sectional study examined weight status, smartphone usage, social media engagement, and willingness to participate in mHealth weight management research and educational programs among AAM of varying age groups.

Methods

Recruitment and Participants

Cross-sectional survey data were collected from a convenience sample of 311 African American males in north central Florida, United States. Recruitment was done primarily at barber shops, churches, and community events. The inclusion criteria were: 1) self-identify as African American and male, 2) over 18 years of age, and 3) able to read and write in English. Participants completed a self-administered questionnaire and received a $5 grocery store gift card. Data were collected over a nine-month period from April 2014 to January 2015. The study was approved by the Institutional Review Board at the researcher's institution.

Measures

This project was part of a larger study that focused on mobile health research and African Americans, and the description of the survey is published elsewhere (James et al., 2016; James & Harville, 2017). Data were collected on participant demographics, weight status, weight satisfaction, smartphone use, social media engagement, and willingness to participate in mHealth weight management program. Body mass index (BMI) was calculated using the World Health Organization (2006) guidelines self-reported height and weight [BMI=weight (kg)/height (m)^2]. The questionnaire took approximately 15 minutes to complete.

Statistical Analysis

Data were analyzed using IBM SPSS for Windows (version 24.0 Armonk, NY). Data analysis included frequencies, independent samples *t*-tests, one-way analysis of variance (ANOVA), and multinomial logistic regression. Means were calculated with standard deviations. Post-hoc comparisons of ANOVA were conducted using Tukey-Kramer HSD. Multinomial logistic regression analyses examined the association between three age groups (18-29, 30-50, and 51+) and weight satisfaction, weight management status, downloading of nutrition/fitness apps, and social media engagement, and willingness to participate in mHealth research using a variety of technologies. The dependent variable was age group, with those 18-29 being the referent group. All independent variables were categorical. The amount of variation in the model was determined using the Cox and Snell R^2 and the Negelkerke R^2 statistics. Statistical significance was established at $p<0.05$ for all tests.

Results

Participant Characteristics

The mean age was 37.1(SD, 14.9), and the age group distribution was: 18-29 years (42.8%), 30-50 (3.02%), and 51+ (25.2%). Most were single (64.1%), employed (61.4%), and had college credits or were college graduates (57.4%). See Table 1 for demographic data.

Table 1. Participant characteristics (n=311)

Characteristics	n	%
Mean BMI (SD)		
18-29	26.3±6.0	
30-50	30.2 ±7.1	
51+	29.9±6.1	
Age Group (years)		
18-29	132	42.8
30-50	99	32.0
51+	78	25.2
Marital status		
Married	111	35.9
Single	199	64.1
Employment		
Employed	191	61.4
Unemployed	91	29.2
Retired	14	4.5
Disabled and unable to work	15	4.8
Highest education level		
Did not finish high school	27	8.7
High school graduate	104	33.8
Some college credits	70	22.7
AA/AS degree	34	11.0
BA/BS degree	39	12.7
Graduate or Professional degree	34	11.0
Current college student		
Yes	80	25.9
No	229	74.1
Home ownership		
Yes	90	29.0
No	220	71.0
Military service		
Yes	43	13.9
No	266	86.1

Weight Status and Weight Satisfaction

The mean BMI was 28.33 (SD, 6.7). Based on BMIs classification, the participants' weight status were classified as underweight ($<1\%$), normal weight (33.7%), overweight (31.6%), and obese (33.7%). Weight satisfaction was rated on a scale from one to five, and the men reported they were "very dissatisfied" (11.4%), "dissatisfied" (19.5%), "somewhat satisfied" (31.6%), "satisfied" (24.4%), or "very satisfied" (13.0%) with their weight. Furthermore, mean BMI varied significantly by weight satisfaction level ($F_{4,289}$=17.54, p<0.0001), with men who were very dissatisfied having higher mean BMI (34.51, SD, 9.70) than all other groups. Those who were dissatisfied also had significantly higher mean BMI (30.75; SD, 6.82) than those who were satisfied (26.32; SD, 4.73) and those who were very satisfied (23.70; SD, 2.90). Those who were somewhat satisfied also had significantly higher mean BMI than those who were very satisfied (28.28; SD, 9.70 vs. 26.32; SD, 4.73).

The mean BMI also varied significantly by age group ($F_{2,289}$=12.81, p<0.0001), with men 18-29 having significantly lower mean BMI (26.3; SD, 6.0) than those 30-50 (30.2; SD, 7.1) and those 51+ (29.9; SD, 6.10). A multinomial logistic regression examining the association between weight satisfaction and age group was significant (X^2=37.89, p<0.0001).

Compared to those 51+, those 18-29 were significantly less likely to be "very dissatisfied," (β=-0.91, OR=0.40, p=0.01), "dissatisfied" (β=-.92, OR=0.40, p=0.006), and "somewhat satisfied" with their weight (β=-0.33, OR=0.49, p=0.03). There were no other significant differences by age group.

Men reported that they were currently trying to lose weight (41.5%), keep their weight the same (24.2%), and gain weight (20.9%). A small number of men reported that they were not actively doing anything about their weight. Mean BMI varied significantly by weight management status ($F_{3,288}$=50.22, p<0.0001). Men who were trying to lose weight had higher mean BMI (32.79; SD, 6.88) than those in the other categories, and those who were trying to gain weight had lower BMI (23.10; SD, 5.25) than those in the other categories. There were no significant differences between those who were keeping weight the same (26.62; SD, 4.52) and those who were doing nothing (26.25; SD, 5.25). A multinomial logistic regression examining the association between participants' weight management status and age group was significant (X^2=42.36, p<0.0001). Compared to those 51+, those 18-29 were significantly more likely to be trying to gain weight (β=1.48, OR=4.38, p<0.0001). There were no other age group differences.

A few men (23.3%) reported that a physician told them to lose weight, and these men had a significantly higher mean BMI than those who were not told to lose weight (34.01; SD, 8.01 vs. 26.53; SD, 4.92), (t=86.23, p<0.0001). A multinomial logistic regression examining the association between being told to lose weight and age group was significant (X^2=53.91, p<0.0001). Compared to those 51+, men 18-29 were significantly less likely to be told they needed to lose weight (β=-1.23, OR=0.29, p<0.0001). There were no other significant group differences.

Mobile Device Usage and Social Media Engagement

Men owned a variety of devices such as laptops (65.0%), smartphones (65.0%), desktop computers (38.6%), and tablets (28.6%). All used their smartphones to send texts (100%) and most access the Internet daily (72.1%). A multinomial logistic regression examining daily access of the internet via smartphones and age group was significant (X^2=33.46, p<0.0001). Compared to men 51+, those 18-29 were significantly more likely to do so (β=1.08, OR=2.95, p<0.0001) as well as those 30-50 (β=0.71, OR=2.04, p<0.0001).

Some men (33.2%) reported they used a nutrition or fitness app on their phones within the past 30 days. There were no significant differences in mean BMI between those who used an app and those who did not. A multinomial logistic regression examining the association between using an app and age group was significant (X^2=29.34, p<0.0001). Compared to men 51+, those 18-29 were significantly more likely to have done so (β=0.98, OR=2.67, p<.0001); those 30-50 were also significantly more likely to have done so (β=0.79, OR=2.19, p<0.0001).

Men sent a mean of 41.38 (SD, 66.71) texts daily. There were significant differences in mean number of texts sent daily between all age groups, ($F_{2,273}$ =26.63, p<0.0001). Post-hoc comparison showed that men 18-29 sent significantly more texts (71.18; SD, 78.17) than those 30-50 (25.84; SD, 56.90) and those 51+ (8.82; SD, 15.64). There were no significant differences in the number of texts sent daily between those 30-50 and those 51+. Men received a mean of 45.05±69.41 texts daily. additionally, there were significant differences in mean number of texts received daily between all age groups, ($F_{2,273}$=35.13, p<0.0001). Post-hoc comparison showed that men 18-29 received significantly more texts (80.07; SD, 89.48) than those 30-50 (25.01; SD, 31.23) and those 51+ (9.01; SD, 12.98). There were no significant differences in the number of texts received daily between those 30-50 and those 51+.

Men used a variety of social media site and tools such as Facebook (72.0%), YouTube (67.8%), Google+ (45.7%), Instagram (31%), Twitter (27.3%), and Skype/FaceTime (22.5%).

A multinomial logistic regression model examining the association between age group and social media use was significant (X^2=299.91, p<0.0001). Compared to those 51+, those 18-29 years old were significantly more likely to use YouTube (β=.75, OR=2.12, p<.001), Facebook (β=1.32, OR=3.74, p<0.0001) and Instagram (β=2.43, OR=11.38, p<0.0001). Compared to 51+, those 30-50 years old were significantly more likely to use Instagram (β=1.17, OR=3.23, p<.001,), and Facebook (β=0.92, OR=2.50, p<0.0001). See Table 2.

Table 2. Multinomial logistic regression of social media usage and age group among African American men (n=311)

Social Media	β (SE)	Wald	OR (95% CI)	P
30-50				
Twitter	-0.10 (0.44)	0.01	1.00 (0.42, 2.43)	.986
YouTube	0.32 (0.51)	0.40	1.38 (0.51, 3.74)	.533
Facebook	1.12 (0.56)	3.91	3.07 (1.01, 9.33)	.048*
Google +	-0.37 (0.38)	1.00	0.69 (0.33, 1.45)	.327
Skype/FaceTime	0.74 (0.41)	0.32	1.08 (0.48, 2.42)	.858
Instagram	1.59 (0.34)	12.67	4.88 (2.04, 11.41)	<.0001*
51+				
Twitter	-0.92 (0.62)	0.03	0.91 (0.29, 2.84)	.874
YouTube	1.08 (0.53)	4.13	2.95 (1.04, 8.39)	.042*
Facebook	1.70 (0.60)	7.90	5.42 (1.67, 17.59)	.005*
Google +	-0.05 (0.48)	0.01	0.95 (0.37, 2.41)	.195
Skype/FaceTime	-0.32 (0.53)	0.35	0.73 (0.26, 2.07)	.552
Instagram	2.10 (0.67)	9.95	8.15 (2.21, 30.01)	<.002*

The referent group is: 18-29
*p<.05 significant

Model fit: -2 Log Likelihood = 120.93, $X^2(12)$=60.44, P<0.0001; Pseudo R square: Cox & Snell = 0.260, Nagelkerke = 0.299

Willingness to Participate in mHealth Research

Men expressed willingness to participate in mHealth research targeting general health and wellness (63.6%), healthy eating and physical activity (54.7%), weight management (43.1%), diabetes prevention/management (33.1%), hypertension prevention/management (26.7%), cardiovascular disease prevention/management (22.2%), and binge eating/food addiction (13.5%). BMI was significantly higher among those who were willing to participate in weight management programs than those who were not (30.22; SD, 7.44 vs. 26.80; SD, 5.50, p<0.0001). There were no other significant differences in BMI. Compared to those 51+, those 18-29 were significantly more willing to participate in mHealth research for binge eating/food addiction (β=1.21; OR, 3.35; p=.024) and heart disease prevention/management (β=1.26; OR, 3.53, p=0.016), but less willing to participate in mHealth research for hypertension prevention/management (β=-2.00, OR=0.14, p<.000). See Table 3.

Table 3. Multinomial logistic regression of willingness to use specific mHealth tools and age group among African American men (n=311)

mHealth tools	β (SE)	Wald	OR (95%CI)	P
30-50				
Text message	0.93 (0.29)	9.74	2.54 (1.47, 4.57)	.002*
Smartwatch	0.63 (0.29)	4.87	1.88 (0.76, 3.28)	.027*
Smartphone app	0.72 (0.29)	0.64	1.08 (0.61, 1.89)	.801
Web portal	-0.10 (0.31)	0.10	0.90 (0.48, 1.67)	.747
Online support	-0.15 (0.36)	0.17	0.86 (0.43, 1.75)	.668
51+				
Text message	1.99 (0.52)	7.88	2.51 (1.32, 4.79)	.005*
Smartwatch	1.16 (0.43)	8.82	2.53 (1.36, 4.70)	.003*
Smartphone app	1.20 (0.45)	12.02	3.02 (1.62, 5.63)	<.001*
Web portal	-0.18 (0.48)	2.01	0.64 (0.25, 1.63)	.349
Online support	-0.54 (0.51)	0.72	0.40 (0.25, 1.77)	.397

The referent group is: 18-29
* p<.05 significant

Model fit: -2 Log Likelihood = 165.64, $X^2(1)$=37.23, *p<.0001*; Pseudo R square: Cox & Snell = 0.116, Nagelkerke = 0.58

Men also expressed willingness to participate in mHealth research that used text messages (62.0%), smartwatches/health trackers (55.0%), smartphone apps (51.4%), health tracking websites (32.8%), and online group support (21.5%). BMI was higher among those willing to receive text messages than those who were not (28.93; SD, 6.41 vs. 27.32; SD, 6.94, p=0.045). A multinomial logistic regression model examining the association between age group and willingness to use mobile device and tools was significant (X^2=37.60, p<0.0001).

Compared to those 51+, men 18-29 were more willing to receive text messages (β=0.92, OR=1.32, p=0.005), use a smartphone app (β=0.96, OR=3.01, p=0.001), and use a smartwatch/health tracker (β=0.93, OR=2.53, p=0.003). Compared to those 51+, men 30-50 were more willing to use a smartphone app (β=1.03, OR=2.81, p=0.002). There were no other significant differences.

Discussion

Despite the growing use of mHealth technologies to prevent and treat obesity, AAs remain underrepresented in mHealth research (Campbell, *et al.*, James *et al.*, 2017). AAM in this study had lower rates of overweight or obesity (65% vs. 70%) than their national counterparts (NCHS, 2017), and most were currently trying to lose weight or prevent further weight gain (66%). Thus, it is a worthwhile public health endeavor to promote weight loss or the prevention of further weight gain AAM who are normal weight, overweight, and obese (NTF, 2000).

Most men expressed some level of dissatisfaction with their weight. These variables varied by age group, with men 18-29 more likely to have lower BMI and less likely to be dissatisfied with their weight than their older counterparts. However, while the men 18-29 had significantly lower BMI than the other groups, their mean BMI was still classified as overweight (26.3, SD 6.0). Additionally, they were more likely than the older groups to be trying to gain weight. These young men may be focused on gaining muscles and "bulking up" rather than gaining weight per se. This suggests that mHealth programs and messages should be tailored for younger, overweight AAM to prevent them from becoming obese in later years (James, 2013). Additionally, concepts of "healthy weight," "overweight and obesity," and "muscle versus fat weight" should be explored with these men, and messages be developed accordingly. Interestingly, those who reported not doing anything about their weight also had a mean BMI that classified them as overweight. Messages and programs should also be developed to educate overweight AAM about the risk factors associated with overweight and obesity. For example, these should be tied to preventing type 2 diabetes, hypertension, heart diseases, and other obesity-related conditions that have a high prevalence among AAM (DHHS, 2009; DHHS, 2010).

It is interesting to note that although 65% of the men were classified as overweight or obese, only 23% reported that they were told to lose weight by a physician. This is consistent with other studies that report many primary care physicians do not diagnose or document "obesity" in their clients (James, 2013). This could be due to many physicians being reluctant or ill-prepared to treat obesity in clients. However, quality, patient-centered care should ensure that the continuum of care includes referral to registered dietitians, health coaches, psychologists, and support groups (James, 2013; DHHS, 2010; Phelan, Burgess, Yeaszel, Hellerstedt, Griffin, *et. al.*, 2015). Physicians can also refer patients to various weight management research studies.

Men in this study sent and received text messages daily and most expressed willingness to participate in mHealth weight management research that used text messages. Texting is now one of the primary means of communication for many individuals (James, *et al.*, 2016). Texting is one of the most common tool used in mHealth behavioral research, and there is great potential for expanding its usage in various areas of health care to promote health and prevent diseases. It is widely available, comes standard with most plans at little or no cost, provides instant feedback, and requires little expertise (Cole-Lews & Kershaw, 2010; Patrick, Raab, Adams, Dillon, Zabinski, *et al.*, 2009). Texting is also a two-way communication that allows practitioners and researchers to send reminders, motivational messages, and personalized feedback. It also allows clients/participants to provide feedback and text questions and concerns (Patrick, Raab, Adams, Dillon, Zabinski, *et al.*, 2009). The long-term efficacy of text-based mHealth weight management interventions are still being examined. However, a systematic review and meta-analysis of mHealth interventions that used texting messaging found that participants lost significantly more weight than participants in studies that did not use text messages (Siopis, Chey, & Allman-Fainelli, 2014). AAM in all age groups reported they would be willing to participate in text-based mHealth weight management programs. Thus, health researchers should explore the "dosage of texts" that would be most beneficial to men in different age groups.

Incorporating social media into mHealth weight management program is relatively new. Social media engagement can be used as a stand-alone strategy or as a complement to other traditional strategies (James, Harville, Efunbumi, Babazadeh, & Ali, 2017; Berger & Schwartz, 2011). Like other Americans, Facebook was the most frequently social media used by AAM (James, Harville, Efunbumi, Babazadeh, & Ali, 2017). Although younger men were significantly more likely to use Facebook than their older counterparts, Facebook use among older Americans continue to grow. In fact, more than half of internet users 65 and older use Facebook (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015).

One study noted significantly more weight loss after eight weeks among participants who were in the Facebook plus texting group, than those in the Facebook only group and the waiting list group (Napolitano, Hayes, Bennett, Ives, & Foster, 2013). Additionally, since most American adults use two or more social media sties, it is possible that AAM would be willing to participate in a social media-intense weight management program, especially those 18-29 and 30-50 (Duggan et al., 2015). Furthermore, researchers should explore using social networks and discussion forums as these have been shown to help individuals in their weight management journey (Jane, Foster, Hagger, & Sebely, 2015; Hwang, Etchegaray, Sciananna, Bernstam, & Thomas, 2014). Short health education videos via YouTube may also enhance the program, especially for those with low health literacy and eHealth literacy (James & Harville, 2016).

Men in this study were also willing to participate in mHealth research that used wearable digital devices, apps, web portals, and online counseling and support, to varying degrees. Most of these technologies use Web 2.0 (or second generation web design), which allows developers to create smartphone apps and wirelessly connected devices to monitor and engage users (Eysenbach, 2008; Kumar, Nilsen, Abernathy, Atienza, Patrick, *et al.*, 2013; Bernhardt, Mays, & Kreuter, 2011). Web 2.0 also allows users to generate and share content via social media (Bernhardt, Mays, & Kreuter, 2011; Nations, 2017). Some have theorized that the emerging Web 3.0, or the "internet of things," have already created a seamless connection between anything with an on/off switch (Nations, 2017). This means that anything that can be connected will be connected all of the time. Thus, mHealth researchers have opportunities to recruit AAM to participate in research using a wide range of new and emerging mHealth tools.

Limitations

The limitations of this cross-sectional study include using self-reported data from a convenience sample that was sufficiently healthy to complete the survey. Cross-sectional studies limit generalizability of the findings to other groups of AAM and causal inferences cannot be made. A convenience sample is subject to selection bias and sampling error. There is also a limitation in assessing weight status solely using reported BMI. However, the results may have some practical applications to the general population of healthy AAM. This study fills a gap in the literature about smartphone usage, social media usage, and willingness to participate in mHealth weight management research among AAM of different age groups. As such, the data provides novel insights that can be used to design and tailor mHealth weight management messages, programs, and interventions for AAM.

Acknowledgement

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