Smart device ownership and use of social media, wearable trackers, and health apps among Black women with hypertension in the United States

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Abstract

Background: Black women have high rates of hypertension. Digital health approaches may be effective for managing blood pressure.

Objective: We examined smart device ownership and use of social media, wearable activity trackers, and health apps by Black women with hypertension in the US.

Methods: We analyzed data from the Health Information National Trends Survey (HINTS6; 2022) provided by Black women who reported that a healthcare provider had diagnosed them with hypertension or high blood pressure (N=409). Participants reported if they had a tablet computer or a smartphone (either vs neither), how often they visited a social media site in the past 12 months (ever vs never), and whether they had used an electronic wearable device to monitor or track health or activity in the past 12 months (yes vs no). Those with tablets/smartphones reported whether they had used a health or wellness app in the past 12 months. We conducted crude and age-adjusted logistic regression models to examine associations between participant characteristics and device ownership and mHealth use. Analyses were weighted, and results are representative of Black women with hypertension in the US.

Results: Among Black women with hypertension in the US, 89.7% (SE: 1.9%) own a smartphone or tablet; 81.9% (SE: 2.1%) use social media, and 33.0% (SE: 2.9%) use a wearable activity tracker. Among those with smartphones/tablets, 58.7% (SE: 4.0%) have used health or wellness apps in the past 12 months. Younger women were more likely to own smart devices (weighted % [SE]: 18-49 years: 96.9% [2.4%], 50-64 years: 91.4% [2.9%] vs 65+ years: 78.9% [4.3%]), use social media (18-49 years: 98.8% [0.9%], 50-64 years: 85.3% [3.1%] vs 65+ years: 57.1% [4.5%]), and use health apps (18-49 years: 66.9% [6.7] vs 65+ years: 44.2% [6.7]). Women with higher education were more likely to own smart devices (college graduates: 98.0% [0.9%], some college: 94.3% [1.7%] vs at most high school: 77.9% [5.1%]), use social media (college graduates: 90.7% [2.7%], some college: 88.6% [2.3%] vs at most high school: 66.3% [4.8%]), use wearables (college graduates: 47.7% [6.5%] vs at most high school: 20.1% [6.2%]), and use health apps (college graduates: 70.9% [6.9%], some college: 66.2% [5.2%] vs at most high school: 34.7% [7.0%]). Women with weaker feelings of ethnic/racial/cultural belonging were less likely to use wearables (neutral/disagree: 18.% [6.1%] vs strongly agree: 38.9% [4.1%]) and health apps (neutral/disagree: 47.0% [9.0%] vs strongly agree: 65.4% [5.2%]). Women with low digital health literacy were less likely to own smart devices (low: 82.2% [3.3%] vs adequate: 98.2% [1.0%]) and use health apps (low: 44.2% [4.8%] vs adequate: 72.2% [5.1%]).

Conclusions: Understanding how and which digital tools can be leveraged can inform development of interventions for hypertension self-management and prevention of cardiovascular disease among Black women with hypertension. Clinical Trial: N/A

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Smart device ownership and use of social media, wearable trackers, and health apps among Black women with hypertension in the United States

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Summary sentence

The majority of Black women with hypertension in the United States have smartphones or tablets and use social media, and many use wearable activity trackers and health or wellness apps, digital tools which can be used to support lifestyle changes and medication adherence.

Keywords: Black women; hypertension; blood pressure; social media; technology

Introduction

In the United States (US), Black women are disproportionately affected by hypertension with prevalence of 56% compared to 37% among White and Hispanic women [1]. Digital health tools including apps and wearables can support lifestyle modifications and medication adherence, and thus hypertension control [2]. With high social media and smartphone use in studies with local samples [3], Black women with hypertension may be poised to leverage digital tools to manage their health. However, previous studies examining digital health use among US adults with hypertension [4] have not reported use by race and sex. We examined smart device ownership and use of social media, wearable activity trackers, and health apps among Black women with hypertension in the US.

Methods

We analyzed cross-sectional data from the 2022 Health Information National Trends Survey (HINTS6). Details on HINTS methodology is available online [5]. Briefly, civilian, non-institutionalized adults living in the US were sampled using a two-stage design and completed an online or mail survey.

Participants reported their sex assigned at birth. Participants selected 1+ options to describe their race. Those who selected “Black or African American” (with or without other races selected) were included. Participants were asked if a doctor or other health professional ever told them they had high blood pressure or hypertension (yes or no). Black women reporting a diagnosis of hypertension or high blood pressure were included in the analysis.

Participants reported if they had a tablet computer or a smartphone (either vs neither), how often they visited social media sites in the past 12 months (ever vs never), and whether they used a wearable device to monitor or track health or activity in the past 12 months. Those with tablets/smartphones were asked whether they had used a health or wellness app in the past 12 months.

Participants reported their age, presence of children in their household, education, feelings about their income, and whether they had worked 35+ hours per week in the past 30 days. Participants were asked about their confidence in finding helpful health resources on the Internet (low digital health literacy: somewhat/a little bit/not at all confident vs adequate: completely/very confident). Participants reported the degree to which they have strong sense of belonging to their ethnic, racial, and/or cultural group.

Statistical analyses

We used the survey procedures in SAS 9.4 (SAS Institute, Inc., Cary, NC) and replicate weights provided by HINTS to calculate standard errors (SEs) of estimates using the using the ‘delete one’ jackknife replication method, and results are representative of Black women with hypertension in the US. We conducted logistic regression models to examine associations between participant characteristics (independent variables) and device ownership and mHealth use (outcomes). We adjusted associations for age to account for confounding [6–8]. We assessed the assumption of linearity for age using Box-Tidwell tests.

Ethical Considerations

HINTS data collection was approved by the Westat Institutional Review Board (IRB), and participants provide informed consent. HINTS6 public-use dataset is de-identified and analyses of these data do not require additional IRB approval.

Results

We excluded Black women with hypertension who were missing information on any variables in the analysis (n=51), resulting in an analytic sample of 409. Table 1 shows characteristics of Black women with hypertension in the US.

Nearly 9 in 10 (89.7%, SE: 1.9%) Black women with hypertension in the US own a smartphone or tablet; 81.9% (SE: 2.1%) used social media and 33.0% (SE: 2.9%) used a

wearable activity tracker in the past year. Of those who own smartphones/tablets, 58.7% (SE: 4.0%) used a health or wellness app in the past year. Table 2 shows characteristics associated with smart device ownership and digital health use.

Discussion

The majority of Black women with hypertension in the US own smartphones/tablets and use social media; a third use wearable devices, and most mobile device owners use health apps. Younger and more highly educated women reported higher ownership/use, similar to US adults generally [6–8] and those with hypertension [4]. Ethnic/racial/cultural belonging and low digital health literacy may also play a role in device ownership and digital tool use.

Strengths include the use of a nationally representative sample. Limitations include a lack of data on frequency of wearable tracker or health app use, degree of willingness to use digital tools for hypertension management [3], hypertension severity, and other factors that may influence device ownership and digital tool use [6–8]. Leveraging digital tools for hypertension control may be a promising strategy for the prevention of cardiovascular disease in Black women with hypertension.

Data Availability:

HINTS6 data is available for download at: https://hints.cancer.gov/data/download-data.aspx

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Conflict Disclosure:

None.

Author Contributions:

JK: Conceptualization, writing (original draft, revisions and editing)
SB: Formal analysis and data curation; Writing (original draft, revisions and editing)
SP: Writing, review and editing
RN: Writing, review and editing
MW: Conceptualization, writing (original draft, revisions and editing); Formal analysis and data curation; Supervision

Abbreviations:

CI: confidence interval
HINTS: Health Information National Trends Survey
IRB: Institutional Review Board
OR: odds ratio
SE: standard error
US: United States

References

1. Ostchega Y, Fryar CD, Nwankwo T, Nguyen DT. Hypertension Prevalence Among Adults Aged 18 and Over: United States, 2017-2018. NCHS Data Brief. 2020 Apr;(364):1–8.

2. Cao B, Gupta S, Wang J, Hightow-Weidman LB, Muessig KE, Tang W, et al. Social Media Interventions to Promote HIV Testing, Linkage, Adherence, and Retention: Systematic Review and Meta-Analysis. Journal of medical Internet research. 2017 Nov 24;19(11):e394.

3. James DCS, Harville C. Smartphone Usage, Social Media Engagement, and Willingness to Participate in mHealth Weight Management Research Among African American Women. Health Educ Behav. 2018 Jun;45(3):315–22.

4. Langford AT, Solid CA, Scott E, Lad M, Maayan E, Williams SK, et al. Mobile Phone Ownership, Health Apps, and Tablet Use in US Adults With a Self-Reported History of Hypertension: Cross-Sectional Study. JMIR Mhealth Uhealth. 2019 Jan 14;7(1):e12228.

5. HINTS 6 Methodology Report [Internet]. National Cancer Institute; 2023 Apr. Available from: https://hints.cancer.gov/docs/methodologyreports/HINTS_6_MethodologyReport.pdf

6. Gottfried J. Americans' Social Media Use [Internet]. Pew Research Center; 2024 Jan. Available from: https://www.pewresearch.org/internet/2024/01/31/americans-social-media-use/

7. Gelles-Watnick R. Americans' Use of Mobile Technology and Home Broadband [Internet]. Pew Research Center; 2024 Jan. Available from: https://www.pewresearch.org/internet/2024/01/31/americans-use-of-mobile-technology-and-home-broadband/

8. Vogels EA. About one-in-five Americans use a smart watch or fitness tracker [Internet]. Pew Research Center; 2020 Jan. Available from: https://www.pewresearch.org/short-reads/2020/01/09/about-one-in-five-americans-use-a-smart-watch-or-fitness-tracker/

Tables & Figures

Table 1: Characteristics of Black women with hypertension or high blood pressure in the United States (N=409), HINTS 6 (2022)

Characteristics	Weighted % (SE)
Age	
18-49 years	32.3 (3.7)
50-64 years	40.2 (3.4)
65+ years	27.5 (2.0)
Works 35+ hours per week	44.9 (3.2)
Education status	
High school or less	31.8 (3.2)
Some college	49.8 (3.6)
College graduate	18.4 (2.7)
Feelings about present income	
Living comfortably on present income	26.0 (3.2)
Getting by on present income	40.7 (3.5)
Finding it very difficult/difficult on present income	33.4 (3.2)
Has children in household	28.3 (3.9)
Ethnic group belonging	
Strongly agree	55.6 (3.7)
Agree	20.8 (2.8)
Neither agree nor disagree, disagree, or strongly disagree	23.6 (3.4)
Low digital health literacy	52.7 (3.8)

Table 2: Digital health activities by demographic characteristics among Black women with hypertension or high blood pressure in the United States (N=409), HINTS 6 (2022)

Characteristics	Weighted % (SE)	Age-adjusted OR (95% CI)[a]	Weighted % (SE)	Age-adjusted OR (95% CI)[a]
	Has tablet and/or smartphone		**Uses social media**	
Age[b]				
18-49 years	96.9 (2.4)	8.5 (0.7-107.3)	98.8 (0.9)	60.1 (5.7-634.3)
50-64 years	91.4 (2.9)	2.9 (1.1-7.7)	85.3 (3.1)	4.4 (2.4-7.9)
65+ years	78.9 (4.3)	(Reference)	57.1 (4.5)	(Reference)
Works full-time				
Yes	96.0 (1.8)	(Reference)	90.3 (2.4)	(Reference)
No	84.7 (2.9)	0.4 (0.1-1.0)	75.0 (3.0)	0.8 (0.4-1.7)
Education status				
High school or less	77.9 (5.1)	(Reference)	66.3 (4.8)	(Reference)
Some college	94.3 (1.7)	3.8 (1.5-9.4)	88.6 (2.3)	3.2 (1.6-6.3)
College graduate	98.0 (0.9)	12.6 (3.9-40.7)	90.7 (2.7)	4.6 (2.2-9.5)
Feelings about present income				
Living comfortably	92.4 (3.2)	(Reference)	77.3 (4.8)	(Reference)
Getting by	87.7 (2.9)	0.5 (0.1-1.6)	80.2 (3.5)	0.9 (0.4-2.2)
Finding it very difficult/difficult	90.1 (3.1)	0.5 (0.2-1.6)	87.5 (3.6)	1.2 (0.4-3.8)
Children in household				
No	87.7 (2.2)	(Reference)	77.6 (2.6)	(Reference)
Yes	95.0 (3.2)	1.4 (0.2-8.5)	92.7 (2.9)	1.2 (0.4-3.8)
Ethnic group belonging				
Strongly agree	92.7 (2.2)	(Reference)	81.1 (3.1)	(Reference)
Agree	80.7 (5.8)	0.3 (0.1-1.0)	79.7 (4.6)	0.8 (0.3-2.0)
Neutral/disagree	90.7 (4.2)	0.6 (0.1-2.6)	85.5 (4.5)	1.0 (0.4-2.5)
Digital health literacy				
Adequate	98.2 (1.0)	(Reference)	90.6 (2.4)	(Reference)
Low	82.2 (3.3)	0.1 (0.02-0.5)	74.1 (3.2)	0.4 (0.2-1.0)
	Uses wearable activity tracker		**Uses health or wellness apps[c]**	
Age[b]				
18-49 years	38.3 (7.8)	2.0 (0.9-4.7)	66.9 (6.7)	2.6 (1.2-5.5)
50-64 years	35.2 (5.7)	1.8 (0.8-4.1)	59.8 (6.2)	1.9 (0.9-4.0)
65+ years	23.4 (4.5)	(Reference)	44.2 (6.7)	(Reference)
Works full-time				
Yes	46.3 (5.9)	(Reference)	66.2 (5.7)	(Reference)
No	22.2 (3.7)	0.4 (0.2-0.8)	51.8 (5.5)	0.7 (0.3-1.6)
Education status				

High school or less	20.1 (6.2)	(Reference)	34.7 (7.0)	(Reference)
Some college	35.7 (5.1)	2.0 (0.7-5.3)	66.2 (5.2)	3.4 (1.8-6.6)
College graduate	47.7 (6.5)	3.4 (1.2-9.7)	70.9 (6.9)	4.6 (1.6-13.3)
Feelings about present income				
Living comfortably	42.1 (6.1)	(Reference)	65.8 (8.7)	(Reference)
Getting by	28.0 (4.9)	0.5 (0.2-1.1)	55.9 (7.1)	0.6 (0.2-1.7)
Finding it very difficult/difficult	32.1 (5.5)	0.6 (0.2-1.3)	56.4 (5.6)	0.5 (0.2-1.4)
Children in household				
No	32.7 (3.2)	(Reference)	54.0 (4.8)	(Reference)
Yes	33.8 (7.7)	0.7 (0.3-1.8)	69.2 (7.8)	1.3 (0.5-3.6)
Ethnic group belonging				
Strongly agree	38.9 (4.1)	(Reference)	65.4 (5.2)	(Reference)
Agree	33.2 (7.6)	0.7 (0.3-1.7)	52.7 (8.5)	0.5 (0.2-1.2)
Neutral/disagree	18.8 (6.1)	0.3 (0.1-0.9)	47.0 (9.0)	0.4 (0.1-0.9)
Digital health literacy				
Adequate	36.2 (4.4)	(Reference)	72.2 (5.1)	(Reference)
Low	30.1 (4.2)	0.9 (0.5-1.6)	44.2 (4.8)	0.3 (0.2-0.7)

[a] Adjusted for age (years, continuous). Results from crude logistic regression models were largely similar. Exceptions: full-time employment and smart device ownership (crude OR: 0.2, 95% CI: 0.1-0.7); full-time employment and social media use (crude OR: 0.3, 95% CI: 0.2-0.6), children in household and social media use (crude OR: 3.7, 95% CI: 1.4-9.7); ethnic group belonging (neutral/disagree) and use health or wellness apps (crude OR: 0.5, 95% CI: 0.2-1.1).

[b] Models for categorical age were not adjusted for continuous age. Only 2 women aged 18-49 years did not own a tablet or smartphone and only 2 women aged 18-49 years did not use social media, limiting precision for estimates of associations between age and device ownership and social media use.

[c] Analysis limited to n=341 participants in the analytic sample who have a tablet and/or smartphone and provided information on health app use