

## Short Communication

# Cell Phone Usage Patterns in HIV-Infected Smokers

Brittlyn K. Pearlman<sup>1</sup>, Lorien C. Abrams<sup>2</sup>, and Jonathan Shuter<sup>3\*</sup><sup>1</sup>Montefiore Medical Center, USA<sup>2</sup>Department of Public Health and Health Services, University of George Washington, USA<sup>3</sup>Department of Medicine, Montefiore Medical Center, USA

## \*Corresponding author

Jonathan Shuter, Department of Medicine, Montefiore Medical Center, AIDS Center – Schiff 2, 111 E 210th Street, Bronx, NY 10467, USA, Tel: 718-920-7845; Fax: 718-405-0610; Email: Jshuter@montefiore.org

Submitted: 22 April 2015

Accepted: 22 September 2015

Published: 24 September 2015

## Copyright

© 2015 Shuter et al.

## OPEN ACCESS

**Abstract**

Persons living with HIV (PLWH) in the US smoke cigarettes at approximately triple the rate of the general population, and tobacco use has emerged as a leading killer in this highly vulnerable group. Cell phones offer a modern, broad-reach platform to deliver tobacco treatment, although this strategy has not been explored in PLWH smokers. We conducted a cross-sectional survey on cell phone use behaviors in a convenience sample of PLWH smokers attending an urban HIV-care clinic. Fifty subjects completed the survey. Sixty-two percent of participants had smart phones. Android phones were four times as common as iPhones and 28% of subjects had multiple cell phones. Most had both data plans and unlimited texting. The majority received and sent text messages at least daily. Forty-eight percent searched for health information on their phones, and 53%, 68%, and 56% used their cell phones to check email, listen to music, and play games at least daily, respectively. There were some significant differences in cell phone usage patterns by age, race, and educational attainment. Overall, these findings support the development of mobile health (m Health) tobacco treatments targeting PLWH smokers.

**Keywords**

- HIV
- Tobacco
- Smoking
- Cell phone
- Mobile

**ABBREVIATIONS**

PLWH: Persons Living With HIV

**INTRODUCTION**

Cell phones, including smart phones, are becoming an increasingly important route for the delivery of tobacco cessation treatments in both the general [1] and HIV-infected populations [2] in the United States. Persons living with HIV (PLWH) in the US smoke at triple the rate of the general population [3]. With advances in HIV care, tobacco has emerged as a leading cause of mortality in this group [4]. Efforts to treat tobacco use in PLWH utilizing traditional approaches, such as motivational interviewing and face-to-face counseling, have met with limited success [2,5,6]. Most PLWH in the United States have cell phones, and several studies have used cell phones as a means of delivering one-on-one live cessation counseling [2,7]. We are not aware of any research that has investigated the roles of texting and other smart phone capabilities for tobacco treatment in PLWH smokers, although they have been explored in the general population [1,8]. Information regarding cell phone/smart phone usage and capabilities in the PLWH smoker population may prove useful in informing the development of tobacco treatment delivered via this platform.

**MATERIALS AND METHODS**

Montefiore Medical Center delivers care to over 3,000 HIV-infected individuals in their Center for Positive Living in the

Bronx, New York. For this study, a convenience sample of PLWH who affirmed current smoking and possession of a cell phone was assembled by direct recruitment from the clinic waiting area. The subjects provided verbal informed consent and then completed a brief standardized survey with pencil and paper or through a face-to-face interview. The surveys did not include any personally identifying information; it focused on the cell phones people had and the activities they performed with them. After the surveys were completed, the data were entered into an Excel spreadsheet and then imported into SPSS version 22.0 for analysis. For summary statistics, means and standard deviations were calculated. For comparisons of proportions, chi-squared or Fisher's exact test was used as appropriate. For comparisons of means, we employed Student's t-test or the Mann-Whitney U-test for dichotomous independent variables and ANOVA for independent variables with more than two categories. All tests were conducted using a two-tailed methodology with a P=0.05 deemed to be statistically significant.

The study protocol was reviewed by the hospital's IRB and exempted from oversight.

**RESULTS AND DISCUSSION**

A total of 51 subjects completed the study; however, only 50 surveys were used in the final data analysis due to the fact that one subject did not have a cell phone. The surveys were administered between October 2014 and March 2015 and everyone meeting enrollment criteria (i.e. tobacco users with cell

phones) who were asked to participate agreed. The final sample included 32 (64%) women and 18 (36%) men. An overview of the socio demographic characteristics and survey responses of the study sample are provided in (Table 1).

Notable observations from the survey include that in this ethnic minority, inner-city, poor (91% of the clinic have household incomes below the federal poverty line), HIV-infected sample that 68% had completed high school and/or some college, many (28%) had more than one cell phone, four times as many had Androids than iPhones, most had unlimited texting plans,

most maintained the same phone number over a prolonged time period, 82% received texts daily, 72% sent texts daily, 53% checked email and 57% browsed the internet daily, and 68% played music and 56% played games daily on their cell phones. Slightly less than half searched for health information on their phones.

We also performed analyses to identify associations between socio demographic characteristics and cell phone usage patterns. Factors that were associated with younger age included: unlimited texting plans (P=0.04), sending texts daily (P=0.01),

**Table 1:** Socio demographic characteristics and cell phone usage patterns of the study sample\*.

Characteristic	N (%) Full sample (N=50)	N (%) Latino (non-Black) (N=23)	N (%) Black (non-Latino) (N=17)
Years of age (mean ± SD)	52.4±8.6	51.6±7.0	56.2±9.2
Gender			
Female	32 (64%)	14 (61%)	12 (71%)
Male	18 (36%)	9 (39%)	5 (29%)
Ethnicity			
Latino	27 (54%)	N/A	N/A
Non-Latino	23 (46%)		
Race			
Black	21 (42%)	N/A	N/A
White	8 (16%)		
Other**	20 (40%)		
Education			
< High School	2 (4%)	1 (5%)	1 (6%)
Some High School	12 (24%)	8 (38%)	1 (6%)
High School Graduate	16 (32%)	6 (29%)	8 (47%)
Some College	14 (28%)	5 (24%)	6 (35%)
College Graduate	4 (8%)	1 (5%)	1 (6%)
Number of Cell Phones (± SD)	1.36 ± .66	1.09 ± 0.29	1.71 ± 0.92
Range	1 ± 4	1 ± 2	1 ± 4
Owns a Smartphone			
Yes	31 (62%)	16 (70%)	9 (82%)
No	19 (38%)	7 (30%)	2 (18%)
Type of Smartphone***			
iPhone	6 (19%)	3 (19%)	1 (11%)
Android	25 (81%)	13 (81%)	8 (89%)
Data Plan			
Yes	28 (58%)	13 (62%)	9 (53%)
No	20 (42%)	8 (38%)	8 (47%)
Unlimited Texting			
Yes	38 (86%)	18 (90%)	11 (79%)
No	6 (14%)	2 (10%)	3 (21%)
How texting is paid for			
Monthly	18 (40%)	10 (45%)	6 (50%)
On a plan	17 (38%)	7 (32%)	5 (42%)
Other	10 (22%)	5 (23%)	1 (8%)
Last time phone number changed			
In the last week	1 (2%)	1 (4%)	0 (0%)
In the last month	1 (2%)	1 (4%)	0 (0%)
In the last year	12 (24%)	6 (26%)	5 (29%)
More than a year ago/never	36 (72%)	15 (65%)	12 (71%)
How often is phone used for calls/texts?			
Many times/day	44 (88%)	22 (96%)	14 (82%)
Once/day	3 (6%)	1 (4%)	2 (12%)
Less than once/day	3 (6%)	0 (0%)	1 (6%)

How many texts are received each day?			
None	9 (18%)	4 (17%)	3 (18%)
<5	17 (34%)	8 (35%)	6 (35%)
6-10	12 (24%)	7 (30%)	3 (18%)
11-20	8 (16%)	3 (13%)	3 (18%)
>20	4 (8%)	1 (4%)	2 (12%)
How many texts are sent each day?			
None			
<5	14 (28%)	6 (26%)	5 (29%)
6-10	14 (28%)	7 (30%)	5 (29%)
11-20	11 (22%)	7 (30%)	2 (12%)
>20	5 (10%)	0 (0%)	3 (18%)
How frequently email is checked?	6 (12%)	3 (13%)	2 (12%)
Many times/day			
A few times/day	15 (44%)	6 (43%)	6 (43%)
Less than once/day	3 (9%)	1 (7%)	2 (14%)
Frequency of internet browsing on phone	16 (47%)	7 (50%)	6 (43%)
Many times/day			
A few times/day			
Once/day	14 (45%)	6 (50%)	5 (38%)
Less than once/day	2 (6%)	2 (17%)	0 (0%)
	2 (6%)	0 (0%)	2 (15%)
Frequency of music listening on phone	13(42%)	3 (25%)	6 (46%)
Many times/day			
A few times/day			
Once/day	13 (38%)	7 (41%)	4 (36%)
Less than once/day	6 (18%)	2 (12%)	1 (9%)
	4 (12%)	0 (0%)	3 (27%)
Frequency of game playing on phone	11 (32%)	5 (29%)	3 (27%)
Many times/day			
A few times/day			
Once/day	10 (31%)	4 (36%)	4 (33%)
Less than once/day	5 (16%)	3 (27%)	2 (17%)
Health information looked up on phone?	3 (9%)	1 (9%)	2 (17%)
Yes	11 (34%)	3 (27%)	4 (33%)
No			
Do you own headphones?	22 (48%)	13 (62%)	7 (44%)
Yes	24 (52%)	8 (38%)	9 (56%)
No			
How often are headphones with you?	31 (62%)	15 (65%)	10 (59%)
Never	19 (38%)	8 (35%)	7 (41%)
Sometimes			
Usually			
Always	22 (44%)	10 (44%)	8 (50%)
	2 (4%)	2 (9%)	0 (0%)
	5 (10%)	4 (17%)	0 (0%)
	20 (40%)	7 (30%)	8 (50%)
*For some survey responses, N adds up to less than the column total N because of missing data.			
**Many Latino/subjects refused to self-categorize as Black or White.			
***Percentages calculated for those who had smart phones.			

and looking up health information on the internet ( $P=0.002$ ). The only observed difference between genders was a trend toward heavier texting (>10 texts sent per day) by males compared to females ( $P=0.07$ ). There was a trend toward Latino's being more likely to search for health information on their phones ( $P=0.09$ ). Black individuals were more likely to have more than one phone ( $P=0.03$ ) than non-Blacks. There was a trend toward higher likelihood of daily email usage by Blacks than non-Blacks ( $P=0.06$ ). For those members of the study sample with any post-high school education, a higher proportion browsed the internet at least daily on their phones ( $P=0.03$ ) compared to those with lower educational attainment, and there were trends toward

higher likelihood of unlimited texting plans (0.07) and histories of searching for health information on their cell phones ( $P=0.09$ ).

In this study, we aimed to describe characteristics of cell phone/smart phone usage in a group of urban HIV-infected smokers, with the hope that these data could be useful in informing modern tobacco treatment strategies. In our sample, 62% of participants had smart phones, which is very similar to the general US population statistic (64%) reported in a recent Pew survey [9]. The vast majority of respondents sent and received text messages and most had unlimited texting. This finding is of some importance since the evidence-base supporting the effectiveness of mobile health interventions for smoking

cessation rests heavily on text message-based approaches [10]. Most subjects in our study sample had data plans for their phones, and most also checked their emails, browsed the internet, searched for health information, listened to music and played games on their phones. Although these behaviors were far from universal they do suggest that cell phones may provide alternative routes to contact and send information (e.g. email) to significant numbers of PLWH smokers, and they also may afford access to valuable delay and distract tactics (e.g. listening to music or playing a game) for those experiencing urges during quit attempts.

It is not surprising that older patients tend to send and receive less text messages per day than younger patients [11]. This suggests that younger PLWH smokers may be a particularly attractive audience for cell phone-based tobacco treatments. Since the HIV-infected population in the US is aging, it may also suggest that mobile health-based tobacco treatments targeting PLWH should be user friendly for people of all ages and should not presuppose facility with all smart phone features. Similarly, PLWH smokers with higher educational attainment were more likely to have unlimited texting plans, browse the internet on their phones, and use them to look up health information. Mobile tobacco treatments may be less well-suited for those with low literacy and low educational attainment.

This study had several limitations that deserve mention. Participants were drawn from a relatively small convenience sample from a single center in the Bronx, NY, so findings may not be generalizable to PLWH in other geographic areas or to those less engaged in care. For unclear reasons, our survey sample was predominantly female even though the gender distribution in the clinic is roughly even between men and women. The overwhelming majority of the respondents belonged to racial/ethnic minority groups, and thus findings may not be generalizable to white PLWH smokers. Because we were limited to a very brief questionnaire administered in the waiting room of a busy clinic, we did not rigorously ascertain smoking status with detailed questioning or biochemical verification, we did not collect information on intensity or duration of tobacco use, and we did not gather detailed HIV-related medical information. It is doubtful that we enrolled significant numbers of non-smokers as the main limitation of smoking self-report is inadequate sensitivity rather than specificity [12]. Finally, the distinction between a simple cell phone/feature phone and a smart phone is an increasingly blurry line. Most feature phones, for example, possess texting and some gaming capabilities. Since we did not collect detailed information on the phones, it is not possible to determine whether non-participation in certain cell phone behaviors resulted from user choice or from lack of access.

## CONCLUSION

In conclusion, our findings support the view that cell phones are a potentially useful delivery platform for tobacco treatment in PLWH smokers. Most PLWH smokers have unlimited texting and engage in texting behaviors daily. The majority also utilize

other phone features such as music and gaming that could offer accessible delay and distract strategies for those experiencing cravings for cigarettes. Differences in cell phone use behaviors based on age and educational attainment were observed and may further inform the targeting of mobile tobacco treatment interventions for this highly vulnerable population.

## ACKNOWLEDGEMENTS

This work was supported by the National Institutes of Health/ National Institute on Drug Abuse (Grant # 1R34DA037042), and by the Clinical Core of the Center for AIDS Research at the Albert Einstein College of Medicine and Montefiore Medical Center funded by the National Institutes of Health (Grant # AI-51519). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute or the National Institutes of Health.

The authors would also like to acknowledge the support and cooperation of the staff and patients of the Center for Positive Living.

## REFERENCES

1. Abrams LC, Lee Westmaas J, Bontemps-Jones J, Ramani R, Mellerson J. A content analysis of popular smartphone apps for smoking cessation. *Am J Prev Med.* 2013; 45: 732-736.
2. Vidrine DJ, Marks RM, Arduino RC, Gritz ER. Efficacy of cell phone-delivered smoking cessation counseling for persons living with HIV/AIDS: 3-month outcomes. *Nicotine Tob Res.* 2012; 14: 106-110.
3. Reynolds NR. Cigarette smoking and HIV: more evidence for action. *AIDS Educ Prev.* 2009; 21: 106-121.
4. Helleberg M, Afzal S, Kronborg G, Larsen CS, Pedersen G, Pedersen C, et al. Mortality attributable to smoking among HIV-1-infected individuals: a nationwide, population-based cohort study. *Clin Infect Dis.* 2013; 56: 727-734.
5. Lloyd-Richardson EE, Stanton CA, Papandonatos GD, Shadel WG, Stein M, Tashima K, et al. Motivation and patch treatment for HIV+ smokers: a randomized controlled trial. *Addiction.* 2009; 104: 1891-1900.
6. Stanton CA, Papandonatos GD, Shuter J, Bicki A, Lloyd-Richardson EE, de Dios MA, et al. Outcomes of a Tailored Intervention for Cigarette Smoking Cessation Among Latinos Living With HIV/AIDS. *Nicotine Tob Res.* 2015; 17: 975-982.
7. Vidrine DJ, Arduino RC, Lazev AB, Gritz ER. A randomized trial of a proactive cellular telephone intervention for smokers living with HIV/AIDS. *AIDS.* 2006; 20: 253-260.
8. Heffner JL, Vilardaga R, Mercer LD, Kientz JA, Bricker JB. Feature-level analysis of a novel smartphone application for smoking cessation. *Am J Drug Alcohol Abuse.* 2015; 41: 68-73.
9. Pew Research Center. Mobile technology fact sheet. 2014.
10. Free C, Phillips G, Galli L, Watson L, Felix L, Edwards P, et al. The effectiveness of mobile-health technology-based health behavior change or disease management interventions for health care consumers: A systematic review. *PLOS Med.* 2013; 10.
11. Pew Research Setting. Cell phone activities 2013.
12. Connor Gorber S, Schofield-Hurwitz S, Hardt J, Levasseur G, Tremblay M. The accuracy of self-reported smoking: a systematic review of the relationship between self-reported and cotinine-assessed smoking status. *Nicotine Tob Res.* 2009; 11: 12-24.

### Cite this article

Pearlman BK, Abrams LC, Shuter J (2015) Cell Phone Usage Patterns in HIV-Infected Smokers. *J Subst Abuse Alcohol* 3(3): 1038.