

EDUCATION AND ADHERENCE

Social Media, Text Messaging, and Email—Preferences of Asthma Patients between 12 and 40 Years Old

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Background. Electronic media such as social media (Facebook, Twitter, MySpace), email, and text messaging could be useful in the management of asthma. However, patient use and preferences for electronic media in asthma management is currently unknown. **Methods.** A survey was sent to asthma patients between 12–40 years of age. The survey collected demographic information, use of electronic media, interest in using electronic media to receive asthma information, and interest in using electronic media to communicate with a health care provider about asthma. Free text entries were encouraged. **Results.** 145 completed surveys were returned. Text messaging, email, and Facebook were used at least weekly by a majority of respondents (82%, 77%, and 65%, respectively). Email was clearly the most preferred method to receive asthma information and to communicate with a physician. There was some interest in using Facebook or text messaging, whereas Myspace and Twitter had minimal interest. On logistic regression analysis, female and Black or Hispanic participants were more likely to have an interest in the use of electronic media for asthma care. Frequent users (>1X/week) of each electronic media type had greater enthusiasm for their incorporation into asthma care. Free text entries revealed that many participants felt social media sites were for connecting with friends rather than for health care, and privacy concerns were also raised. **Conclusion.** Electronic media offers a novel way to improve asthma care. Email was the most preferred method, though text messaging and social media sites like Facebook may be appropriate for certain patients.

Keywords asthma education, text message, Facebook, MySpace, Twitter

INTRODUCTION

Asthma has become an increasingly prevalent and problematic disease in recent years, with 34 million, or one in nine Americans having been diagnosed with asthma during their lifetime (1). In 2008, the National Health Interview Survey administered by the Centers for Disease Control and Prevention (CDC) found a 13.3% lifetime asthma prevalence, which has been increasing since 2001 (1). Furthermore, during this time there has been a greater increase in the prevalence of asthma among adolescents and young adults. Children aged 5–17 years have the highest rates of asthma, and have seen prevalence rates increase from 91.9 to 107 cases per 1000 (2). Young adults aged 18–44 have seen a similar trend, with rates increasing from 68.8 to 71.8 cases per 1000 during the same time period. With increasing rates of diseases, the burden on health-care services is significant, accounting for 444,000 hospital discharges related to asthma and 10.6 million office visits in 2006 (3, 4). Developing novel

methods to help patients with asthma self-management could improve these outcomes.

Among adolescents and young adults, the use of the Internet has increased dramatically in recent years (5–7), potentially improving the ways in which information can be exchanged. However, there have been both positive and negative results in using Internet-based interventions to improve health behaviors and outcomes, promote communication of information, and enhance self-management of chronic diseases such as asthma (8–14). For example, a study of 120 children randomized to traditional in-person education or virtual web-based education found that those in the virtual group had greater inhaler technique scores and asthma diary adherence, though disease control and outcome measures were not significantly different from the traditional education group (15). Another study of 314 adolescents using a web-based tailored program found improvement in hospitalizations, symptoms, and missed school days when compared with a control group, who were given access to generic asthma web sites (9).

Social media sites (such as Facebook, Twitter, and MySpace) as well as short messaging system (SMS) text messaging have also seen dramatic increases in usage, particularly among adolescents and young adults (16–20). Preliminary studies using SMS text messaging for asthma have shown minimal benefit (21, 22). There have been no

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clinical trials using social media sites that we are aware of, even as the number of patient groups (23, 24) and professional medical organizations (25) utilizing these technologies continue to grow.

As the use of these electronic media (social media, Internet, email, or text messaging) continues to evolve, it is unclear which media type patients might prefer to help manage their asthma. Exploring these preferences could help in designing more tailored and effective interventions. The purpose of this study was to quantify the use of these technologies in adolescent and young adult patients with asthma. Furthermore, we explored adolescents' and young adults' interest in using these technologies to receive asthma information or to communicate with their physician.

METHODS

Overview

This study was an anonymous cross-sectional survey. The survey was offered to patients with asthma between 12 and 40 years of age in pediatric pulmonary, allergy and general pediatric clinics at the University of Michigan Health System between April and July 2010. The patients in these clinics come from a wide variety of backgrounds, including urban/inner city, suburban, and rural areas. Participants were approached, and invited to participate if they answered that they currently had asthma. Patients under the age of 18 completed the survey themselves, after consent was obtained from their parents. The survey design and implementation was approved by the University of Michigan Institutional Review Board, and written informed consent was obtained from all participants.

Survey

The survey was 17 questions in length, and took approximately 7 minutes to complete. Demographic information including age, gender, and race/ethnicity was collected, as well as information regarding asthma duration and use of asthma medications.

Participants were asked to quantify their use of each technology (text messaging, Facebook, Twitter, MySpace, email, and Internet) based on a scale of daily, at least once a week, at least once a month, less than once a month, or never. Next, participants were asked to quantify their interest in receiving information about factors that might affect asthma control through each of the technologies. Level of interest was quantified as high, some, low, or no interest. Using the same scale, participants were next asked to quantify their interest in asking their doctor or other healthcare providers questions using each of the electronic media technologies.

Free text entries were solicited to determine information participants would most prefer to receive via these technologies, reasons why they might not be interested in using these technologies for communication, and other

comments regarding the use of these methods for patients with asthma.

Data Analysis

For each electronic media type, responses were dichotomized into categories of "at least once a week" and "less than once a week". Age was categorized into adolescents (12–17 years of age), young adults (18–29 years of age), and adults aged 30–40 years. To evaluate individuals from traditionally underserved minority populations, participants of Black or Hispanic race/ethnicity were grouped together. We were particularly interested in individuals that had high use of these technologies ($\geq 1X/\text{week}$) and therefore a subgroup analysis among frequent users of electronic media was performed. Duration of asthma was categorized based on the number of years of asthma ("0–5 years" for recent diagnosis vs. "5+ years"), and daily medication use was dichotomized (yes/no).

A chi-square test was performed to assess the association of age category and usage "at least once a week" for each media type (text message, email, Facebook, MySpace, and Twitter). Similar analyses were also performed on the association of age category and "high or some interest" in receiving information through each media type, and "high or some interest" in communicating through each media type. Logistic regression was used to identify significant demographic and asthma-related characteristics associated with interest in receiving information and interest in communicating with a doctor through specific media types such as text message, Facebook, and email. Responses were dichotomized as "high or some interest" and "low or no interest". Separate models were run for each respective social media type. Regression models were adjusted for age, gender, race, recent asthma diagnosis, daily medication use, weekly text message use, weekly Facebook use, and weekly email use. All data were analyzed using SPSS version 17.0 software (SPSS Inc., Chicago, IL, USA).

RESULTS

A total of 145 completed surveys were returned by subjects identified as currently having asthma. Demographic data are listed in Table 1. The age, gender, and race/ethnicity of subjects included were similar to the patient population demographics typically seen at the clinics from which they were selected.

Use of Electronic Media

For the entire cohort, text messaging (82.5%), email (77.3%), and Facebook (64.8%) were used at least once a week by the majority of participants, much more than Twitter (8.3%) and MySpace (13.2%). Furthermore, there were significant associations between age categories and use of MySpace and email (Table 2). For MySpace, there was decreasing usage with age whereas the opposite was

TABLE 1.—Demographic information of surveyed population.

Characteristics	Patients (n = 145) n (%)
Age (years)	
12–17	55 (37.9)
18–29	36 (24.8)
30–40	54 (37.2)
Gender	
Male	58 (40.0)
Female	87 (60.0)
Race/ethnicity	
White	102 (70.8)
Black	29 (20.1)
Asian	6 (4.1)
Hispanic	2 (1.4)
Other	5 (3.1)
Years with asthma	
0–5	30 (22.9)
5+	101 (77.1)
Daily medication use	
Yes	111 (77.6)

true for email. There is also some evidence showing an association between age category and usage of text message ($p = .067$) with those aged 18–29 years using it the most (94.4%) compared with those aged 12–17 years (75.5%) and 30–40 years (81.5%) (Table 2).

Interest in Receiving Information or Communicating with a Physician through Electronic Media

Overall, 58.9% of participants had interest in receiving asthma information through email, which was much higher than any other electronic media type (Table 2). While Facebook (23.2%) and text messaging (34.1%) did show some interest, Twitter (3.7%) and MySpace (3.6%) each had minimal interest in all ages. Only the use of

text messaging to receive information was significantly associated with age category ($p = .041$) with those aged 18–29 years having more interest compared with those aged 12–17 years or 30–40 years. There is some evidence showing an association between age category and interest in receiving information through email ($p = .068$). Interest increased with age category, from 47.2% in those aged 12–17 years, to 61.1% in those aged 18–29 years, to 69.2% in those aged 30–40 years with high/some interest.

When evaluating participants' interest in communicating with a doctor through different modalities, email was again the preferred method by a large margin (Table 2). As shown previously, Twitter (2.9%) and MySpace (5.1%) were rated fairly low in all age groups. There were no statistically significant associations between age category and interest in communicating through an electronic media type. However, as shown in Table 2, email was the most popular among those aged 30–40 years ($p = .089$).

Logistic regression methods analyzed the characteristics associated with both interest in receiving information and interest in communicating with a doctor through different methods (Table 3). Significant characteristics associated with the use of text messaging to receive asthma information included age 18–29 years, minority race, lack of daily asthma medication, and email use less than once a week. Furthermore, minority race and weekly text message use were significant characteristics associated with interest in communicating via text messaging as well. Weekly use of Facebook was a significant characteristic associated with interest in receiving information (OR = 11.2) and communicating with a doctor (OR = 40.7) through Facebook. Women were also more likely to be interested in communicating with a doctor through Facebook than men. Finally, asthma diagnosis of greater than 5 years and weekly email use

TABLE 2.—Use, interest in receiving information, and interest in communicating with a doctor through electronic media types.

	All ages (years) (n = 145)	12–17 (n = 55)	18–29 (n = 36)	30–40 (n = 54)	P-value
Use of electronic media type (at least once a week)					
Email	77.3	55.8	83.3	94.3	<.001
Text message	82.5	75.5	94.4	81.5	.067
Facebook	64.8	59.6	69.4	66.7	.596
MySpace	13.2	24.0	14.3	2.0	.005
Twitter	8.3	12.8	8.6	4.0	.295
Interest in receiving information through electronic media type (high/some interest)					
Email	58.9	47.2	61.1	69.2	.068
Text message	34.1	32.7	50.0	24.0	.041
Facebook	23.2	26.9	25.0	18.0	.541
Twitter	3.7	6.0	0.0	4.1	.342
MySpace	3.6	7.7	0.0	2.0	.126
Interest in communicating through electronic media type (high/some interest)					
Email	63.3	53.8	61.1	74.5	.089
Text message	33.8	31.4	41.7	30.8	.511
Facebook	22.3	28.8	19.4	17.6	.351
MySpace	5.1	7.8	2.8	3.9	.510
Twitter	2.9	2.0	5.6	2.0	.556

Notes: All data are presented as percentages. Bold values denote significant difference between the three age groups at .05 significance level.

TABLE 3.—Characteristics of individuals showing high/some interest in receiving information and communicating with a doctor through specific electronic media type.

Variable	Interest in receiving information through media type OR (95% CI)	Interest in communicating through media type OR (95% CI)
Text message		
Age ^a (years)		
18–29	4.65 (1.21, 16.7)	1.55 (0.50, 4.82)
Race ^b		
Black or Hispanic	2.95 (1.01, 8.62)	2.75 (1.03, 7.34)
Daily medication use	0.20 (0.05, 0.77)	0.69 (0.24, 1.98)
Weekly text use	3.13 (0.71, 13.9)	4.66 (1.11, 19.7)
Weekly email use	0.22 (0.06, 0.78)	0.50 (0.16, 1.56)
Facebook		
Gender		
Female	1.79 (0.62, 5.18)	4.03 (1.14, 14.3)
Weekly Facebook use	11.2 (2.22, 56.4)	40.7 (3.48, 478.2)
Email		
Race ^b		
Black or Hispanic	2.88 (0.83, 9.34)	1.88 (0.61, 5.81)
Recent diagnosis	0.33 (0.13, 0.87)	0.42 (0.17, 1.08)
Weekly email use	7.69 (2.27, 26.1)	3.41 (1.15, 10.1)

Notes: Regression analysis was adjusted for variables such as age, gender, race, recent asthma diagnosis (less than 5 years), daily medication use, weekly text message use, weekly Facebook use, and weekly email use. Bold values denote significance at .05 level. OR, odds ratio; CI, confidence interval.

^aReference age category is 12–17 years of age.

^bReference race category is White.

were significant characteristics associated with interest in receiving information through email, although minority race approached significance ($p = .09$). Weekly email use was the only significant characteristic associated with interest in communicating with a doctor through email.

Subgroup Analysis among Frequent Users of Electronic Media

Analysis of the frequent users ($\geq 1X/\text{week}$) of specific technologies was also conducted for text messaging ($n = 118$), Facebook ($n = 92$), and email ($n = 109$). Overall, these users were more likely to have an interest in receiving information or communicating with their physician through the specific media format (Table 4). For example, while 23.2% of all subjects had high/some interest in receiving asthma information through Facebook, 34.7% of frequent Facebook users indicated they had high/some interest in doing so. For frequent users of text messaging, Facebook, and email, the increases were approximately 4–11% higher as compared with all users, with the greatest increase seen among frequent users of Facebook.

TABLE 4.—High/some interest among frequent technology users (≥ 1 time/week) through the respective technology.

Variable	Interest in receiving information through media type	Interest in communicating through media type
Text message ($n = 118$)	43 (38.4%)	44 (38.9%)
Facebook ($n = 92$)	32 (34.7%)	30 (33.3%)
Email ($n = 109$)	73 (67.6%)	75 (70.8%)

Next, we performed logistic regression to determine the characteristics among frequent users associated with both interest in receiving information and interest in communicating with a doctor through different methods (Table 5). Among frequent text message users, minority race, lack of weekly email use, and lack of daily asthma medication use were found to be significant characteristics associated with interest in receiving information through text messages. Minority race was the only characteristic associated with interest in communicating with a doctor through text messaging. For frequent Facebook users, minority race was the only significant characteristic associated with interest in receiving information through Facebook, and female gender was the only significant characteristic associated with interest in communicating with a doctor through Facebook. Finally, for frequent email users, lack of daily medication use was the only significant characteristic. Among frequent email users, age 30–40 years was the only significant characteristic associated with interest in communicating with a doctor through email.

Participant Comments

Free text entries were encouraged to allow participants to comment on the type of information they would be interested in receiving through electronic media, and then grouped into common themes. Ninety-five participants (66% of the total cohort) volunteered information. Air quality alerts (including pollen counts and ozone alerts) were highly desired ($n = 21$). Patients also requested basic asthma information such as symptoms, causes, triggers, and management tips ($n = 21$). Minor

TABLE 5.—Characteristics of frequent users of specific electronic media type ($\geq 1X/\text{week}$) showing high/some interest in receiving information and communicating with their doctor.

Variable	Interest in receiving information through media type	Interest in communicating through media type
Text message ($n = 118$)		
Race ^a		
Black or Hispanic	3.51 (1.12, 11.0)	3.26 (1.15, 9.28)
Weekly email use	0.22 (0.05, 0.95)	0.38 (0.11, 1.38)
Daily medication use	0.13 (0.03, 0.67)	0.58 (0.18, 1.86)
Facebook ($n = 92$)		
Gender		
Female	1.83 (0.57, 5.93)	5.52 (1.34, 22.7)
Race ^a		
Black or Hispanic	3.70 (1.03, 13.4)	1.13 (0.29, 4.47)
Email ($n = 109$)		
Age ^b (years)		
30–40	1.78 (0.54, 5.90)	3.71 (1.15, 12.0)
Daily medication use	0.28 (0.09, 0.89)	0.59 (0.18, 1.87)

Notes: Regression analysis was adjusted for variables such as categorical age, gender, race, recent asthma diagnosis (less than 5 years), and daily medication use. Bold values denote significance at the .05 level.

^aReference age category is 12–17 years of age.

^bReference race category is non-Hispanic White.

categories included new studies/treatment options ($n = 8$), alternative treatments ($n = 3$), and medicine side effects ($n = 2$).

If a subject indicated no or little interest in using any electronic media to communicate with their physician, we invited free text entries to explain why. Forty-eight participants (33% of the total cohort) were included in this subset. The most common reason was that the patient did not use or have that specific type of media ($n = 32$). Furthermore, many people ($n = 17$) did not want to use social media sites like Facebook for health-related information. Some commented that such sites were for connecting with friends, and they did not want their health information seen by others. Another reason why patients did not want to receive information through media types was due to the perception that their asthma was well controlled and that they did not need additional information ($n = 16$). Finally, several people said that they would rather talk to a doctor in person ($n = 14$).

DISCUSSION

With the increasing availability, use, and demand for electronic media, it is important to determine which technologies might be the most effective to improve asthma outcomes. Our study found that email was the preferred technology for receiving asthma-related information and for communicating with healthcare providers. While the overall use of text messaging was slightly higher, email was the only platform that a majority of participants expressed interest in using both as a means of information gathering and for communication with physicians. Facebook and text messaging did receive some interest and may be appropriate for certain patients. MySpace and Twitter showed very little interest as a platform, even among adolescents (12–17 years), where

24% of patients used MySpace on at least a weekly basis. These results have important implications for intervention design when using electronic platforms.

Previous studies have examined joint email–Internet interfaces for asthma education, with promising results. Two asthma self-management interventions using Internet and email platforms demonstrated improvements in asthma knowledge, symptoms, control, and lung function (9, 13). Other studies using similar platforms for self-management of weight loss, diabetes, and nutrition have shown similar positive results (12, 26–28). This prior evidence coupled with our results provide a solid groundwork that an email/Internet-based intervention can be successful in improving health in chronic disease, and more specifically, in asthma patients. While the use of traditional asthma self-management programs utilizing an asthma specialty nurse or health educator has shown benefit for outcomes and symptoms, these programs require the expenditure, expertise and time constraints of an asthma educator, and the cost-effectiveness of such programs is unclear (29, 30). An email–Internet self-management program could theoretically eliminate many of these barriers.

With the increasing popularity and use of other modes of communication such as Facebook, Twitter, and MySpace, we were interested if patients would embrace these technologies as a way to improve asthma care. Recent evidence has shown that Facebook and other social media sites may have potential for patient education and communication with healthcare professionals (18, 31). However, our study found only 22% of individuals with asthma expressed interest in either receiving information or communicating with a doctor through Facebook. For frequent users of Facebook, the results were somewhat more encouraging. Approximately 33% of individuals were interested in receiving information or communicating with a doctor through Facebook, although

even among frequent Facebook users, email was the electronic media of choice.

Many of the comments from patients apprehensive about using Facebook and other social media sites were concerned about privacy, and noted that their use of these sites was for social reasons rather than for health concerns. This provides some evidence that social media sites may not be as helpful for health information and communication as had been hoped. As medical and professional organizations develop Facebook pages and Twitter feeds for patients, it will be important to keep the above findings in mind.

When exploring the demographic characteristics of patients interested in using various forms of technology, age and race seemed to be the most significant factors. Recent evidence has shown that younger audiences are more likely to use electronic technologies and would be more interested in their use for health interventions (17). In our study, certain age groups seemed to prefer different modalities. As an example, as individuals moved from the youngest to oldest age categories, usage and preference in using an email-based program increased. We also found that frequent users of certain electronic media were more likely to demonstrate interest in using that technology for asthma care. Therefore, it is important to consider the target audience and their baseline use of a specific electronic media prior to designing any intervention.

Furthermore, our analysis showed that minority patients (Black or Hispanic) preferred using electronic media more than White patients. Current evidence suggests that Whites and Blacks in urban areas have similar usage of electronic technologies such as the Internet and text messaging. For example, a 2004 study of urban youths aged 15–30 years in New York City (of whom 94% were African American or Hispanic) found that 66% used the Internet daily or more than a few times per week (32). This is similar to the national Internet usage rate of 69.8% among individuals aged 15–24 years found in the 2007 Current Population Study administered to 41,019 adolescents and young adults by United States Census Bureau (33), as well as the Internet usage rate of 58% from a 2005 national random digit dialing probability sample of 5586 individuals (34). Importantly, the national probability sample study found no significant difference between White, Black, and Hispanic users for participation in online health-related activities (34).

Studies have also demonstrated that while inner-city residents may have a somewhat lower overall usage than more affluent areas, interest among these residents for use of technologies is high (6, 35). Internet use among Black women has doubled since 2003, and younger adults have accounted for much of this increase (7). There is also evidence suggesting that Blacks are more likely than Whites to seek information through technologies such as the Internet and text messaging (36). Our study replicated these findings. Therefore, electronic health interventions may be especially effective in minority populations or in urban areas.

We also found that participants who had been diagnosed with asthma in the past 5 years and those who used daily medications for asthma were less likely to express interest in using electronic media to receive asthma information. A possible explanation might be that patients who are newly diagnosed with asthma may have already received information from their healthcare provider. Similarly, patients who use daily medications, and therefore may have more severe asthma, might also have received information from their physician. However, both of these groups were as likely as others in the desire to use electronic media to communicate with their physician. Therefore, for certain patient subgroups electronic media might be more helpful as a communication tool rather than as one to disseminate information.

This study does have limitations. First, this is a cross-sectional study and therefore cause-and-effect relationships cannot be made. Second, while all participants had a physician diagnosis of asthma, formal testing (e.g., lung function measurements, peak flow readings) was not required. Third, the survey did not collect information regarding socioeconomic status. When discussing use and interest in using various forms of technology, an individual's access to these technologies can greatly impact outcomes (6, 37). Future surveys should include information regarding access to these technologies, which may be influenced by socioeconomic status. Fourth, we did not determine which web sites, Twitter feeds, or Facebook pages participants were getting their information from. There could be adverse consequences of turning to friends rather than professional organizations or governmental agencies for healthcare information, and this should be examined in future studies. Fifth, younger participants (less than 18) might rely more on their parents for information, which may affect their health-seeking behavior through electronic media for asthma care. Finally, the lack of standardized measures for the outcomes of interest could lead to biased or inaccurate conclusions. However, even with these limitations, we believe the key findings of this study regarding the use of electronic media among asthma patients are valid.

CONCLUSION

This study is the first to elucidate the usage, preferences, and interest of patients with asthma for electronic and social media technologies. The data provide a foundation for future studies incorporating these technologies for asthma interventions. It is also useful for physicians and organizations trying to determine new and effective ways to connect with patients. Email was the most preferred method, though text messaging and social media sites like Facebook may be appropriate for certain patients. Larger studies will help to further explore how best to use the expanding electronic media choices most effectively.

ACKNOWLEDGMENT

There was no external funding to support this research.

DECLARATION OF INTEREST

All authors declare no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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