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Public Health Information Delivery in the Emergency

Department: Analysis of a Kiosk-Based Program

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Abstract

Background—As over one-third of the U.S. population visits an emergency department (ED) any given year, public health interventions in the ED can have major population-level impacts.

Objectives—We performed a survey study to determine ED patients' interest in receiving information via kiosk on common, chronic conditions for which education and preventive screening could offer public health benefit and to assess what topical information patients are interested in receiving.

Methods—This is a secondary analysis of survey data from an ED pilot program Dec 2011–April 2012. Main outcome measures were patients' interests in receiving information on health topics via kiosk module.

Results—Over half of the 4,351 patients indicated interest in receiving information on at least one health topic including high blood pressure (30%), depression (21%), diabetes (18%), sexually transmitted diseases (STDs, 11%), drug abuse (6%), and physical abuse (3%). African American patients were more likely to be interested in receiving information on high blood pressure (odds ratio (OR) 2.7, 95% [confidence interval 2.2–3.2]), depression (OR 1.3 [1.1–1.6]), diabetes/sugar (OR 2.2 [1.8–2.8]), drug abuse (OR 1.4 [1.0–1.9]), and STDs (OR 2.6, [1.9–3.7]). Participants >55 years were more likely to desire information on high blood pressure and diabetes (age 55–64 years OR 4.0 [3.1–5.1]; age >64 years OR 4.4 [3.2–6.2]). Patients who were interested in receiving public health information were more likely to be older, African American, and male ($p < 0.05$).

Conclusions—Interest in obtaining kiosk-delivered education on hypertension predominated. Kiosks are versatile tools that could be used in ED settings to provide health education services.

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Keywords

kiosks; information delivery; emergency department

Introduction

With one-third of the U.S. population visiting an Emergency Department (ED) every year, public health outreach campaigns in the ED have the potential to impact a large proportion of the community.^{1,2} Possible health improvement strategies include the delivery of health education and preventive services in the ED. However, such interventions have the potential to impede the ED system if they divert resources from vital functions.^{3,4}

Interactive computerized kiosks have recently emerged as tools to provide educational services during ED visits without detracting from personnel resources. Prior evaluations of ED kiosk modules have examined their use in collecting medical information,⁵ promoting child safety,⁶ screening for domestic partner violence,⁷ and managing urinary tract infections.⁸ Our ED has been offering HIV testing to patients since 2005,^{9,10} and we previously evaluated patients' responses to a kiosk-based screening program.¹¹ As part of that study, we queried patients' interest in receiving health information about chronic conditions via ED kiosk. This report is a pilot cross-sectional survey and secondary analysis of that data,¹¹ which aims to characterize the feasibility of using kiosks to provide public health education programs in the ED and to determine the types of health information ED patients are interested in receiving.

Materials and Methods

This kiosk program took place in an urban ED in Baltimore, Maryland, with an annual census of approximately 65,000 visits. From December 2011 to April 2012, all ambulatory, acuity level 3–5 and some level 2 (Emergency Severity Index) ED patients age ≥ 18 years were directed to a stand-alone computerized kiosk during 7 am to 11 pm on weekdays. The kiosk module contained five screens: 1) manual login screen; 2) survey of patients' interest (yes/no) in receiving information about health topics; 3) interest in updating health information via kiosk; 4) HIV test offer; 5) relevant instructions dependent on acceptance of HIV test. Proffered health topics were high blood pressure, diabetes/sugar, sexually transmitted diseases (STDs), physical abuse, drug abuse, and depression (Figure 1).¹² The readability level of key kiosk questions on patients' interest in receiving health information via kiosk was approximately grade level 8. Patients who were non-ambulatory or critically ill (acuity level 1 and most of level 2) bypassed the stand-alone computerized kiosk.

We previously summarized the demographics of this cohort of 4,351 patients.¹³ The age distribution was as follows: 1,038 (24%) 18–24 years, 1,102 (25%) 25–34, 698 (16%) 35–44, 880 (20%) 45–54, 450 (10%) 55–64 (10%), and 182 (4.2%) >64. 2,454 (56%) patients were female, 3,356 (77%) African American and 742 (17%) White. Patients presented to the hospital with the following chief complaints most commonly: abdominal pain (466 patients, 11%), back pain (175 patients, 4.0%), headache (166 patients, 3.8%), chest pain (112 patients, 2.6%), and abscess (112 patients, 2.6%).¹³

Demographic and clinical data were obtained via medical records and compared by indication of interest in any of the proffered health topics and by health topic selected. χ^2 tests and logistic regressions were performed using SAS V.9.3 (SAS Institute, Cary, North Carolina, USA). Multiple imputation technique for missing values was performed in order to eliminate the bias due to dropping records with missing values. P-values <0.05 were considered statistically significant. This study was approved by the Institutional Review Board.

Results

The summary of demographic and clinical information of this patient cohort has been reported elsewhere¹³ and is presented in the Methods Section above. Of 4,351 patients who completed the HIV testing module and additional survey questions, 50.3% of patients responded 'yes' regarding interest in receiving information about one or more potential health topic. Patients who demonstrated interest were more likely to be older (interest versus no interest – age: 39.5±14.8 years vs. 36.1±14.3 years, $p<0.001$), African American (African American: 54%, White: 34%, other race: 46%, $p<0.001$), and male (male: 53%, female: 48%, $p=0.001$). There was no significant difference by acuity level ($p=0.552$). However, there was a statistically significant difference by chief complaint. 71% of 112 patients with chest pain as chief complaint, the fourth leading chief complaint in patients, were interested in receiving public health information from kiosk while they were in the ED while patients with other leading chief complaints and other complaints expressed less interest (abdominal pain: 48%, back pain: 54%, headache: 49%, abscess: 51%, other chief complaint: 50%, $p=0.001$). 1,309 (30%) patients selected high blood pressure, 913 (21%) depression, 794 (18%) diabetes/sugar, 478 (11%) STDs, 267 (6%) drug abuse, and 134 (3%) physical abuse.

Table 1 displays regression results comparing patient characteristics and health topic selection. Older age group was associated with interest in high blood pressure (age 55–64 OR: 4.0; >64 OR: 4.4) and diabetes/sugar (55–64 OR: 3.6; >64 OR: 3.6) as compared to those aged 18–24. Desire for information on depression was greatest among patients aged 35–64 (35–44 OR: 1.4; 45–54 OR: 1.5; 55–64 OR: 1.3) as compared to young age group 18–24, while patients 25–54 years showed more interest in drug abuse education (25–34 OR: 1.4; 35–44 OR: 1.7; 45–54 OR: 2.5). Participants 18–34 years were more likely to select STD information (18–24 years OR: 4.6; 25–34 OR: 3.0) as compared to those aged 65 years or older.

Among the patients who indicated interest in receiving information via kiosk about any health topic, gender and race were also associated with interest in specific topics. Men were more interested in high blood pressure (OR: 1.2), drug abuse (OR: 1.8), and STD (OR: 1.3) education. African American patients more often selected high blood pressure (OR: 2.7), depression (OR: 1.3), diabetes/sugar (OR: 2.2), drug abuse (OR: 1.4), and STDs (OR: 2.6).

In some instances, patients' chief complaint during the ED visit was associated with interest in specific public health topics. Patients who presented with a chief complaint of headache or chest pain demonstrated increased interest in high blood pressure (headache OR: 1.7;

chest pain OR: 2.7), while patients with a chief complaint of abscess were more often interested in diabetes/sugar (OR 1.7).

Discussion

Previous literature focusing on information delivery via kiosk includes a study by Gielen and colleagues that examines child safety education.⁶ The authors determined that families were more likely to follow child safety best practices following a kiosk module. These results indicate that electronic kiosks can be effective methods of initiating behavior change. Over half of the patients surveyed in our analysis expressed interest in receiving kiosk-delivered health information. Men and older patients were particularly likely to select high blood pressure, suggesting that patients may choose relevant education services. Even though our results cannot answer the usability question of public health information delivery via kiosk in the ED, our findings support the notion that substantial number of ED patients would like to receive information about select health topics. Kiosk-delivered educational campaigns should be tailored to individual patients' interests and target information gaps relevant to their health needs.

ED kiosks may help to provide access to medical information for under-served populations. African Americans in Baltimore have 1.44 and 1.85 times higher rates of hypertension and diabetes, respectively, than do patients of other races.¹⁴ Similarly, African American patients in our analysis expressed more interest in kiosk-delivered health education. ED kiosks also have the potential to assist in referral to community resources, as shown by Houry, et al. for victims of intimate partner violence.⁷ Kiosks have the potential to facilitate information delivery and to help connect patients with primary care physicians and other resources.

Limitations

The major limitation to our study is the lack of specificity of the principal outcome measure. Patients selected whether they would be interested in receiving information via kiosk, but were not able to indicate the strength of that interest. There were six proffered health topics that represent chronic conditions, and the study could have benefitted from a wider range of subjects. Additionally, the data collection tool does not inquire about patients' medical histories, experiences, or level of knowledge about particular topics. Furthermore, our analyses are limited by reading level, computer experience and therefore potentially socioeconomic status, other potential confounders (e.g. education level, having a primary care physician), and the extent to which our population represents the larger ED population as we did not include non-ambulatory or critically ill patients. We are limited to those who indicated interest in one of the health topics and cannot generalize to the entire population as there were significant differences in age, race and gender. This study is a pilot cross-sectional study that examines survey data and presents an initial perspective on interest in a kiosk educational approach. Future research is needed to determine optimal intervention modalities.

Conclusions

Our results suggest that many patients are interested in receiving public health information in the ED via kiosk. In particular, these patients are more likely to be older, male and African American. There is an opportunity for providers to use kiosk modules to address chronic conditions in the ED without interrupting emergency patient care. Self-service kiosks may help to address the problem of limited resources in the ED setting and provide a process-oriented solution to introduce public health interventions during ED visits.

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Article Summary

1. Why is this topic important?

This topic is important because we address a simple intervention that could benefit a large proportion of the population. We survey patients' interest in receiving information on common, chronic conditions for which education and preventive screening could offer public health benefit.

2. What does this study attempt to show?

This study attempts to show that patients are interested in receiving public health information via computerized kiosk during ED visits.

3. What are the key findings?

Over half of patients surveyed demonstrated interest in obtaining kiosk-delivered education, and interest in hypertension predominated.

4. How is patient care impacted?

Our findings demonstrate patient support for educational computerized kiosk placement in EDs. This represents a first step in the implementation of public health educational modules in emergency departments.

The Emergency Department is thinking about offering information on different health topics using kiosks.

Would you be interested in getting information about any of the following on a kiosk? (Choose all that apply.)

High Blood Pressure	Diabetes/ Sugar	Sexually Transmitted Disease
Physical Abuse	Drug Abuse	Depression

Continue

Figure 1.
Module screen with survey question on interest in receiving health information via kiosk.

Table 1

Regression Results on Interest in Receiving Information about Health Topics

	Odds Ratio (95% CI)				
	High blood pressure	Depression	Diabetes/sugar	Drug abuse	STDs
Age					
18–24	1.0	1.0	1.0	1.0	4.6 (2.2–9.6)
25–34	1.3 (1.1–1.6)	1.0 (0.8–1.3)	1.4 (1.1–1.8)	1.4 (1.0–2.2)	3.0 (1.5–6.3)
35–44	1.9 (1.5–2.3)	1.4 (1.1–1.8)	1.8 (1.4–2.3)	1.7 (1.1–2.7)	1.7 (0.8–3.6)
45–54	2.9 (2.4–3.6)	1.5 (1.2–1.9)	2.4 (1.9–3.0)	2.5 (1.7–3.6)	1.8 (0.8–3.8)
55–64	4.0 (3.1–5.1)	1.3 (1.0–1.7)	3.6 (2.7–4.7)	1.2 (0.7–2.0)	1.2 (0.5–2.8)
>64	4.4 (3.2–6.2)	1.1 (0.7–1.6)	3.6 (2.4–5.2)	0.8 (0.3–1.9)	1.0
Gender					
Female	1.0	NS	NS	1.0	1.0
Male	1.2 (1.1–1.4)			1.8 (1.4–2.3)	1.3 (1.0–1.5)
Race					
Non-black	1.0	1.0	1.0	1.0	1.0
Black	2.7 (2.2–3.2)	1.3 (1.1–1.6)	2.2 (1.8–2.8)	1.4 (1.0–1.9)	2.6 (1.9–3.7)
Chief complaint					
Other	1.0	NS	1.0	NS	NS
Abd. pain	1.0 (0.8–1.2)		1.0 (0.8–1.3)		
Headache	1.7 (1.2–2.3)		1.2 (0.8–1.8)		
Back pain	1.3 (0.9–1.8)		1.1 (0.7–1.6)		
Abscess	1.0 (0.7–1.6)		1.7 (1.1–2.7)		
Chest pain	2.7 (1.8–4.0)		1.4 (0.9–2.2)		

NS: not significant;

Abd. Pain: abdominal pain