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Visit Satisfaction and the use of Tailored Health Behavior Communications in Primary Care.

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ABSTRACT:**BACKGROUND:**

Though studies suggest that computer-tailored health communications can help patients improve health behaviors, their effect on patient satisfaction, when used in health care settings, has yet to be examined.

METHODS:

A computer application was developed to provide tailored, printed feedback for patients and physicians about two of the most common adverse health behaviors seen in primary care, smoking and physical inactivity. Ten primary care providers and 150 of their patients were recruited to use the program in the office before their visit. After the visit, patients completed a self-report survey that addressed demographics, computer use history, satisfaction with the visit and the extent to which the physician addressed the reports during the visit.

RESULTS:

Most patients were female (67.6%), approximately half (46.0%) were seen for a routine exam, most (63.3%) had at least one chronic illness and fewer than a third (31.3%) had ever used the Internet or email. Most (81.1%) patients reported that the program was easy to use, but fewer than half of the doctors looked at the report in front of the patient (49.2%) or discussed the report with the patient (44.3%). Multivariate modeling showed that visit satisfaction was significantly greater among those whose doctor examined the report. This effect of the doctor examining the report on satisfaction was even greater for those who reported a chronic illness.

CONCLUSIONS:

Physicians who incorporate computer tailored messaging programs into the primary care setting, but who do not address the feedback reports that they create may contribute to patients being less satisfied with their care.

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A stand-alone computer application was developed to provide tailored, printed feedback for patients and physicians about two of the most common adverse health behaviors seen in primary care, smoking and physical inactivity. Ten primary care providers and 150 of their patients were recruited to use the program in the office before their visit. After the visit, patients completed a self-report survey that addressed demographics, computer use history, satisfaction with the visit and the extent to which the physician addressed the reports during the visit. All data presented was collected between October 2001 and February 2002.

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Physicians who incorporate computer tailored messaging programs into the primary care setting, but who do not address the feedback reports that they create may contribute to patients being less satisfied with their care.

BACKGROUND

Smoking and physical inactivity are significant contributors to excess morbidity and mortality in the United States. Studies suggest that computer-tailored health communications can help to improve these behaviors¹⁻⁶. Effective strategies for disseminating these computer-tailored applications, however, have yet to be identified, which may be especially important for prevention and treatment of behavioral risk factors like smoking and physical inactivity. The primary care setting may be a useful dissemination channel, given that most Americans see a primary care physician each year⁷ and that a large percentage of Americans still do not have access to the Internet^{8,9}. Though studies suggest that computer-tailored health communications can help patients improve health behaviors, their effect on patient satisfaction, when used in health care settings, has yet to be examined.

Primary care physicians note that they lack proper behavior counseling skills^{10,11}, so that another important potential use for these computer tailored systems is to prompt and guide physicians to effectively counsel their patients to make health behavior changes¹⁰⁻¹². In the primary care setting, however, patients may have varying degrees of adherence with the system, as characteristics such as age and health conditions may be associated with use. In addition, doctors may have varying degrees of adherence with the tailored reports, which may range from ignoring the report altogether to examining the report and using it as a focal point of discussion during the clinical encounter. In light of these issues, the following analysis was undertaken to examine the potential effects that a prototype system may have on primary care patients' satisfaction with care, which has not been previously reported in the literature, as well as describe individual differences in attitudes toward use of the tailored system.

METHODS

A stand-alone computer application was developed to provide tailored, printed feedback for patients about two of the most common adverse health behaviors seen in primary care, smoking and physical inactivity. Two behaviors were chosen, rather than one, so that the program would be useful to a greater number of primary care patients. For example, though some people have never smoked, everyone either exercises (and could get a supportive congratulatory message) or does not (and could get a message to help them modify their inactivity). The details of the development of the program are beyond the scope of this paper and are discussed in another manuscript (under review). The physical activity component was based on the work of one of the co-authors (BHM) and has proven to be effective at increasing physical activity⁴ and provides feedback on variables that mediate or moderate physical activity adoption¹³⁻¹⁶. The smoking component was adapted from a program developed for another project by the investigators. The smoking component provides feedback on variables that mediate or moderate the process of smoking cessation¹⁷⁻²³.

Based on responses to the computerized questionnaire, algorithms selected text and graphical messages which were placed on a report that was printed on paper. For example, if an individual was considering quitting smoking¹⁷ and reported little stress²¹, they would receive the following message "This section has information about stress. Whether you're trying to quit smoking or not, managing stress is an important skill to learn. Compared to other smokers, your answers tell us that you don't have very much stress in your life. That's great! Though you may not feel very stressed right now, it's always a good idea to have a plan for the future." They would also two

stress reduction techniques, randomly selected, including “TAKE TIME FOR YOURSELF: Take time each day to do something for yourself that you enjoy. Perhaps it’s reading a book, taking a walk, or just spending quiet time by yourself. It will help you to manage stress and will give you something to look forward to.”

Given the time constraints of the primary care visit and comments from previous focus groups with physicians, it was felt to be important to address only one behavior during the visit. The intervention, therefore, consisted of three major components: 1) patients answered questions on a computer, which took an average of 10 minutes, 2) patients received a 4-5 page computer-tailored report, printed on paper, about either smoking or physical activity and 3) patients received a one-page printed report that they were to give to their physician, which was designed to prompt and guide their physician to provide smoking cessation or physical activity counseling. Patients can receive additional “doses” at future visits with the provider.

RECRUITMENT

Primary care providers were recruited using letters sent to a random sample of 120 primary care providers and to physicians practicing in low-income public health clinics in Rhode Island. Ten primary care providers were recruited for the project, six were solo or dual-physician practices and four were low-income public health clinics staffed by at least 3 primary care providers. The main research question of the parent study was to understand the feasibility of using the stand-alone computer-tailored message program as part of routine primary care. It was felt that physicians with more control over their practice (solo or dual physicians) may have an easier time incorporating it into their practice, therefore a sample was recruited in which half of the physicians were in solo/dual physician practices while the rest were in larger practices. Only one provider per practice was recruited. Providers were paid \$2000 each for participating in the study to compensate for their time spent on the study, in meeting with study staff and in time spent with their staff in modifying their current practice routine. Office staff members were not compensated directly by the project.

Several strategies were employed to prepare the physicians to address the content in the printed reports. First, each project physician met with the project PI (CNS) to review samples of the printed reports and briefly discuss how the counseling recommendations from the reports would be used in practice. Physicians had no concerns about the content of the reports, which were based on consensus recommendations for addressing tobacco²⁴ and physical activity in primary care²⁵, and agreed to use the reports during office visits with study subjects. Second, as most practices had a slightly different method for moving patients through a visit and for presenting paperwork to physicians, the physicians’ report was given to patients who were to present it to the physician. This page had large, bold red lettering at the top that said “please give this to your doctor”. Third, as nurses and other office staff may perform counseling roles in some practices and not in others, nurses and other office staff were not involved directly in counseling patients in the study, or responding to patients’ questions about the printed reports.

Fifteen patients from each practice were recruited to use the program before their visit and to complete an exit interview, after seeing their physician, about the experience. Consecutive adult patients were approached for enrollment in the study after registering at the reception desk. Only English-speaking adults with an appointment with a study physician on the same day they were approached were enrolled. Patients were paid \$20 for their participation. The protocol was

approved by The Institutional Review Board of The Miriam Hospital. All data presented was collected between October 2001 and February 2002.

Two-hundred and sixty six patients were approached to use the program and to participate in exit interviews about the program. Of those, 62 were excluded (33 were scheduled to see a provider other than a study physician on the day of recruitment, 13 were less than 18 years of age, 16 were not English-speaking) and 54 refused to participate (11 felt "too ill", 28 were "not interested", 5 were "watching children", and 10 "didn't have the time"). Of those who were enrolled, 4 did not complete the pre- and post- visit data collection and were excluded. Of those who were not excluded (208), 150 (72.1%) agreed to participate and completed both the program and all data collection. The research associates (RA) was present in the area while subjects used the program. The RA was trained not to help unless asked, and 18 (12.0%) asked for help in completing the computerized survey. Both research associates had prior experience in conducting research in primary care settings. Of the 150 patients, technical problems with the computer program prevented 6 from receiving a printed report and 7 reported that they did not give the report to their doctor, so they were excluded from the analysis.

SURVEY MEASURES

In addition to the standard items used to obtain demographic information, the survey elicited information about health and physical activity, adapted from the 2001 Behavioral Risk Factor Surveillance System (BRFSS). The 2001 BRFSS included lifestyle activities, rather than just leisure-time activities that were included in previous BRFSS instruments. Patients were asked about their history of twelve common chronic health conditions (e.g., heart disease, hypertension).

To capture use and attitudes toward the tailored computer system, patients were asked whether they had used the computer before their visit, how easy it was to use the computer, whether the patient had any privacy concerns, and whether they would use the computer before each visit. Questions also addressed the role of the computer during the clinical encounter with their physician, including whether the physician had asked if the patient used the computer, and among those reporting use, whether the physician looked at any report pages in front of the patient and whether the report was discussed with the patient.

Use of the Internet was measured using a single question about their ever having used the Internet or email⁸. Patient satisfaction was measured using nine questions that were averaged to reflect a general latent construct of patient satisfaction²⁶. The items included technical and interpersonal skills of the physician as well as efficiency of staff. The overall scale score ranges between 1 (poor) and 5 (excellent). Exploratory analyses revealed that a single factor solution demonstrated the best fit to the data, and all items were significantly correlated ($r > .4$) to the final scale (Cronbach's $\alpha = .95$).

ANALYSIS

Frequency distributions were performed to examine patient demographics, as well as determine the number patients who reported the presence of a chronic condition, smoking status, levels of physical activity, recent use of the Internet, and whether the physician asked whether the patient had used the computer program during their office visit. Next, patient characteristics were introduced in a multivariate regression to describe computer use, attitudes toward and experience

with the computer program, and overall satisfaction with the medical visit. This study gathered data from 10 different medical practices, which enrolled an average of 15 participants per site. Preliminary analyses revealed that between-group differences at the site-level were associated with a significant amount of variation (intraclass correlation, ICC) in patient outcomes (8-10%). This source of variability necessitates statistical adjustment to account for the reduction of standard errors of the regression coefficients (e.g. adjusted betas) that occurs when observations are correlated, such as patients presenting to the same practice as is the case in this study.

The regression analyses presented here were estimated via a Generalized Estimating Equation (GEE) approach (Liang and Zeger, 1986) and modeled using the Proc Genmod procedure in SAS (SAS Institute, Cary, NC). It should be noted that the corresponding regression coefficients and significance tests are similarly interpreted as those estimated using standard regression (e.g. logistic, ordinary least squares) procedures.

RESULTS

Table one presents the descriptive statistics of the study participants. Only 24.3% of the physicians asked the patients if they used the computer in the office before seeing the physician, and among patients who had used the computer, less than half of the doctors looked at the report in front of the patient (49.2%) or discussed the report with the patient (44.3%). Of note, a large majority (81.1%) felt the computer was easy to use and privacy concerns were noted by less than 25%.

Table 2 presents the patient-level correlates of satisfaction with the medical visit. These analyses were designed to examine the effect of using the computer program on visit satisfaction, individuals who did not report using the computer before their doctor visit and receiving a printed report (27) were excluded. The model presented examines the main effects, and shows that patient satisfaction was higher among patients with chronic conditions, non-smokers, and patients whose physicians examined the report during the medical visit.

DISCUSSION

This study examined how using computer tailored health behavior messages in a primary care setting influenced patients' satisfaction with care, as well as described individual differences in attitudes toward use of the tailored system. Overall, about half (46.8%) of patients reported that their doctor discussed the report with them during their visit. Patients who reported that the doctor didn't look at the report consistently reported lower levels of visit satisfaction, after adjusting for other patient characteristics. Interaction analyses showed that this effect may be stronger for those who report having a chronic medical condition.

In this study, patients were asked to use a computer program in their doctors' office. It stands to reason that patients would expect their doctor to be attentive to the report or to discuss the report or the patients' experience using the computer program. A possible reason for this finding is that patients expect their doctors to be thorough, in ways that they can observe. Patients whose physician did not discuss the program with them or look at the reports, therefore, perceived a lack of thoroughness and rated visit satisfaction lower. This is in keeping with findings that suggest that patients equate quantity of medical care, another measure of thoroughness, with quality of medical care. Oboler and colleagues found that over 90% of patients felt that the abdomen, reflexes, and prostate should be examined, though no evidence exists that these are useful clinical procedures when used routinely²⁷. Weingarten and colleagues noted that patients

who were offered more preventive services were more satisfied²⁸. The general lack of association of patient demographics with satisfaction was in keeping with other studies. Patient gender, however, was associated with satisfaction in the study, while this association has been inconsistent between studies²⁹⁻³¹.

The main findings suggest that computer-tailored interventions need to be applied with caution in primary care settings. It appears that physicians who cannot or will not discuss or pay attention to materials that patients are provided may end up with less satisfied patients. What remains to be understood is whether these findings generalize to other office-based interventions. It is common for physician offices to have a variety of patient education messages, in the form of posters, pamphlets, computer kiosks, and videotapes, for example. It is possible that doctors who have posters in the office advertising influenza vaccines but who do not offer influenza vaccines to their patients, may contribute to decreased patient satisfaction compared to physicians without such posters.

There are several potential limitations to these findings. First, this was not a randomized trial that randomized half one group of patients to discuss the report with their doctor and the other half not to discuss the report. Therefore, conclusions about the effects of the intervention on overall satisfaction are not possible. Second, there may some unmeasured variable that confounds the relationship between the physician reviewing the report and visit satisfaction. For example, provider communication style was not measured, and Flocke and colleagues noted that a more person-focused style may be associated with greater satisfaction³². Differences that may be attributable to providers, however, were controlled for in this analysis, so it is expected that this is not a significant limitation that impacts the interpretation of these findings. Third, the findings may be related to the design of the physician reports, which may limit the generalizability of these findings to other studies. The page that was printed for the patient to give to the doctor had bold letters at the top of the page that said "please give this to your doctor". This likely heightened the patient's expectation that the doctor would address the report during the visit. If, for example, the physician report was designed as a "Dear Doctor" letter that the computer tailoring system assisted the patient in creating, the physician's perception of the report may have changed as would their inclination to pay attention to the report during the visit. Further studies would be necessary to test this hypothesis and to understand the optimal way to design and implement potentially useful computer applications such as these while insuring that they "first, do no harm" to patient satisfaction.

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LIST OF TABLES

TABLE 1.0. Characteristics of patient subjects and their physician visits.

TABLE 2.0. Association of patient characteristics and visit characteristics with patient satisfaction.

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	N ¹	%
Age		
Less than 25	22	14.7
25-34	24	16.0
35-44	31	20.7
45-54	32	21.3
55 and older	41	27.3
Sex		
Males	48	32.4
Females	100	67.6
Education		
Less than high school graduate	32	21.3
High school graduate	47	31.3
Some college or more	71	47.4
Race		
White	123	83.1
Black	6	4.1
Hispanic	17	11.4
Other	2	1.4
Presence of chronic condition	95	63.3
Current smoker	44	30.1
Physical activity		
less than 150 minutes/week	75	51.0
at least 150 minutes/week	72	49.0
Physician asked if patient used computer	33	24.3
Physician looked at report in front of patient	61	49.2
Physician discussed report with patient	54	44.3
Patient felt that computer was easy to use	107	81.1
Patient had privacy concerns about the computer	32	24.8
Patient ever used Internet/email	46	31.3

Note:

¹Sample N=150, but cell sizes may vary due to missing data

TABLE 2.0. Association of patient characteristics and visit characteristics with patient satisfaction.¹

	Beta ²	SE ^{3,4}	Z ⁵
Intercept	3.34	0.32	9.92
Age ⁶	-0.1	0.04	1.12
Male ⁶	0.23	0.12	1.91
White ⁶	0.03	0.21	0.17
Some college or more ⁶	0.16	0.13	1.25
Chronic condition⁶	0.44	0.15	2.87
Current smoker⁶	-0.3	0.07	3.74
High Physical Activitiy ⁶	-0.2	0.14	1.25
Ever Used Internet/email ⁶	0.15	0.14	1.03
MD asked about report	-0.1	0.14	0.05
MD looked at report in front of PT	0.53	0.13	4.03
MD discussed report with PT	-0	0.13	0.27

¹Among patients reporting use of computer before visit (n=123), ²Unstandardized Beta, ³Standard Error

⁴Standard Errors estimated via Generalized Estimating Equations (GEE)

⁵ Bold values indicate a Z-statistic > 1.96 and a two-tailed p-value < .05

⁶Reference values for patient demographics are: females, minorities, non-chronic condition, non-smokers, non-routine visits, low PA, never used internet. Age is coded as continuous

MD = physician, PT = patient

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