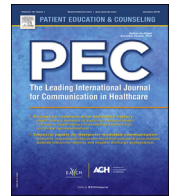




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Short Communication

Factors affecting cancer patients' electronic communication with providers: Implications for COVID-19 induced transitions to telehealth

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ABSTRACT

Objective: Because of the pandemic, electronic communication between patients and clinicians has taken on increasing significance in the delivery of cancer care. The study explored personal, clinical, and technology factors predicting cancer survivors' electronic communication with clinicians.

Methods: Data for this investigation came from the Health Information National Trends Survey (HINTS5, Cycle 2) that included 593 respondents who previously or currently had cancer. Multivariate regression analyses were used to predict electronic communication with clinicians. Predictors included demographic variables and health status, technology use (online health information-seeking behavior, tracking of health-related data such as using a Fitbit), and quality of past communication experiences with clinicians.

Results: In this pre COVID-19 sample, 42 % respondents (N = 252) did not engage in any type of electronic communication (e.g., emailing, texting, data sharing) with providers. In multivariate analyses, predictors of more electronic communication with clinicians included frequency of seeking health-related information online ($\beta = .267, p < .001$) and better communication experiences with clinicians ($\beta = .028, p = .034$), while no demographic variable showed significance. The technology use variables (online health information seeking, health tracking) were significantly higher predictors of electronic communication with clinicians ($\Delta R^2 = .142, p < .001$) than was past experiences with clinicians ($\Delta R^2 = .029, p = .016$).

Conclusions: Access and past experience with interactive media technologies are strong predictors of cancer patients' electronic communication than with clinicians. Adoption of telehealth technology likely depends as much on patients' relationships with technology as it does their relationships with clinicians.

Practice implications: Since Covid-19, cancer care providers have turned to telehealth provide patients with needed cancer care services. Enhancing patients' digital competence and experience with electronic communication will help them more easily navigate telehealth care. Providers can leverage their relationship with patients to facilitate more effective use of telehealth services.

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1. Introduction

Since the COVID-19 pandemic, there have been unprecedented, international efforts to substitute telehealth visits for face-to-face encounters [1]. This has created radical changes in cancer care [2] which require regular office visits for treatment, support, and follow-up [3]. While patients have expressed satisfaction with virtual visits (i.e., mediated (a)synchronous communication with clinicians) and some prefer telehealth to clinic visits [4], virtual encounters may be problematic if they are more physician-

centered [5–7] and raise concerns about security and privacy online [8]. Thus, more research is needed on how pandemic induced transitions from face-to-face clinic to telehealth visits has affected health care utilization and quality of clinician-patient communication [9].

The purpose of this Short Communication is to report an exploratory analysis of data from the US National Cancer Institute's 2018 Health Information Trends Survey (HINTS) on factors predicting cancer survivors' utilization of electronic communication (e-communication) with health care providers. HINTS collects nationally representative data about the American public's use of cancer-related information and changing communication trends and practices, including their e-communication with clinicians.

Although pre COVID-19, this survey does allow for an examination of factors associated with cancer survivors'

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willingness to engage in e-communication with clinicians via secure messaging, emailing, and data sharing. While HINTS does not address synchronous telehealth visits *per se*, these forms of e-communication (e.g., patient portals, text messages) have become even more important since the pandemic so that patients can access information, lab results, support resources, and have interactions with clinicians [3,10,11].

In order to identify factors affecting patients' willingness to use e-communication with cancer care providers, this investigation embraces a key premise of social cognitive theory (SCT) [12] that posits that an individual's behavior is a function of personal factors and environmental influences. Given past research, we expect personal characteristics (e.g., higher education, health status, younger age) may influence one's e-communication with providers [13,14]. Cancer patients' interactions with their environments would include their relationships with *health care providers* as well as their relationships with *technology*. Some research indicates each may independently influence e-communication with clinicians [15,16]. Guided by SCT, this investigation examined the following research question:

RQ: To what extent do cancer patients' demographic and health-related characteristics, past health care experiences (frequency of seeing providers, quality of communication), and use of technology for health-related purposes (seeking online health information, using health tracking devices such as Fitbit) predict their utilization of e-communication with providers?

2. Method

2.1. Participants and measures

We used the 2018 HINTS data, a nationally representative mail survey gathered in the US from January 2018 to May 2018, and included 593 respondents who had a previous cancer diagnosis. Table 1 shows the study variables and how they were measured. The outcome variable, e-communication with clinicians, was the sum of whether in the past year respondents had texted, emailed, and/or electronically shared information with a health care provider (scale range 0–3). To answer the research question, predictor variables were grouped into 3 categories based on the

Table 1
Study Measures.

| Variable | Item | Scale |
|---|--|---|
| (1) Age | What is your age? | |
| (2) Gender | Are you male or female? | 0=male, 1=female |
| (3) Education | What is the highest grade or level of schooling you completed? | 0=Less than high school, 4=Post-Baccalaureate Degree |
| (4) Physical Health | In general, would you say your health is . . . | 0=Poor, 4=Excellent |
| (5) Mental Health ^a | Over the past 2 weeks, how often have you been bothered by any of the following problems? a. Little interest or pleasure in doing things. b. Feeling down, depressed, or hopeless. c. Feeling nervous, anxious, or on edge. d. Not being able to stop or control worrying. | 0=Nearly everyday, 3=Not at all. Measured by the mean of the four items. Cronbach α = .859 |
| (6) Cancer History | At what age were you first told that you had cancer? | Measured by subtracting the age one had cancer from one's age. |
| (7) Health-related information-seeking behavior | In the past 12 months, have you used a computer, smartphone, or other electronic means to do any of the following? a. Looked for health or medical information for yourself. b. Looked for health or medical information for someone else. c. Looked up medical test results. | 0=No, 1=Yes. Measured by the sum of all items. |
| (8) Track | Has your tablet or smartphone Helped you track progress on a health-related goal such as quitting smoking, losing weight, or increasing physical activity? Other than a tablet or smartphone, have you used an electronic device to monitor or track your health within the last 12 months? Examples include Fitbit, blood glucose meters, and blood pressure monitors. | 0=No, 1=Yes. Measured by the sum of both items. |
| (9) Patient-centered communication ^b | The following questions are about your communication with all doctors, nurses, or other health professionals you saw during the past 12 months. How often did they do each of the following? a. Give you the chance to ask all the health-related questions you had. b. Give the attention you needed to your feelings and emotions. c. Involve you in decisions about your health care as much as you wanted. d. Make sure you understood the things you needed to do to take care of your health. e. Explain things in a way you could understand. f. Spend enough time with you. g. Help you deal with feelings of uncertainty about your health or health care. | 0=Never, 3=Always. Measured by the sum of all items. Cronbach α =.924 |
| (10) Frequency of visiting a provider | In the past 12 months, not counting times you went to an emergency room, how many times did you go to a doctor, nurse, or other health professional to get care for yourself? | 0=None/missing, 1 = 1 time, 2 = 2 times, 3 = 3 times, 4 = 4 times, 5 = 5–9 times, 6 = 10 or more times. |
| (11) Electronic Communication | Have you sent a text message to or received a text message from a doctor or other health care professional within the last 12 months? In the past 12 months, have you used an electronic device to communicate with a doctor or a doctor's office? Have you shared health information from either an electronic monitoring device or smartphone with a health professional within the last 12 months? | 0=No/Don't know, 1=Yes. Measured by the sum of all items. |

^a The mental health measurement was adopted from Patient Health Questionnaire (PHQ-4) [30].

^b The measurement for PCC was grounded in the PCC framework proposed by Epstein and Street [31]. Empirical evidence supports its use in cancer patients [32].

premises of SCT—(a) personal and health-related (age, education, race/ethnicity, gender, time since cancer diagnoses, physical and mental health status), (b) past experiences with health care providers (how many visits with providers over past 12 months, quality of past communication experiences), and (c) use of technology for health-related purposes (using the Internet to seek health information, using technology to track health data).

2.2. Data analyses

Regression analyses were conducted in three blocks using the grouped variables. First, demographic and health variables were entered into the model (Model 1), followed by variables related to past experiences with providers (Model 2), and finally use of technology for health purposes (Model 3). To assess significance in variances explained, we observed the R-squared change in Models 2 and 3.

3. Results

3.1. Sample characteristics

Most participants were females ($N = 344$, 58 %) and reported good to excellent physical ($N = 443$, 74.7 %) and mental health ($N = 525$, 88.5 %) (Table 2). Education levels varied, and time since cancer first diagnosed cancer ranged from 0 to 87 years ($M = 13.83$, $SD = 13.39$). Approximately 42 % respondents ($N = 252$) had not engaged in any e-communication with providers.

3.2. Statistical analyses

In bivariate analyses, e-communication was higher among the younger ($r = -.198$, $p < .001$) and more educated respondents ($r = .224$, $p < .001$), as well as those who more often sought health information online ($r = .480$, $p < .001$), tracked health data ($r = .430$, $p < .001$), and who visited providers more often over the last 12 months ($r = .173$, $p < .001$).

In multivariate analysis, demographic and health factors (Model 1) explained 7.4 % of the variance in patients'

e-communication, with education being the only significant predictor ($\beta = .171$, $p = .001$). Variables related to past experiences with providers (Model 2) explained an additional 2.9 % of the variance in patients' e-communication. While education remained a significant predictor ($\beta = .179$, $p < .001$), the influence of past patient-centered communication experiences ($\beta = .026$, $p = .069$) and the frequency of seeing doctors ($\beta = .071$, $p = .061$) did not reach statistical significance. Technology-use factors (Model 3) explained an additional 14.2 % of the variance in the outcome variable. In this model, patients' online information-seeking behavior ($\beta = .273$, $p < .001$) and past patient-centered communication experiences ($\beta = .028$, $p = .031$) predicted their e-communication, with marginal effects associated with the frequency of seeing doctors ($\beta = .057$, $p = .104$) and using electronic methods to track health data ($\beta = .186$, $p = .051$) (see Table 3 for full regression results).

4. Discussion and conclusion

4.1. Discussion

Several findings were noteworthy. First, e-communication with providers was most strongly influenced by the respondents' use of technology for other health-related purposes, especially seeking health information online. This finding is consistent with research indicating that sustained patient portal use is dependent upon access to broadband internet, self-efficacy using internet, and more time spent online [15–17]. Although higher education, younger age, and more frequent clinical visits were associated with e-communication in bivariate analyses, these relationships were no longer significant when including effects associated with using technology for health-related purposes.

Second, although not correlated with e-communication with providers per se, better communication experiences with providers was a significant predictor in the multivariate models. While beyond the scope of this Short Communication, this finding may reflect differences among subgroups of patients whose e-communication depends partially on the quality of their relationships with clinicians. For example, fears of losing a

Table 2
Descriptive Analysis.

| | N | Percentage | Mean | SD | Range |
|---|-----|------------|--------|--------|-------|
| (1) Age | – | – | 68.09 | 13.073 | 23~97 |
| (2) Gender | – | – | 0.58 | 0.493 | 0~1 |
| Male | 246 | 41.50% | – | – | – |
| | – | 68.09 | 13.073 | 23~97 | – |
| (2) Gender | – | – | 0.58 | 0.493 | 0~1 |
| Male | 246 | 41.50% | – | – | – |
| Female | 344 | 58% | – | – | – |
| (3) Race | – | – | 0.81 | 0.392 | 0~1 |
| White | 481 | 81.10% | – | – | – |
| Non-White | 112 | 18.90% | – | – | – |
| (4) Education | – | – | 2.83 | 1.155 | 0~4 |
| Less than high school | 11 | 1.90% | – | – | – |
| High school graduate | 26 | 4.40% | – | – | – |
| Some college | 124 | 20.90% | – | – | – |
| Bachelor's degree | 40 | 6.70% | – | – | – |
| Post-baccalaureate degree | 150 | 25.30% | – | – | – |
| (5) Physical Health | – | – | 2.21 | 0.986 | 0~4 |
| (6) Mental Health | – | – | 2.56 | 0.713 | 0~3 |
| (7) Cancer History | – | – | 13.83 | 13.399 | 0~87 |
| (8) Health-related information-seeking behavior | – | – | 1.42 | 1.104 | 0~3 |
| (9) Track | – | – | 1.02 | 1.104 | 0~2 |
| (10) PCC | – | – | 17.04 | 4.284 | 0~21 |
| (11) Frequency of visiting a provider | – | – | 3.43 | 1.808 | 0~6 |
| (12) Electronic Communication | – | – | 0.91 | 0.989 | 0~3 |

Note. ** Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).

Table 3
Multiple Regression Models.

| | Model 1 | | Model 2 | | Model 3 | |
|---|---------|-------|---------|-------|---------|-------|
| Block 1: Demographic variables | β | p | β | p | β | p |
| Age | −0.007 | 0.166 | −0.008 | 0.122 | 0 | 0.962 |
| Gender | −0.137 | 0.252 | −0.125 | 0.292 | −0.163 | 0.136 |
| Race | −0.024 | 0.87 | −0.022 | 0.876 | −0.152 | 0.25 |
| Education | 0.171 | 0.001 | 0.179 | 0 | 0.093 | 0.055 |
| Physical Health | −0.058 | 0.335 | −0.025 | 0.696 | −0.063 | 0.289 |
| Mental Health | −0.045 | 0.565 | −0.063 | 0.409 | −0.058 | 0.418 |
| Cancer History | −0.005 | 0.264 | −0.003 | 0.472 | 0 | 0.948 |
| Block 2: Past experiences with providers | | | | | | |
| PCC | | | 0.026 | 0.069 | 0.028 | 0.031 |
| Frequency | | | 0.071 | 0.061 | 0.057 | 0.104 |
| Block 3: Use of technology for health purposes | | | | | | |
| information-seeking behavior | | | | | 0.273 | 0 |
| Track | | | | | 0.186 | 0.051 |
| R ² | 0.074 | | 0.103 | | 0.245 | |
| R ² change | | | 0.029 | | 0.142 | |
| p | 0.006 | | 0.016 | | 0 | |

personal relationship with one's doctor is one barrier to African-American and Latino patients' use of patient portals [18]. Greater trust, better communication with clinicians, and clinicians' promotion of patient portals has been associated with more frequent online communication with providers [15,17,19].

Finally, although 40 % of the HINTS cancer survivors reported they did not have any e-communication with clinicians over the past 12 months, utilization of telehealth cancer services has increased (whether by choice or necessity) in response to COVID-19 [20]. While tele-oncology cannot substitute for some in-person visits, [21], clinicians and patients to date have had some positive experiences using telehealth services, including saving personal protective equipment (PPE) and reducing the need for hospital services [22]. Other evidence indicates that telehealth has not increased physicians' workload and that both cancer patients and providers have expressed satisfaction with transitions to telehealth for certain services [23]. Recent surveys in various countries suggests that, while many patients still prefer in-person visits for some aspects of care, telehealth platforms offer a reasonable and satisfactory alternative for other cancer care services [11,24,25]. However, successful transitioning to telehealth for cancer care services will depend on patients' willingness and capacity to use digital forms of communication with their providers. Based on our findings, the quality of patients' relationships with clinicians and their experiences with using technology for health-related purposes will be important determinants.

This study has limitations. Our analysis was exploratory, and we did not examine patients' use of telehealth visits during COVID-19. Attitudes toward live telehealth visits were not assessed by HINTS, and factors affecting real-time virtual visits may be different from asynchronous e-communication. Also, as a cross-sectional survey, HINTS allows for identifying correlations among variables and not necessarily causation. Finally, HINTS did not query respondents' access to and quality of internet connectivity, which greatly affects one's experiences using telehealth.

4.2. Conclusion

The most important implication of our findings is that the transition from face-to-face to telehealth consultations involves more than simply adapting to a different medium for clinical encounters; it also depends on users' (both patients and clinicians) relationships with interactive media technology. Just as medical care transitioned from the biomedical model to the biopsychosocial model of clinical care [26], health communication

researchers need to think beyond the body, mind, and social dimensions of health to also include the technological context of health-related experiences. Our study suggests that cancer patients' relationships with technology for health-related purposes, along with their relationships with clinicians, are key components for successfully engaging cancer patients with telehealth.

4.3. Practice implications

There are at least two ways health care providers can help patients more smoothly transition to telehealth for some cancer care services. First, clinicians can develop strategies to promote and maintain effective clinician-patient communication when using digital platforms. These include proactively using the technology to reach out to patients to stay connected, taking steps to offering longer time during virtual visits, and finding ways to maintain the humanness of supportive relationships [27].

Second, transitioning to telehealth has been a learning curve for both providers and patients. In light of pre-COVID research showing that most patients do not discuss their use of health information technology (e.g., use of the internet for health information) with their providers [28], clinicians could initiate conversations on this subject to guide patients' use of telehealth, address any concerns around its use, and assist patients in navigating various digital functions (e.g., online consultations, examinations, data sharing) afforded by virtual platforms [20]. The importance of having positive initial telehealth visits was shown in a recent study [29] in which patients with diabetes had greater acceptance of asynchronous e-communication with clinicians when initial expectations for the technology were lower, suggesting the benefits of a positive disconfirmation of negative expectations.

CRedit authorship contribution statement

Qiwei L. Wu: Conceptualization, Methodology, Investigation, Data curation, Writing - original draft, Visualization. **Richard L. Street:** Conceptualization, Resources, Writing - review & editing, Supervision.

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