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Using Patient Reported Outcomes in Oncology Clinical Practice

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Abstract

Background and Aims—Patient reported outcomes (PROs) are increasingly being implemented into the care of patients with cancer. The use of a standard set of PROs (e.g., pain) in cancer is becoming established and there is interest in what additional PROs might provide valuable information. The goal of this observational study was to examine how the PROs of self-efficacy for pain and other symptoms assessed at the point of service were associated with pain, symptom severity and distress, and physical and psychosocial functioning in a sample of breast and gastrointestinal patients. We also sought to examine differences in these relationships by cancer type (breast and gastrointestinal) as well as understand differences in self-assessment mode (paper/pencil or electronic tablet).

Methods—178 patients with breast (n=65) and gastrointestinal cancer (n = 113) completed the Chronic Pain Self Efficacy Scale, M.D. Anderson Symptom Inventory, and Functional Assessment of Cancer Therapy-General questionnaires. Measures were completed with paper and pencil and electronically using a tablet computer while patients waited for their clinical appointment. Responses from the initial completed questionnaires on both the paper and electronic instruments were analyzed.

Results—Patients' self-efficacy scores for pain and other symptoms correlated positively with pain, symptom severity and distress, and physical and psychosocial functioning; patients with lower levels of self-efficacy reported poorer outcomes and functioning overall. The results were

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independent of cancer type and mode of assessment. No statistically significant differences were found in the PROs when collected by electronic technology versus paper-pencil mode; patients were very satisfied with using the tablet computer to complete the PRO measures.

Conclusions and Implications—Our results suggest that self-efficacy for pain and symptom management may be a beneficial addition to clinic-based PRO assessment batteries for patients with cancer and other chronic diseases. Existing short, validated symptom self-efficacy scales could easily be integrated into clinical practice to help healthcare providers identify patients that might benefit from intervention. Study results also support existing research that suggests electronic approaches are a practical way to collect PRO data, including self-efficacy data, in the clinic. Overall, our data suggest that patients who have particularly low levels of self-efficacy for pain and symptom management may be at risk for higher levels of pain and disability. Thus, if self-efficacy for pain and symptom management were routinely collected at the time of clinical service, psychosocial interventions to improve self-efficacy for pain and symptom management, and in turn overall quality of life, could be implemented in a timely fashion.

Keywords

self-efficacy for pain; cancer; patient reported outcomes; symptom management

INTRODUCTION

Patient reported outcomes (PROs) are increasingly being routinely implemented into the care of patients with cancer (1–3). PROs include any report on health that comes directly from the patient and can include assessment of symptoms (e.g., pain, fatigue), physical functioning, psychological functioning, and overall health-related quality of life. PROs are important for identification of problematic symptoms, are emphasized as important endpoints in medical and drug studies, and can be used for timely implementation of beneficial interventions (4, 5). PROs are commonly collected with the use of electronic technologies (i.e., tablet computers, smart phones, other mobile health [mHealth] applications); a meta-analysis found that electronically collected PROs provide data that is equivalent to traditional paper-pencil assessment methods (6). The use of a standard set of PROs (e.g., pain, fatigue) in cancer is becoming more established (5, 7) and there is growing interest in what additional PROs – such as those that examine important psychological or social constructs – might be the most informative tool for assessing improvements in patients' symptoms, functioning, and distress.

One PRO that may be very important to assess is patients' confidence (i.e., self-efficacy) in their ability to manage their pain and other cancer symptoms (8). Patients' self-efficacy for managing cancer pain and symptoms has consistently been related to important symptoms such as pain, functioning, and distress (9–12). Self-efficacy for pain and other symptoms refers to patients' belief or confidence that they can manage symptoms and distress due to their cancer (13). Self-efficacy for pain and symptom management has surfaced as an important variable in understanding pivotal patient outcomes such as pain, physical functioning, and psychological distress (14). Research studies have reported that cancer patients who have low levels of confidence (i.e., self-efficacy) in their ability to manage their pain and other symptoms are much more likely to report poor outcomes (12, 15). To our

knowledge, no study has examined how diverse cancer populations' (i.e., breast and gastrointestinal [GI]) self-reports of self-efficacy for pain and symptom management assessed at the time of patients' clinical appointment are associated with important outcomes such as pain, functioning, and distress. If self-efficacy for pain and symptom management at the time of service is related to negative outcomes in patients with cancer, this information could help providers implement timely interventions to increase patients' self-efficacy for pain and symptom management.

The main goal of this study was to examine how the PROs of self-efficacy for pain, function, and other symptoms assessed at the point of service were associated with pain, symptom severity and distress, and physical and psychosocial functioning in a sample of patients with breast or GI cancer. We hypothesized that lower levels of self-efficacy in each area (i.e., pain, function, other symptoms) would be associated higher pain, higher symptom severity and distress, and lower physical and psychosocial functioning. There were two secondary goals of this study: 1) to examine differences by cancer type (i.e., breast and GI) on the relationship between self-efficacy for pain, function, and other symptoms and important cancer-related outcomes; and 2) to examine differences in self-assessment mode (paper/pencil or electronic tablet) in a large sample of cancer patients.

This study has several unique features allowing for interesting secondary goals, each of which can directly inform clinical practice. First, the inclusion of both breast and GI cancer patients allowed for the examination of differences by cancer type in relation to self-efficacy for pain, function, and other symptoms on important cancer-related outcomes. This is an important question, as it will point to a similar or disparate relationship of important PROs between cancer patients with different diagnoses. Second, patients completed self-efficacy assessments and other PROs using both paper-pencil and electronic computer tablets. In past work in a small sample of breast cancer patients, we found statistically significant differences in self-efficacy assessments between these two modes of assessment (i.e., paper-pencil, electronic) (16). Others, however, have reported no differences among a more common set of PROs when assessed with paper-pencil or electric modes (6). A further aim of this study was to examine differences in self-efficacy assessments by assessment mode in a larger sample. This information is valuable in understanding how mode of collection may be important in understanding self-efficacy and other PROs. Finally, this study extends past work (17) by examining patient satisfaction with PROs at the time of service in a large sample of patients with breast and GI cancer, about half of whom had metastatic disease.

METHODS

Participants and Procedures

This study included 178 patients with breast (n=65) and gastrointestinal cancer (n = 113) participating in two parent studies focused on assessing the feasibility and utility of collection of PROs in the cancer clinic. The methods have been previously described (16–18) and the Duke University Health System Institutional Review Board approved both studies. All patients signed the IRB-approved consent form before taking part in this project; participants who provided complete data were included in this study. Patients in this study completed paper and pencil questionnaires and electronic questionnaires using a tablet

computer while waiting for their clinical appointment. Data for this study was taken from the first time point that the patient completed either the paper-pencil PRO or the electronic PRO. Permission to use PRO instruments was obtained.

Measures

Self-efficacy for Pain, Symptoms, and Function—Self-efficacy for managing pain, symptoms, and function was assessed with a modified version of the Arthritis Self-Efficacy Scale (19). The original scale was modified by removing 9 items relevant to patients with arthritis but not cancer (e.g. “How certain are you that you can button and unbutton 3 medium-size buttons in a row in 12 seconds?”) and adding 7 items regarding management of pain from the Chronic Pain Self-Efficacy scale (20) and other common cancer symptoms such as nausea and shortness of breath. Patients rated 16 items regarding their perceived ability to manage a variety of symptoms on a scale of 10 (not at all certain) to 100 (completely certain). The scale contains three subscales: self-efficacy for managing pain, self-efficacy for managing other symptoms (e.g., fatigue, nausea, depression), and self-efficacy for function. The possible range for the total score is 10 to 100 with higher scores indicating greater self-efficacy. Reliability was good for each of the subscales (Cronbach’s α ranged = 0.89 – 0.92) and the total scale (α = 0.96). Prior studies using this instrument to assess self-efficacy in lung cancer patients (21) and prostate cancer patients (22) have demonstrated evidence of internal consistency and construct validity.

Pain—Pain was assessed with a 1-item numeric rating scale taken from the M.D. Anderson Symptom Inventory (23) (MDASI) asking participants to rate their pain at its worst in the last 24 hours. Patients rated their pain from 0 to 10, where 0 = not present to 10 = as bad as you can imagine. In a review of pain measurements for patients with cancer, Jensen et al. (24) found 1-item numeric rating scales to be both reliable and valid for this population.

Functional Assessment of Cancer Therapy – General (FACT-G) (25)—The FACT-G was used to assess physical well-being (7-items), social well-being (7-items), emotional well-being (6-items), and functional well-being (7-items). All items on the FACT-G use a 5-point rating scale (0 = Not at all; 1 = A little bit; 2 = Somewhat; 3 = Quite a bit; and 4 = Very much). Each subscale is scored by adding the total of the patient response on the items in the subscale; negatively worded items are reverse scored prior to summing. Higher scores indicate better functioning. Reliability was good in this sample with Cronbach’s α ranging from 0.81–0.88.

M.D. Anderson Symptom Inventory (MDASI) (23)—The MDASI was used to assess symptom severity and symptom distress. The MDASI consists of 15 core symptoms items (i.e., pain, fatigue, nausea, sleep disturbance, distress, shortness of breath, loss of memory, loss of appetite, drowsiness, dry mouth, sadness, emesis, numbness or tingling, diarrhea and constipation) that are rated on the basis of their presence and severity. Each symptom is rated on an 11-point scale (0–10), in order to indicate the presence and severity of the symptom (0 = not present and 10 = as bad as you can imagine in the last 24 hours). It also includes six interference symptoms with the function in the last 24 hours (i.e., general activity, mood, work, relationship with other people, walking and enjoyment of life). The

interference items are also measured on scales from 0 to 10, (0 = did not interfere and 10 = interfered completely). Reliability was good for both the severity scale ($\alpha = 0.87$) and the distress scale ($\alpha = 0.92$).

Electronic Patient Reported Outcomes Satisfaction (ePRO)—All patients who completed the electronic version of the PROs in this study were asked to answer four items related to their satisfaction with using the electronic tablet in the clinic to complete PROs. These questions asked about the readability of the tablet, ease of tablet use, ability to navigate the tablet, and the comfortableness of the tablet to hold. These four questions were rated on a 5 point scale where 1 = the most difficult/unsatisfied and 5 = very easy/very satisfied. A total ePRO satisfaction score was calculated by summing patient responses. The reliability for these 4 items was good ($\alpha = 0.78$).

Analyses

Descriptive analyses were used to examine the demographic and medical data in this study. Means and standard deviations were computed for all study measures. Bivariate correlations or chi-square analyses were used to examine the relationship between patient characteristics (age, gender, race, education, marital status, disease status) and study variables of interest (self-efficacy, pain, FACT-G, MDASI). Differences between paper-pencil collected measures and electronic collection of measures were examined using a dependent t-test. Bivariate correlations were used to examine the relationship between self-efficacy assessments (pain, function, symptom, total) and pain, the FACT-G scales (physical, social/family, emotional, functional), and the MDASI (severity, distress).

RESULTS

Table 1 provides descriptive data on participants in this study. On average, participants were 56.6 years old ($SD=11.43$) and 57% were female. The study sample was 79% White, 16% Black, and 4% of another race. The majority of participants had a college degree (23%) or some graduate school training (21%); 21% reported a high school education or less and 34% reported some college. The majority of patients were married (74%). Thirty-seven percent of participants had breast cancer and 63% had GI cancer, with 48% overall having metastatic disease.

Relationship Between Patient Characteristics and Study Variables of Interest

Age was associated with self-efficacy for pain ($r=-0.22$; $P=0.003$), self-efficacy for other symptoms ($r=-0.19$; $P=0.01$), and the total self-efficacy scale ($r=-0.19$; $P=0.099$). Age was not associated with any other study variables. Education was associated with pain ($r=0.17$; $P=0.02$) and with symptom severity ($r=0.22$; $P=0.005$). Race (coded 0 = nonwhite, 1=white) was associated with the FACT-G emotional subscale ($r=-0.16$; $P=0.03$). Neither gender, marital status, nor cancer stage (metastatic vs. non-metastatic) were significantly associated with any of the study variables of interest.

Relationship Between Self-Efficacy and Study Outcome Measures

As hypothesized, self-efficacy for pain, other symptoms, and functioning at a patient's time of clinic service was associated with their reported outcomes of pain, FACT-G sub-scales (physical, social/family, emotional, functional), and MDASI scales (symptom severity, symptom distress). Table 2 displays the magnitude of these relationships (r 's = 0.23 to 0.64; all $P < 0.01$). Self-efficacy in each domain (as well as the total scale) was significantly associated with each outcome such that patients with lower levels of self-efficacy reported poorer outcomes and functioning. These relationships held when examining the breast and GI samples alone. The pattern of relationships between self-efficacy for pain, function, and other symptoms with patient reported outcomes in patients with cancer highlights two of the main study questions: 1) self-efficacy for pain and symptom management may be a very important PRO to regularly assess as it is significantly associated with pain, functioning, distress, and other symptoms, and 2) in our sample of breast and GI patients, of whom about half had metastatic disease, the significant relationships between self-efficacy and study outcomes held and no differences were observed between these patient groups. This suggests that in patients with cancer, regardless of type or extent of disease, self-efficacy for pain and symptom management may be an important variable to consider.

Differences in PRO Outcomes Assessed Electronically vs. Paper-Pencil Assessment

This study was also designed to answer the question of whether or not the mode of assessment (electronic or paper-pencil) could impact patient responses. We examined differences in response to each study outcome (i.e., self-efficacy for pain, function, symptom, total, pain, the FACT-G scales [physical, social/family, emotional, functional], and the MDASI scales [severity, distress]), in the sample as a whole, and in breast and GI alone. We found no difference in any of the assessment measures when measurement mode was electronic or paper-pencil. Table 3 displays the means, standard deviations, and t-scores between the electronic and paper-pencil outcomes in the full sample.

Electronic Patient Reported Outcomes Satisfaction (ePRO)

Patients rated their satisfaction with use of the electronic PRO system as very satisfied. The average score was 19.9 (with a possible total of 20; $SD = 1.55$). This indicates that patients felt that the tablet computer was easy to read, to use, to navigate, and comfortable to use. Electronic approaches are a practical way to collect PRO data, including self-efficacy data, in the clinic.

DISCUSSION

Self-efficacy for pain and symptom management has emerged as one of the most consistent predictors of patient outcomes across chronic disease populations. The goal of this study was to examine how the PROs of self-efficacy for pain, other symptoms, and function assessed at the time of patients' clinical appointment was associated with pain, symptom severity and distress, and physical and psychosocial functioning in a sample of patients with breast and GI cancer. We found that each domain of self-efficacy (pain, function, other symptoms) as well as the total score was significantly associated with each of our study outcomes. This finding was consistent across patients with varying cancer types and extent

of disease. Patients with breast cancer or GI cancer who reported lower levels of self-efficacy for symptom management reported much higher levels of pain, symptoms severity, symptom distress, and lower levels of physical and psychosocial functioning. Our results highlight our overarching hypothesis that self-efficacy for pain and symptom management may be an important to consider as a standard PRO for patients with cancer.

Self-efficacy for the management of pain and other symptoms may be a particularly worthwhile PRO given that psychosocial interventions have been developed that can improve self-efficacy for the management of pain and other symptoms. Interventions to improve self-efficacy for pain and symptoms management in cancer patients are based on a biopsychosocial model of cancer pain and suggest that several psychological and social factors are important in understanding cancer pain and symptoms. Intervention studies in patients with cancer and other chronic diseases have found that when patients experience improvements in self-efficacy for the management of pain and other symptoms they are also likely to report improvements in pain, other symptoms, and physical and psychological functioning (26–29). In an illustrative study examining a psychosocial intervention for patients with cancer, Porter, et al. (26) found that their coping skills training intervention led to improved self-efficacy for pain, function, and other symptoms in a sample of early stage lung cancer patients. Their coping skills training also led to improvements in pain, physical and functional well-being, lung cancer symptoms, and depressive symptoms. The coping skills intervention in this study included both patients with lung cancer and their caregiver. The intervention taught the dyad symptom management strategies such as progressive muscle relaxation and other relaxation strategies, an activity pacing strategy, problem solving, and communication.

A review examining mechanisms of change in psychosocial and behavioral interventions for patients with cancer identified increases in self-efficacy as one of the most important mechanisms of intervention effects (15). Traditionally, concepts like self-efficacy for pain and symptom management have been assessed within the context of a research trial, but not commonly put to use in clinical practice. PROs as recently conceptualized, however, are often collected at patients' clinical appointments and are meant to inform clinical care and implementation of intervention. Our data suggest that patients who have particularly low levels of self-efficacy for pain and symptom management may be at risk for higher levels of pain and disability. Given this, if self-efficacy for pain and symptom management were routinely collected at the time of clinical service, psychosocial interventions to improve self-efficacy for pain and symptom management, and in turn overall quality of life, could be implemented in a timely fashion.

No statistically significant differences were found in the PROs of self-efficacy for pain and symptom management when collected by electronic technology or paper-pencil mode. We also found that patients were very satisfied with using the tablet computer to complete the battery of PRO measures. In fact, routine PRO data collection is rapidly becoming standard in the cancer clinic, and electronic methods are becoming more prevalent. (30–32)

Assessment of self-efficacy as a standard part of care, appropriately timed, may be a practical guide for care. Short, validated symptom self-efficacy scales have been developed

that could easily be integrated into clinical practice to help healthcare providers identify patients that might benefit from an intervention to increase their self-efficacy. One such instrument is the Self-Efficacy for Managing Chronic Disease 6-item Scale (33). This scale asks participants to rate on a scale from 0 = not at all confident to 10 = totally confident their confidence to keep fatigue, physical discomfort or pain, emotional distress, other symptoms or health problems from interfering with the things they want to do; their confidence that they can do different tasks and activities to manage their health condition; their confidence in doing things other than taking medication to reduce illness impact. This scale is scored by a mean of the 6-items. In clinics where electronic PRO collection is facilitated, these items could be programmed into the current assessment battery; in clinics where paper-pencil is used, these items can be collected and scored quickly.

This study has several limitations. First, participants in this study were at different points in their cancer diagnosis and treatment trajectory, which could influence their report of self-efficacy and symptoms. However, our main interest in this study was examining the relationship between self-efficacy and symptoms, which is more likely to be consistent across these trajectories. We would expect someone with low self-efficacy for pain to have higher pain irrespective of his or her time since diagnosis or treatment experience. Regardless, future work may consider asking these questions in a more homogeneous sample of patients. Second, this study is limited by its cross-sectional design precluding us to comment on causality of the observed relationships; longitudinal work is needed to examine these relationships at various time-points across the cancer spectrum. Third, this study may also be limited in that patients who participated are highly educated, reported relatively low pain scores and may tend to have high overall levels of self-efficacy compared to patients who chose not to participate. Future work should examine these relationships in patients from more diverse educational backgrounds and patients with a wider range of pain and self-efficacy.

To our knowledge, this is the first study to examine self-efficacy for pain and symptom management as a potential important PRO to assess in patients with breast or GI cancer of varying degrees of illness including people with both local and metastatic stages of cancer. Our results suggest that self-efficacy for pain and symptom management may be a beneficial addition to PRO assessment batteries that are increasingly being implemented at the time of clinical service in patients with cancer and other chronic disease. A number of assessment instruments have been developed that can assess self-efficacy for pain and symptom management that could be implemented in clinical practice. Importantly, psychosocial interventions have shown that increases in patients' self-efficacy for pain and symptom management may be an important mechanism leading to increased quality of life outcomes in patients with cancer.

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Reference List

1. Snyder CF, Jensen RE, Segal JB, Wu AW. Patient-reported Outcomes (PROs): Putting the Patient Perspective in Patient-centered Outcomes Research. *Med Care*. 2013; 51(8 Suppl 3):S73–S79. [PubMed: 23774513]
2. Huebner J, Rose C, Geissler J, Gleiter CH, Prott FJ, Muenstedt K, Micke O, Muecke R, Buentzel J, Bottomley A, Hofheinz RD. Integrating cancer patients' perspectives into treatment decisions and treatment evaluation using patient-reported outcomes - a concept paper. *Eur J Cancer Care (Engl)*. 2013; 23(2):173–179. [PubMed: 23889081]
3. Albrecht TA. Striving to improve patient-reported outcomes for cancer survivors as the war wages on. *Ann Oncol*. 2013; 24(9):2204–2205. [PubMed: 23868904]
4. Willke RJ, Burke LB, Erickson P. Measuring treatment impact: a review of patient-reported outcomes and other efficacy endpoints in approved product labels. *Control Clin Trials*. 2004; 25(6): 535–552. [PubMed: 15588741]
5. Cleeland CS, Sloan JA. Assessing the Symptoms of Cancer Using Patient-Reported Outcomes (ASCPRO): searching for standards. *J Pain Symptom Manage*. 2010; 39(6):1077–1085. [PubMed: 20538189]
6. Gwaltney CJ, Shields AL, Shiffman S. Equivalence of electronic and paper-and-pencil administration of patient-reported outcome measures: a meta-analytic review. *Value Health*. 2008; 11(2):322–333. [PubMed: 18380645]
7. Turk DC, Dworkin RH. What should be the core outcomes in chronic pain clinical trials? *Arthritis Res Ther*. 2004; 6(4):151–154. [PubMed: 15225358]
8. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns*. 2002; 48(2):177–187. [PubMed: 12401421]
9. Jerant A, Franks P, Kravitz RL. Associations between pain control self-efficacy, self-efficacy for communicating with physicians, and subsequent pain severity among cancer patients. *Patient Educ Couns*. 2011; 85(2):275–280. [PubMed: 21159483]
10. Mystakidou K, Parpa E, Tsilika E, Gogou P, Panagiotou I, Galanos A, Kouvaris I, Gouliamos A. Self-efficacy, depression, and physical distress in males and females with cancer. *Am J Hosp Palliat Care*. 2010; 27(8):518–525. [PubMed: 20834031]
11. Mystakidou K, Tsilika E, Parpa E, Gogou P, Theodorakis P, Vlahos L. Self-efficacy beliefs and levels of anxiety in advanced cancer patients. *Eur J Cancer Care (Engl)*. 2010; 19(2):205–211. [PubMed: 19659666]
12. Porter LS, Keefe FJ, Garst J, McBride CM, Baucom D. Self-efficacy for managing pain, symptoms, and function in patients with lung cancer and their informal caregivers: associations with symptoms and distress. *Pain*. 2008; 137(2):306–315. [PubMed: 17942229]
13. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977; 84(2):191–215. [PubMed: 847061]
14. Bandura, A. Self-efficacy: the exercise of control. New York: W.H. Freeman; 1997. p. 604ix
15. Stanton AL, Luecken LJ, Mackinnon DP, Thompson EH. Mechanisms in Psychosocial Interventions for Adults Living With Cancer: Opportunity for Integration of Theory, Research, and Practice. *J Consult Clin Psychol*. 2012; 81(2):318–335. [PubMed: 22663900]
16. Abernethy AP, Herndon JE 2nd, Wheeler JL, Day JM, Hood L, Patwardhan M, Shaw H, Lyerly HK. Feasibility and acceptability to patients of a longitudinal system for evaluating cancer-related symptoms and quality of life: pilot study of an e/Tablet data-collection system in academic oncology. *J Pain Symptom Manage*. 2009; 37(6):1027–1038. [PubMed: 19394793]

17. Abernethy AP, Herndon JE 2nd, Wheeler JL, Patwardhan M, Shaw H, Lysterly HK, Weinfurt K. Improving health care efficiency and quality using tablet personal computers to collect research-quality, patient-reported data. *Health Serv Res.* 2008; 43(6):1975–1991. [PubMed: 18761678]
18. Reese JB, Shelby RA, Keefe FJ, Porter LS, Abernethy AP. Sexual concerns in cancer patients: a comparison of GI and breast cancer patients. *Support Care Cancer.* 2010; 18(9):1179–1189. [PubMed: 19777269]
19. Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. *Arthritis Rheum.* 1989; 32(1):37–44. [PubMed: 2912463]
20. Anderson KO, Dowds BN, Pelletz RE, Edwards WT, Peeters-Asdourian C. Development and initial validation of a scale to measure self-efficacy beliefs in patients with chronic pain. *Pain.* 1995; 63(1):77–84. [PubMed: 8577493]
21. Porter LS, Keefe FJ, McBride CM, Pollak K, Fish L, Garst J. Perceptions of patients' self-efficacy for managing pain and lung cancer symptoms: correspondence between patients and family caregivers. *Pain.* 2002; 98(1-2):169–178. [PubMed: 12098629]
22. Campbell LC, Keefe FJ, McKee DC, Edwards CL, Herman SH, Johnson LE, Colvin OM, McBride CM, Donattuci CF. Prostate cancer in African Americans: relationship of patient and partner self-efficacy to quality of life. *J Pain Symptom Manage.* 2004; 28(5):433–444. [PubMed: 15504620]
23. Cleeland CS, Mendoza TR, Wang XS, Chou C, Harle MT, Morrissey M, Engstrom MC. Assessing symptom distress in cancer patients: the M.D. Anderson Symptom Inventory. *Cancer.* 2000; 89(7):1634–1646. [PubMed: 11013380]
24. Jensen MP. The validity and reliability of pain measures in adults with cancer. *The journal of pain : official journal of the American Pain Society.* 2003; 4(1):2–21. [PubMed: 14622723]
25. Cella, D. Manual of the Functional Assessment of Chronic Illness Therapy (FACIT) Measurement System, Version 4.1. Evanston, IL: Center on Outcomes, Research, & Education; 2004.
26. Porter LS, Keefe FJ, Garst J, Baucom DH, McBride CM, McKee DC, Sutton L, Carson K, Knowles V, Rumble M, Scipio C. Caregiver-Assisted Coping Skills Training for Lung Cancer: Results of a Randomized Clinical Trial. *J Pain Symptom Manage.* 2010
27. Byma EA, Given BA, Given CW, You M. The effects of mastery on pain and fatigue resolution. *Oncol Nurs Forum.* 2009; 36(5):544–552. [PubMed: 19726394]
28. Kurtz ME, Kurtz JC, Given CW, Given BA. Patient optimism and mastery-do they play a role in cancer patients' management of pain and fatigue? *J Pain Symptom Manage.* 2008; 36(1):1–10. [PubMed: 18358691]
29. Somers TJ, Wren AA, Shelby RA. The context of pain in arthritis: self-efficacy for managing pain and other symptoms. *Curr Pain Headache Rep.* 2012; 16(6):502–508. [PubMed: 23054977]
30. Basch E, Abernethy AP. Supporting clinical practice decisions with real-time patient-reported outcomes. *J Clin Oncol.* 2011; 29(8):954–956. [PubMed: 21282536]
31. Basch E, Abernethy AP, Mullins CD, Reeve BB, Smith ML, Coons SJ, Sloan J, Wenzel K, Chauhan C, Eppard W, Frank ES, Lipscomb J, Raymond SA, Spencer M, Tunis S. Recommendations for incorporating patient-reported outcomes into clinical comparative effectiveness research in adult oncology. *J Clin Oncol.* 2012; 30(34):4249–4255. [PubMed: 23071244]
32. Jaggi R, Chiang A, Polite B, Medeiros B, McNiff K, Abernethy A, Zon R, Loehrer P. Qualitative analysis of practicing oncologists attitudes and experiences regarding collection of patient-reported outcomes. *J Oncol Pract.* 2012
33. Lorig KR, Sobel DS, Ritter PL, Laurent D, Hobbs M. Effect of a self-management program on patients with chronic disease. *Eff Clin Pract.* 2001; 4(6):256–262. [PubMed: 11769298]

Highlights

- We examined PROs of self-efficacy for pain and other symptoms in cancer patients.
- Patients with lower self-efficacy reported poorer outcomes and functioning overall.
- Self-efficacy for pain/symptom management is important to assess in cancer.
- Tablets are accepted by patients and practical for collecting PRO data in clinics.

Table 1

Summary of Demographic and Medical Data

	Total (N=178)	Breast (n=65)	GI (n=113)
Age (years)	56.6 (11.43)	54.6 (11.95)	57.8 (11.02)
Female % (n)	57% (102)	100% (65)	33% (37)
Race % (n)			
White	79% (141)	78% (51)	80% (90)
Black	16% (29)	18% (12)	15% (17)
Other	4% (8)	3% (2)	5% (6)
Education % (n)			
High school	21% (38)	14% (9)	26% (29)
Some college	34% (61)	35% (23)	34% (38)
College degree	23% (41)	25% (16)	22% (25)
Graduate school	21% (38)	26% (17)	19% (21)
Married/Partnered % (n)	74% (132)	68% (44)	78% (88)
Metastatic disease % (n)	48% (85)	60% (39)	41% (46)

Table 2

Correlations between Electronic PROs of Self-efficacy and Study Variables of Interest

Total Sample (N=178)										Breast (n=65)				GI (n=113)				
<u>Self-Efficacy</u>										<u>Self-Efficacy</u>				<u>Self-Efficacy</u>				
Pain Function Other Total										Pain Function Other Total				Pain Function Other Total				
Pain										-.31	-.29	-.27	-.30	-.26*	-.37	-.24*	-.26	-.31
FACT-G																		
Physical										.41	.60	.48	.50	.49	.77	.61	.48	.42
Social/Family										.23	.26	.26	.26		.46	.33	.25*	.24*
Emotional										.23	.35	.39	.33	.41	.58	.53	.22*	.23*
Functional										.56	.64	.60	.63	.54	.72	.64	.57	.62
MDASI																		
Symptom Severity										-.45	-.49	-.53	-.51	-.51	-.66	-.63	-.42	-.45
Symptom Distress										-.36	-.58	-.43	-.46	-.47	-.76	-.55	-.31	-.38

Note. empty cells are n.s.;

* P < 0.05;

all others P < 0.001.

Table 3
Means and Standard Deviations of Paper and Electronic PRO scores (N=178)

	Paper		Electronic		t	P
	M	SD	M	SD		
Self-Efficacy						
Pain	65.85	20.40	62.97	21.62	1.21	.23
Function	70.37	22.20	66.53	24.27	1.47	.14
Other	69.25	20.08	65.99	21.47	1.38	.16
Total	67.72	19.51	64.56	20.66	1.37	.16
Pain	2.34	2.66	2.28	2.54	.20	.84
FACT-G						
Physical	20.48	5.76	20.71	5.66	-.43	.67
Social/Family	23.05	4.71	22.69	4.98	.74	.46
Emotional	18.50	4.40	18.82	4.47	-.74	.46
Functional	18.30	6.00	17.82	5.53	.82	.41
MDASI						
Symptom Severity	1.71	1.37	1.74	1.43	.97	.33
Symptom Distress	2.09	2.13	2.03	2.12	1.40	.16