Published in final edited form as:

Psychooncology. 2014 September ; 23(9): 981–988. doi:10.1002/pon.3506.

Factors associated with delayed patient appraisal of colorectal cancer symptoms

Laura Siminoff¹, Maria Thomson^{2,*}, and Levent Dumenci²

¹College Health Professions & Social Work, Jones Hall 302, Philadelphia, PA, USA

²Virginia Commonwealth University, Social and Behavioral Health, Richmond, VA, USA

Abstract

Objective—To evaluate the relationship between symptoms, financial and cognitive barriers with patient delays in seeking evaluation of symptoms.

Methods—Data were collected from 252 colorectal cancer patients from academic and community oncology practices in Virginia and Ohio. We used a cross-sectional, mixed methods design collected data through patient interviews and medical record reviews. Structural equation modeling (SEM) tested the hypothesized relationships between symptoms, financial and cognitive barriers and patient care seeking delays.

Results—In bivariate analyses, patients who reported a financial barrier to accessing health care ($t(246) = -2.6, p < 0.01$) were more likely to have greater care-seeking delays. Model testing revealed that experiencing cognitive barriers was a significant, positive, direct predictor of appraisal delay ($0.35; p < 0.01$). Indirect pathways from symptoms ($0.07; p < 0.05$) and financial barriers ($0.09; p < 0.05$) to appraisal delay via cognitive barriers were significant.

Conclusions—Patient interpretations of symptoms were influenced by financial barriers. Conceptualizing financial barriers as a component of the symptom appraisal process is conceptually different from viewing it as only a structural barrier preventing healthcare access.

Introduction

Colorectal cancer (CRC) is the second leading cause of cancer death in the USA. It is estimated that 50,830 Americans will die from CRC in 2013 [1] despite research suggesting that screening using Fecal Occult Blood Testing alone would prevent one in six CRC deaths [2]. The US Preventive Services Task Force recommends screening for adults beginning at age 50 (US Preventive Services Task Force, 2008). However, in 2005, only 59% of adults 50+ years old reported having a Fecal Occult Blood Testing in the previous 2 years or ever having a colorectal endoscopy (National Cancer Institute, 2010). Moreover, incidence of CRC in younger adults (i.e., those who are ineligible for routine screening) is increasing [3] with approximately 6% of all CRC cancers occurring in adults under 50 years old [4]. Delayed diagnosis of CRC is significantly and negatively associated with patient outcomes [5,6]; therefore, understanding the factors contributing to delay is critical.

*Correspondence to: Social and Behavioral Health, Virginia Commonwealth University, Richmond, VA, USA. mthomson2@vcu.edu.

Diagnostic delay of CRC is multifaceted, with factors contributing at the patient, provider and system levels. Prior to entering the healthcare system, patients must first recognize and interpret CRC symptoms as requiring medical attention. When this fails to happen, it is referred to as appraisal delay (AD). AD is defined as the period from which a patient first notices symptoms to the initial disclosure of symptoms to a healthcare provider (HCP). To understand this process, we used the Transactional Model of Stress and Coping (TMSC) [7] as a conceptual model, as an individual coping response to CRC symptoms may influence the length of symptom AD.

The TMSC suggests that coping responses to an external stressor (i.e., CRC symptoms) is a function of the (a) threat appraisal and (b) resources available to address the threat. How an individual responds to a stressful situation is influenced by their evaluation of the seriousness of the threat as well as their ability to address the cause. Disengaging/avoidant coping behaviors are used when a threat is perceived as extreme [7]. Many of the factors that have been found to influence patient symptom appraisal can be considered as disengaging/avoidant coping behaviors (e.g., minimizing [6,8], cognitive avoidance and denial) and can negatively influence behavioral outcomes [9]. Following the TMSC model, we suggest that combination of CRC symptoms and few resources available to address these symptoms may be viewed by some as an extreme threat to one's health.

Financial and insurance barriers [6] also influence symptom AD. Financial barriers are typically identified as having a direct effect on healthcare use. There has been less focus on the role of financial barriers in patient symptom interpretation despite the necessity for adequate financial resources to obtain medical care. For example, Becker found that financial concerns stopped uninsured people from seeking care unless they had severe pain or believed that they would die [10]. In a study of CRC patients, 18% reported experiencing untreated rectal bleeding because they did not consider the symptom serious [11]. To our knowledge, few have explored whether the presence of financial barriers inform patient symptom evaluations. We sought to evaluate the direct and indirect relationships among CRC symptoms, financial barriers and coping responses hypothesized to influence patient symptom AD. Guided by the TMSC, we hypothesized that the relationships between (a) CRC symptoms and perceived economic barriers and (b) AD would be mediated by a set of disengaging/avoidant coping behaviors that we have termed 'cognitive barriers'.

Methods

Participants

The study adopted an observational research design. Individuals newly diagnosed with CRC were recruited from five academic and community oncology practices in Virginia and Ohio. To be included, participants had to be diagnosed with stage I–IV CRC within 6 months preceding the interview. They also had to have experienced symptoms prior to consulting an HCP. The exclusion criteria were diagnosis as a result of routine screening, a cancer diagnosis in previous 5 years and being too ill to participate or provide informed consent. Participants were identified through systematic searches of new patient lists and oncology registries at each participating institution. Potential eligibility was evaluated using prospective chart reviews. After obtaining permission from the patient's physician, a

confirmatory screening interview was completed by trained, graduate level research assistants. A total of 303 individuals were screened as eligible to participate. Of these, 256 consented (84.5%), 39 refused (12.9%) and 8 could not be re-contacted (2.6%). The final sample size was 252 (an additional four were excluded after consenting for never completing an interview).

Semi-structured interviews

Participants who consented to the study participated in a 2-h semi-structured interview format, which utilized the same set of open-ended questions and standardized probes. The semi-structured format was chosen to ensure that study specific information was gathered while allowing for unanticipated topics to be introduced and explored by patients. Interviews focused on patient (a) sociodemographic and psychological factors, (b) symptom recognition and appraisal, and (c) communication with HCPs, friends and family. To aid accurate recall of events leading to their cancer diagnosis, several cognitive interviewing techniques (e.g., think aloud, anchor points and chronological recall) were adapted into the interview format [12–14]. Prior to beginning the interview, patients were asked to think aloud in response to the interview questions [14]. Interviews then began with a series of ‘anchor point’ questions designed to encourage patients to recall major life events in the previous 6 months [12]. These questions (e.g., ‘Did you have a birthday in the last 6 months?’), helped to contextualize their experience of symptoms in the timeframe of other major life events. Chronological emphasis has also been shown to aid recall of past events [13]. The interview guide was designed to elicit the patient's chronological story of their experience of symptoms and subsequent care-seeking activities in response to these symptoms. Standardized probes were used as memory cues [14]. Patients were interviewed an average of 4 months after diagnosis. Interviews were audio recorded and transcribed verbatim.

Chart reviews

A review of all relevant medical records leading to a diagnosis of CRC was used to verify the dates of HCP visits, reported symptoms and diagnostic testing. A chart data abstraction sheet was developed to ensure standardization. All relevant Institutional Review Boards approved this study.

Data coding

Trained research assistants coded verbatim transcripts by using the study code manual. The code manual was developed through iterative coding of initial interviews that continued until saturation was reached. The interview data were coded into binary and ordinal variables using standard methods for qualitative data transformation [15]. Double coding was completed on 20% of the interviews. Coding discrepancies were discussed during weekly meetings until consensus was reached. These methods allow complete capture of all data elements reliably and have been used successfully in many studies [16–19]. Patient self-report data of the first physician encounter was verified through medical chart review.

Measures

Demographic variables—Patients were asked to report their age, income, education, gender, race, marital status and health insurance status at the time of the interview. Chart reviews provided cancer stage at diagnosis and provided verification of patient reports.

Appraisal delay—We used a well-accepted definition of AD, the period from when the patient first noticed CRC symptoms to when symptoms were first reported to an HCP[20–22]. We calculated AD as a continuous score in months. Chart review verified date of first visit to a HCP.

Colorectal cancer symptoms—Patients were first asked to describe the symptoms they experienced prior to seeking medical care. They were then given a list of 10 common CRC symptoms identified through extensive literature review [23] and asked whether they had experienced any from the list. We assessed 10 cardinal symptoms including change in bowel habits (diarrhea and/or constipation), rectal bleeding, weight loss, cramps, bloating, pain, heart-burn, indigestion, gas and tiredness. In addition, we asked patients to report any other perceived symptoms. Responses to the prompted symptom reports were summed to create a final CRC symptom count variable with higher counts indicating more symptoms. All patient-reported symptoms were compared with the total number of symptoms reported in the medical charts. Examining all symptoms we found that medical charts contained more symptoms (mean = 12.9 symptoms) compared with the patient reports in the interview (mean = 5.5 symptoms). The current analysis is limited to the 10 a priori identified symptoms associated with CRC.

Financial barriers—Financial barriers were comprehensively assessed from the interview transcripts and from the medical records documenting the patient's health insurance status. Using a structured checklist, we coded the presence or absence of financial barriers to timely health care-seeking as a dichotomous variable. Examples of financial barriers include patients waiting to seek care until qualifying for Medicare at age 65, waiting until they could afford health insurance premiums, and difficulties applying for Medicaid. Some patients discussed delaying physician office visits or declining diagnostic testing, such as colonoscopy, due to high co-pay costs. Regardless of insurance status, even employed patients often delayed care seeking due to concerns about interference with work such as loss of pay or fear of employers deciding they were too ill to perform their duties.

Cognitive barriers—Cognitive barriers were conceptualized as latent variables that represented disengaging/avoidant coping behaviors.

The four variables that were used to create our latent variable were fear of tests, embarrassment seeking care, patients' belief that they were too young to have cancer, and an expressed belief that the symptoms were not serious. These four binary indicator variables were chosen because they have been previously identified in the literature as barriers to healthcare seeking and were affirmed through patient interviews [24]. The presence or absence of each indicator variable was coded as dichotomous based on the transcript and guided by a structured checklist.

Statistical analysis

Bivariate analyses

t-tests and Pearson correlation analysis were used to examine the bivariate associations between AD and sample demographic variables, perceived financial barriers to obtaining health care, cognitive barriers and symptoms. Due to non-normality, the AD variable was log transformed.

Mediation model

Structural equation modeling was performed to test the direct and indirect relationships between the variables financial barriers, CRC symptoms, cognitive barriers and AD. Our a priori hypothesis was that the latent variable cognitive barriers would represent disengagement/avoidance coping behaviors, which we identified as follows: (1) fear of tests, (2) symptom embarrassment, (3) being too young for cancer, and (4) not taking symptoms seriously. The latent variable, cognitive barriers, was tested to see if it mediated the effect of financial barriers and CRC symptoms on AD. On the basis of the TMSC, we hypothesized that in the presence of financial barriers and more CRC symptoms, cognitive barriers would mediate length of patient AD. The full mediation model was tested. That is, direct relationships between both financial barriers and CRC symptoms with AD were the free parameters of the SEM.

A second model was run to adjust for the covariates of age, gender, race and education. The diagonally weighted least squares, an asymptotically distribution-free method, were used to estimate both models to account for categorical outcome variable distributions. Model fit was evaluated using the χ^2 goodness-of-fit statistic, the Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI) of 0.9 or greater, and the root mean square error of approximation (RMSEA) of less than 0.05. Using Mplus (6.11), we estimated all model parameters simultaneously and made no model modification [25].

Results

Sample characteristics

The sample consisted of 252 CRC patients. Table 1 displays demographic variables. The average patient age was 58 years (standard deviation (SD) = 12.2; ranging from 25–94 years), 52.4% were male, and 49.7% had more than a high school education. Many (65.1%) patients were diagnosed with late stage cancer (stages 3 and 4). CRC symptom scores ranged from 0 to 10 symptoms with a mean of 2.6 symptoms (SD = 1.6). AD ranged from 0–59 months with a median of 2.3 months. Patients sought care predominantly from their primary care physician (50.8%, *n* = 123), or the hospital emergency room (14.5%; *n* = 35). One quarter (26.4%, *n* = 64) visited >1 HCP about their initial symptoms. Seventy-two (28.6%) patients reported financial barriers to accessing health care.

Cognitive barriers

Cognitive barriers were reported by 52% of patients; 73 (29%) reported experiencing only one of the four barriers. These measures are described in the following.

1. *Fear of tests.* Patients described fear of tests as the reason for delayed health care-seeking ($n = 61$; 24.3%). Stories about negative side effects, pain and death associated with diagnostic CRC tests caused some patients to procrastinate care seeking.
2. *Embarrassment around seeking care.* Patients described feeling embarrassed and hesitant about disclosing their CRC symptoms to an HCP ($n = 30$; 11.9%). This was particularly true if the patient was experiencing change in bowel habits (diarrhea or constipation) or rectal bleeding.
3. Patients' belief that they were too young to have cancer. Some patients interpreted their symptoms as indicators of a condition other than cancer, citing their age as a rationale for excluding the possibility of CRC ($n = 29$; 11.6%). Patients who believed that CRC was primarily a concern for older adults did not feel an urgent need to consult an HCP.
4. *Not realizing the seriousness of their symptoms.* Many ($n = 100$; 39.7%) minimized their symptoms and attributed them to less serious causes. For example, patients reported attributing symptoms to the normal aging processes, diet, stress, ulcers or hemorrhoids.

Bivariate associations of factors and appraisal delay

The following barriers to care seeking were significantly and positively associated with AD: Fear of receiving diagnostic tests (7 vs. 4 months of AD; $p < 0.01$), feeling too embarrassed to seek care (10 vs. 4 months AD, $p = 0.01$), patient belief that she/he was too young to have cancer (7 vs. 4 months of AD, $p = 0.05$), and belief that the symptoms experienced were not serious (6 vs. 4 months AD, $p < 0.01$). Patients who reported a financial barrier to accessing health care ($t(246) = -2.6$, $p < 0.01$) were more likely to have increased symptom AD. No associations were found between AD and the demographic variables of age, income, education, employment, race, gender and marital status, cancer stage at diagnosis, state of residence or number of CRC symptoms.

Structural equation model

Model fit—The mediation model adjusted for the demographic variables resulted in good fit to the data: ($\chi^2(27) = 32.92$, $p = 0.19$; CFI = 0.92; TLI = 0.86; RMSEA = 0.03). However, none of the covariate effects were significant ($p > 0.10$). We subsequently eliminated the covariate-adjusted mediation model from further consideration.

The mediation model (without adjustment for the covariates of age, gender, race and education) resulted in a good fit ($\chi^2(11) = 13.41$, $p = 0.26$; CFI = 0.98; TLI = 0.96; RMSEA = 0.03). Table 2 displays the variance/covariance matrix and variable correlations. The mediation model, including standardized parameter estimates, is depicted in Figure 1. The measurement portion of the model consisted of four indicator variables, all of which had large standardized factor loadings (ranging from 0.54 to 0.76) and all were significant ($p < 0.01$).

In our model, the experience of symptoms and financial barriers were weakly correlated with AD directly. Rather, how symptoms (0.21; $p < 0.01$) and financial barriers (0.27; $p < 0.05$) were subjectively experienced by patients were mediated through a set of cognitive barriers that were significantly and directly associated with greater AD (0.35; $p < 0.01$). The direct relationships between AD and both symptoms and financial barriers were not significant ($p < 0.10$), indicating that the effects of CRC symptoms and financial barriers on AD are completely mediated by the cognitive barriers. The model explains 13% of the variability in AD. As an example, Box 1 displays an actual patient story illustrating the interplay of the variables as suggested by our model.

Discussion

This study models factors hypothesized to be barriers to patient health care-seeking for CRC symptoms. Our model supported the hypothesis that cognitive barriers directly influence patient AD. Although a significant bivariate relationship between financial barriers and AD was identified, it became insignificant in the multivariate model. In the model, the presence of financial barriers was mediated through its influence on cognitive barriers.

These findings extend our understanding of why and how patients seemingly ignore serious symptoms, which hamper physician ability to provide curative therapy.

Individuals who experience economic barriers such as lower income or lack of health insurance experience greater disparities in healthcare access and health outcomes [26,27]. Economic barriers are typically thought of as being secondary to the patient's decision to seek medical care; the assumption being that the financial barrier alone is inhibiting access to care. In contrast, our results suggest that perceived financial barriers are related indirectly to AD through their potential influence on the patient's symptom interpretation. In this study, there is a suggested influence of perceived financial barriers on perceptions of symptom seriousness, importance and attributions. When patients believe they cannot afford to seek medical care, they may be more likely to downplay the seriousness of their symptoms. Cognitive and emotional barriers influence health care-seeking. For example, embarrassment, lack of confidence, fear of medical tests and symptom minimization are all associated with delayed medical care-seeking [28,29]. Thus, the presence of these cognitive barriers may help to mask the severity or importance of symptoms from the patient, which further decreases the likelihood that the patient will take appropriate action about his/her symptoms. Facione *et al.* [30] suggested a similar mechanism to explain the positive correlation between asymptomatic women who reported perceived barriers to medical care and greater likelihood to delay care seeking for breast cancer symptoms. This behavior may be even more pronounced when symptoms are not widely recognized to signal cancer or can be easily confused with more common benign diseases. Individuals who face financial barriers to accessing medical care (real or perceived) may engage in these types of cognitive behaviors readily because they are aware that seeking medical care will be cost prohibitive. It has been shown that individuals who do not have health insurance co-pays use up to 30% more healthcare services as compared with those who have out-of-pocket expenses [31]. While some see this as a useful feature of high co-payments, this study suggests that high co-payments may actually deter patients from seeking critical early treatment. Others have

suggested similar dampening effects of high co-payments for preventive screening [32]. According to our model, individuals who perceived financial barriers to addressing CRC symptoms were more likely to use disengagement/avoidance strategies, as represented by the variable of cognitive barriers. Therefore, in addition to patient's problems posing a structural obstacle to healthcare access, the perception of financial barriers also act as cognitive barriers through misattribution of their initial symptoms, which in turn delays contact with the healthcare system. Consistent with the TMS [7,9], these individuals are therefore doubly disadvantaged. Others have also suggested the interplay between cognitive and financial barriers to healthcare access. Carrillo and colleagues recently published the Health Care Access Barriers Model that describes three primary barriers to health care-seeking: structural barriers, financial barriers and cognitive barriers [33]. In their model, they propose that each of these three barriers can influence the others. Our analysis provides empirical support for these relationships.

The presence of financial barriers may also be associated with expectations of facing discrimination or stigma from the medical establishment. Perceived discrimination and stigma are negatively correlated with health service use [34]. Families eligible for public health insurance coverage cite 'risk of stigmatization' as a reason for not enrolling in the program [35]. Anderson suggests that perceptions about whether or not medical care is required are primarily a social construct influenced by social structure and health beliefs [36]. Expectations of discrimination or stigma due to economic circumstances may dampen perceptions of need, as evidenced by the increased use of disengagement/avoidance strategies. Although we did not measure perceptions of discrimination or stigma, these may be important factors to consider in future work.

Some cautionary notes are in order. The modest sample size restricts the ability to model other variables that might have influenced symptom recognition and interpretation. Social support factors such as living alone, having supportive family/friends and access to transportation have been shown to attenuate relationships between low income and AD among breast cancer patients [37]. Many patients in this study were served by a safety net health system. This may partially explain why direct effects on AD were not found in the multivariate model. Nonetheless, this model shows an indirect relationship between financial barriers and AD. Examinations of financial barriers are typically restricted to tests of the direct effects on health care-seeking or use. The current results suggest a more nuanced influence highlighting the mediational role that cognitive barriers play. Another limitation is the retrospective collection of patient symptom experiences, frequently believed to result in over-reporting of symptoms. However, comparison of patient symptom reports with the medical charts revealed a greater number of symptoms recorded in the physician charts and reliability of patient symptoms self-report have been demonstrated in the literature [38,39]. Therefore, we are confident that recall bias due to patients already knowing their cancer diagnosis at the time of interview likely did not play a significant role in patient symptom reports.

This study adds to the literature by simultaneously examining cognitive and economic barriers as part of the context in which the patient interprets their symptoms. Instead of

viewing economic barriers solely as an access issue, our results suggest that economic barriers also influence the process of symptom interpretation and decision-making.

References

1. National Cancer Institute. Colon and rectal cancer. 2013.
2. Hewitson P, Glasziou PP, Irwig L, Towler B, Watson E. Screening for colorectal cancer using the faecal occult blood test, Hemoccult. CDSR. 2007; (1):CD001216. [PubMed: 17253456]
3. Ganapathi S, et al. Colorectal cancer in the young: trends, characteristics and outcome. Int J Colorectal Dis Clin. 2011; 26(7):927–934.
4. O'Connell JB, et al. Colorectal cancer in the young. Am J Surg. 2004; 187(3):343–348. [PubMed: 15006562]
5. Richards MA, et al. Influence of delay on survival in patients with breast cancer: a systematic review. Lancet. 1999; 353(9159):1119–1126. [PubMed: 10209974]
6. Langenbach MR, et al. Delay in treatment of colorectal cancer: multifactorial problem. World J Surg. 2003; 27(3):304–308. [PubMed: 12607056]
7. Lazarus, RS.; Folkman, S. Stress, Appraisal and Coping. Springer; New York: 1984.
8. Rosen AB, Tsai JS, Downs SM. Variations in risk attitude across race, gender, and education. Med Decis Making: Intern J Soc Med Decis Making. 2003; 23(6):511–517.
9. Wenzel, L.; Glanz, K.; Lerman, C. Stress, coping, and health behavior. 2002.
10. Becker G. Deadly inequality in the health care “safety net”: uninsured ethnic minorities’ struggle to live with life-threatening illnesses. MAQ. 2004; 18(2):258–275.
11. Courtney RJ, et al. The current state of medical advice-seeking behaviour for symptoms of colorectal cancer: determinants of failure and delay in medical consultation. Colorectal Disease. 2012
12. Barsky AJ. Forgetting, fabricating, and telescoping: the instability of the medical history. Arch Intern Med. 2002; 162(9):981–984. [PubMed: 11996606]
13. Maunsell E, et al. Breast cancer survivors accurately reported key treatment and prognostic characteristics. J Clin Epidemiol. 2005; 58(4):364–369. [PubMed: 15862722]
14. Friedenreich CM, Courneya KS, Bryant HE. The lifetime total physical activity questionnaire: development and reliability. Med Sci Sports Exerc. 1998; 30(2):266–274. [PubMed: 9502356]
15. Driscoll DL, et al. Merging qualitative and quantitative data in mixed methods research: how to and why not. Ecol Environ Anthropol. 2007; 3(1):19–28.
16. Zhang AY, Siminoff LA. Silence and cancer: why do families and patients fail to communicate? J Health Comm. 2003; 15(4):415–429.
17. Siminoff LA, et al. Doctor, what's wrong with me? Factors that delay the diagnosis of colorectal cancer. Patient Educ Couns. 2011; 84(3):352–358.
18. Siminoff LA, et al. Referral of breast cancer patients to medical oncologists after initial surgical management. Med care. 2000; 38(7):696–704. [PubMed: 10901353]
19. Miller, WL. Vol. 3. Sage Publications, Inc; Thousand Oaks, CA, USA: 1999. Doing Qualitative Research..
20. Terhaar sive Droste JS, et al. Does delay in diagnosing colorectal cancer in symptomatic patients affect tumor stage and survival? BMC Cancer. 2010; 10:332. [PubMed: 20584274]
21. Mitchell E, et al. Influences on pre-hospital delay in the diagnosis of colorectal cancer: a systematic review. Br J Canc. 2008; 98(1):60–70.
22. Macdonald S, et al. Systematic review of factors influencing patient and practitioner delay in diagnosis of upper gastrointestinal cancer. Br J Canc. 2006; 94(9):1272–1280.
23. Hamilton W, et al. The risk of colorectal cancer with symptoms at different ages and between the sexes: a case-control study. BMC med. 2009; 7:17. [PubMed: 19374736]
24. Dracup K, Moser DK. Beyond sociodemographics: factors influencing the decision to seek treatment for symptoms of acute myocardial infarction. Heart & lung: J Crit Care. 1997; 26(4): 253–262.

25. Muthen, LK.; Muthen, BO. M Plus Version 6.1.1. Muthén & Muthén; Los Angeles, CA, USA: 2010.
26. Devoe JE, et al. Insurance + access not equal to health care: typology of barriers to health care access for low-income families. *Ann Fam Med*. 2007; 5(6):511–518. [PubMed: 18025488]
27. Smolderen KG, et al. Health care insurance, financial concerns in accessing care, and delays to hospital presentation in acute myocardial infarction. *JAMA*. 2010; 303(14):1392–1400. [PubMed: 20388895]
28. Simon AE, et al. Patient delay in presentation of possible cancer symptoms: the contribution of knowledge and attitudes in a population sample from the United Kingdom. *Canc Epidemiol Biomarkers Prev: Pub Am Assoc Canc Res*, cosponsored by the ASPO. 2010; 19(9):2272–2277.
29. Cockburn J, et al. Delay in seeking advice for symptoms that potentially indicate bowel cancer. *American journal of health behavior*. 2003; 27(4):401–407. [PubMed: 12882434]
30. Facione NC, et al. The self-reported likelihood of patient delay in breast cancer: new thoughts for early detection. *Prev Med*. 2002; 34(4):397–407. [PubMed: 11914045]
31. Newhouse JP. Free for all? Lessons from the RAND Health Insurance Experiment. 1993
32. Jones RM, et al. Patient-reported barriers to colorectal cancer screening: a mixed-methods analysis. *Am J Prev Med*. 2010; 38(5):508–516. [PubMed: 20409499]
33. Carrillo JE, et al. Defining and targeting health care access barriers. *J Health Care Poor Underserved*. 2011; 22(2):562–575. [PubMed: 21551934]
34. Klassen AC, et al. Relationship between patients' perceptions of disadvantage and discrimination and listing for kidney transplantation. *Am J Public Health*. 2002; 92(5):811–817. [PubMed: 11988452]
35. DeVoe JE, et al. Why do some eligible families forego public insurance for their children? A qualitative analysis. *Fam Med*. 2012; 44(1):39–46. [PubMed: 22241340]
36. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav*. 1995; 36(1):1–10. [PubMed: 7738325]
37. Park AN, et al. Mediating factors in the relationship between income and mammography use in low-income insured women. *J Wom Health*. 2008; 17(8):1371–1378.
38. Adelstein BA, et al. A self administered reliable questionnaire to assess lower bowel symptoms. *BMC Gastroenterol*. 2008; 8:8. DOI:10.1186/1471-230X-8-8.
39. Wang XS, et al. Validation and application of a module of the M.D. Anderson Symptom Inventory for measuring multiple symptoms in patients with gastrointestinal cancer (the MDASI-GI). *Cancer*. 2010; 116(8):2053–2063. [PubMed: 20166216]

Implications for practice

These findings extend our understanding of why and how patients seemingly ignore serious symptoms, which hamper physician ability to provide curative therapy. In addition to uninsured patients, this may have important implications for the treatment and care of those who are underinsured.

Box 1. A Real Patient Example Illustrating the Interplay of Model Variables

Mr. C, a 51 year old married man in the construction business with minimal health insurance, delays seeking treatment for worsening symptoms that included bowel changes, mucous and blood in his stool, pain and urgency, despite having a significant family history of cancer and a father who died of CRC. As Mr. C's history unfolds, we are presented with a patient who tried to 'explain away' his symptoms through dietary changes, finding alternative diagnoses (such as hemorrhoids) and whose fear of being debilitated by treatment and having his financial resources depleted, further motivated him to find reasons other than cancer to explain his condition.

Mr C. was experiencing increased urgency and frequency of bowel movements, stomach pain and noticed blood in his stool. Despite a strong family history of colorectal cancer (father died of CRC and sister had benign polyps removed) and some suspicion about his symptoms, this patient delayed seeking medical attention for over 12 months; As the patient stated: "I wasn't sure. I thought of different things it might be. I thought it could be some tumor or a growth. I thought it could be a hemorrhoid. I thought it could just be, yeah, really a hemorrhoid." When asked why he did not think his symptoms were serious this patient reported that he thought he was too young to have cancer, he was wary of the tests that he may be subjected to, and embarrassed to discuss his symptoms with a health care provider. Concerns of over financial barriers played a role in deciding whether or not to seek care, "I knew I didn't have insurance and I knew that all this costs money and you know, so I didn't know where to go." This patient did not seek care for his symptoms until he experienced debilitating pain. Even after the decision was made to visit a health care provider, financial barriers were a source of continued concern, "I had anxiety and mostly over the money, over the going to the doctor".

Figure 1.
Model of barriers contributing to patient appraisal delay

Table 1

Sample demographics

Characteristic	Mean (SD)
Appraisal delay (months)	4.8 (7.0)
Age (years)	58 (12.2)

Characteristic	n (%)
Gender	
Male	132 (52.4)
Female	120 (47.6)
Race	
Caucasian	133 (52.8)
African American	111 (44)
Other	8 (3.2)
Marital status	
Married	132 (52.4)
Divorced	50 (19.8)
Single	41 (16.3)
Widowed	29 (11.5)
Education	
<High School	49(19.4)
High School diploma	67(26.6)
Some college	78 (31)
Bachelor's degree +	47(18.7)
Employment status	
Employed	112 (44.4)
Unemployed	140 (55.6)
Income	
<\$10,000	42 (16.7)
\$10-\$29 K	63 (25)
\$30-\$49 K	46 (18.3)
\$50-\$74 K	26 (10.3)
\$75-\$100 K	33 (13.1)
>\$100 K	30 (11.9)
Declined to answer/do not know	12 (4.8)
Health insurance	
Private	109 (43.3)
Medicare	68 (27)
Medicaid, state insurance, uninsured	65 (25.8)
Stage	
1	21 (8.3)
2	61 (24.2)
3	100 (39.7)

Characteristic	n (%)
4	64 (25.4)
Unknown	6 (2.4)
State	
Virginia	168 (66.7)
Ohio	84 (33.3)
Fear of tests	
Yes	61 (24.3)
Embarrassment seeking care	
Yes	30 (11.9)
Too young to have cancer	
Yes	29 (11.6)
Not realizing symptom seriousness	
Yes	100 (39.7)

SD, standard deviation.

Table 2

Correlation (variance) table for the model variables

	Appraisal delay	Financial barriers	Symptoms	Cognitive barrier: embarrassed	Cognitive barrier: symptoms not serious	Cognitive barrier: fear of tests	Cognitive barrier: too young
Appraisal delay	0.11						
Financial barriers	0.17 (0.03)	0.20					
Symptoms	0.13 (0.07)	0.11 (0.08)	2.87				
Cognitive barrier: embarrassed	0.30 (0.10)	0.28 (0.13)	0.20 (0.34)	1			
Cognitive barrier: symptoms not serious	0.23 (0.08)	0.08 (0.04)	0.09 (0.16)	0.21 (0.21)	1		
Cognitive barrier: fear of tests	0.25 (0.08)	0.25 (0.11)	0.28 (0.47)	0.57 (0.57)	0.46 (0.46)	1	
Cognitive barrier: too young	0.22 (0.07)	0.15 (0.07)	0.04 (0.07)	0.59 (0.59)	0.42 (0.42)	0.36 (0.36)	1

Covariances are indicated on the diagonal.