Social vs. practical problems in attaining a colonoscopy: Different patient profiles?

Barbara A. Curbow, University of Maryland, College Park
Evelyn C. King-Marshall, University of Maryland, College Park
Nora Mueller, University of Maryland, College Park
Travis Hyams, University of Maryland, College Park
Shahnaz Sultan, North Florida/South Georgia Veterans Affairs Medical Center, Department of Medicine, University of Florida
Thomas J. George Jr, University of Florida, Department of Medicine

Corresponding Author: Dr. Evelyn King-Marshall, University of Maryland, School of Public Health, 1242 SPH Building, College Park, MD 20742; (301) 405-2789; Ekm@umd.edu

ABSTRACT

Background: Colonoscopy is an effective procedure for identifying precancerous polyps and cancerous lesions, but it is unlike other cancer screening tools in that it requires sedation and thus assistance from at least one other individual. The intent of this paper was to identify logistical problems in completing the colonoscopy and to examine their relationships with sociodemographic characteristics.

Methods: All eligible patients (n = 2500) from two academic-affiliated colonoscopy centers (one free standing, one hospital-based) were invited to participate in an onsite, pre-colonoscopy survey; patients agreeing to participate (n = 1841, RR = 73.6%) received a $5.00 gift card. Multiple correspondence analysis (MCA) was used to identify the underlying dimensional structure of the problems. Bivariate statistics were performed to compare demographic variables and health literacy levels among patients reporting problems. Multivariate logistic regression with a backwards conditional solution was used to determine the demographic variables independently associated with problems.

Results: Multiple correspondence analyses indicated two dimensions of problems (social and practical). Using logistic regression, social problems (e.g., finding someone to accompany the patient) were associated with not living in the same home as the driver, not working due to disability, and younger age. Practical problems (e.g., making an appointment) were associated with “other” minority race, poorer health, lower health literacy, and younger age.

Conclusion: Patients experience different problems completing the colonoscopy based on socio-demographics. Particularly at risk are patients who find it difficult to navigate the system, are of younger age, or who may have smaller social networks.

Keywords: Colorectal cancer, colonoscopy, health disparities
INTRODUCTION

Although colorectal cancer (CRC) is declining (American Cancer Society, 2018), it continues to be unequally distributed by race and gender; incidence and mortality rates per 100,000 are highest in African Americans and lowest in Asian/Pacific Islander Americans (American Cancer Society, 2017). Consumers have a wide range of CRC screening tests but over one-third of Americans are not in compliance with screening guidelines (Jin, 2016; Shapiro, et al., 2012; US DHHS, 2013; & Steele et al. 2013). If polyps or cancer are suspected through less invasive screening measures (e.g., fecal occult blood test (FOBT)), a colonoscopy is required as follow-up. Thus, colonoscopy is a critical tool for CRC initial screening, early treatment, and diagnostics and can greatly reduce cancer related mortality (Pan, et al. 2016). Most behavioral research on colonoscopy has focused on patient barriers to referral and adherence. For example, referral has been associated with patient characteristics such as younger age (within age appropriate groups), higher education, higher income, White race, being married, having a comorbidity, and having a relative with CRC (Sewitch, et al., 2007; Daly, et al., 2013; Klabunde, et al., 2006; & Ye, et al., 2009). Once referred, patients must schedule, prepare for, and keep the colonoscopy appointment. Adherence generally has been found to be higher in Whites, males, and individuals of non-Hispanic heritage, non-rural residence, higher income, having insurance, older age, and higher education (Daly, et al., 2013; Inadomi, et al., 2012; Benarroch-Gampel, et al., 2012; Guessous, et al., 2010; Wernli, et al., 2013; Gancayco, et al., 2005; Yager, et al., 2013; Denberg, et al., 2005; Miranda, et al., 2012; Cole, et al., 2012; Anderson, et al., 2013; Higgins, et al. 2012; Shapiro, et al., 2012; Doubeni, et al., 2012; Oliver, et al., 2012; & Halbert, et al., 2011).

This research demonstrates potential sources of health inequities, but other sources are less explored. For example, how do patients who actually arrive at the colonoscopy center (colonoscopy completers) view the problems or hurdles they faced to get there? In a 2012 systematic review of the literature on screening colonoscopy barriers (McLachlan, et al., 2012), authors identified 56 studies of perceived barriers – only 7 of these studies included patients who actually had colonoscopies (as opposed to those referred but not followed up or general populations), and only three (Condon, et al., 2008; Ristvedt, et al., 2003; & Van Gelder, et al., 2004) contacted patients pre-colonoscopy. All three reported on factors such as the unpleasantness of the bowel preparation, and concerns about pain, discomfort, and embarrassment.

These are important psychological barriers but there are additional logistical issues to consider. Unlike other cancer screening tests, colonoscopy has a social component. For most patients, scheduling a colonoscopy means they are committing another person to drive them to and from the procedure and stay for its duration (Waring, et al., 2004). A recent study by Hunleth, et. al., (2016) that used Photovoice to gather qualitative data emphasized the social aspect. Participants used photography to spur a discussion that identified three colonoscopy themes: screening as a struggle, screening as emotionally laden, and the necessity of social connections and support. Regarding social necessities, a participant noted: “Not everybody has someone who could take time off. I don’t know what people do who don’t.” (Hunleth, et al., 2016). A second gap in the literature follows – among people who have colonoscopies, are there identifiable subgroups who report particular types of problems? People facing cancer, or even its possibility, may have different types and levels of personal and social resources to apply to problems.

Current Study

As part of a larger study that explored many facets of the colonoscopy experience, we investigated logistical problems reported by patients who were on-site but pre-colonoscopy that
have been reported elsewhere in the literature. Patients from two academic-affiliated colonoscopy centers (one free standing, one hospital-based) in Alachua County, Florida were invited to enroll in a study investigating the colonoscopy experience. Survey data for this analysis were used to examine these questions: (1) What are the most frequent logistical problems in attaining a colonoscopy? (2) Are there discernable dimensions among the problems? (3) Do problems vary based on patient sociodemographic characteristics?

**METHODS**

**Participants**

Consecutive eligible participants (≥18 years, read/write English, cognitively able) were recruited on the day of colonoscopy. The patient sample is described in Table 1 (left column). There were 3237 eligible patients but 737 (22.8%) were missed due to scheduling or patient flow issues, leaving a pool of 2500 patients, of which 1841 (73.6%) agreed to participate. Among nonparticipants, 396 of 659 (60%) completed an “opt-out” card. Reasons for not enrolling included: physical (e.g., unwell, tired, hungry; 25%), time (e.g., feeling rushed; 16.8%), privacy concerns (14.2%), and not interested (12.7%). Subsequently, 56 (3.0%) enrollees were excluded due to ineligibility, incomplete informed consent form, or participant’s request. Patients received a $5.00 gift card for participating.

**Independent variables**

A six-page instrument provided information about the pre-colonoscopy experience, but only a subset of variables is used in the analyses presented here. Demographic variables from the instrument included sex, age (continuous), Hispanic or Latino ethnicity, race (Black, White, all others), employment (full or part-time, not employed due to disability, unemployed/retired), marital status (married/partnered, single), income (<20K, $20,000 to $49,999, $50,000 to $79,999, 80K+), education, and whether the patient lived with the person who would drive them to and from the colonoscopy center. Perceived health was rated on a six-point scale of 1 = “excellent” to 6 = “very poor”; however, due to the low number of participants rating their health as “very poor,” that category was combined with “poor.” For perceived health literacy, we used a set of four items based on the work of Chew et al., (2004) and later, Haun and colleagues (2012); alpha = .75 and mean inter-item correlation of .43.

**Dependent variables**

In the pre-colonoscopy survey, patients were asked if they experienced any of 7 problems in their completion of the colonoscopy appointment: difficulty getting an appointment, how much the procedure costs, finding child/dependent care, getting time off work, finding someone to come with them, getting a ride, and the driver getting time off work. Patients subsequently listed additional problems through the probe: “Did you have any other problems getting to your appointment?” Open-ended responses were read by two researchers and grouped into emergent thematic categories.

**Procedure**

Following clinic registration, patients received a brief description of the study. Interested individuals received a detailed study description and a copy of the informed consent packet; all other eligible patients were asked to complete the opt-out card. Patients unable to complete the survey prior to their procedure completed it via telephone.

**Data Analysis**
Analyses were conducted using SPSS V. 23 (2014). Multiple correspondence analysis (MCA) was used to identify the underlying dimensional structure of the problems. Chi-square tests and t-tests were performed to compare demographic variables and health literacy levels among patients reporting each of the 7 problems and the presence of any practical or social problem. Multivariate logistic regression with a backwards conditional solution was used to determine the demographic variables independently associated with 1) single problems and 2) any problems within a dimension. For all logistic regression analyses, the reference group was that which was coded at the highest value. Odds ratios (OR) and 95% confidence intervals (95% CI) are reported.

RESULTS

Participants

The sample (left column of Table 1) was predominantly White (76.7%), female (61.3%), employed (54.9%), living with the person who drove them (70.2%), married/partnered (67.2%), and not of Hispanic descent (94.7%). Income was distributed across the four groups; mean education was 14.20 years and mean age was 53.76 years. Most participants rated their health as either “very good” (33.4%) or “good” (35.1%). Mean perceived health literacy (possible range = 4 to 20) was 16.84 (SD = 2.99) and the median was 18.0. We used Haun, et al.’s scoring to estimate categories of health literacy: inadequate (4-12), 10.4%; marginal (13-16), 27.2%; and adequate (17-20), 62.4%.

Single Problems

Overall, 27.3% (n = 510) reported one or more of the problems (Tables 1 and 2): cost (11.6%), driver or “other” getting time off from work (8.2%), getting an appointment (7.1%), finding someone to come with them (6.9%), getting a ride (5.5%), self (patient) getting time off from work (5.5%), and finding child/dependent care (2.8%). The qualitative question produced 81 responses that clustered into 8 themes: (1) Difficulty of the bowel preparation (e.g., the bowel preparation process is uncomfortable); (2) Logistic (e.g., dropping children off at school); (3) Insurance (e.g., insurance doesn’t cover the cost); (4) Cost (e.g., expenses not related to the insurance); (5) System (e.g., paperwork issues); (6) Fear or apprehension (e.g., afraid of the sedation); (7) Health problems (others or self); and (8) Unclear. Due to the small number of responses, we did not statistically analyze thematic groups.

Grouped Problems

We next tested whether there were subcategories of problems using multiple correspondence analysis (MCA) within the optimal scaling procedure of SPSS (V. 23). MCA allows for the detection of underlying dimensions when using categorical data. The 1,694 active cases yielded two dimensions with Eigenvalues of 2.33 and 1.19 respectively (Figure 1). Dimension 1, herein referred to as Social Problems, included: finding someone to come with them, getting a ride, and driver or “other” getting time off from work. The single problem of self (patient) getting time off from work weakly loaded on this dimension; subsequently we analyzed this as its own, ungrouped, problem called ‘self, time off work’. Dimension 2, Practical Problems, included costs, getting an appointment, and finding child/dependent care.

Self (patient) getting time off from work

Bivariate relationships between the problems and sociodemographic variables are presented in the Tables 1-2; only multivariable results are presented in the text. Concerning the single, ungrouped problem of patient being able to get time off from work, logistic regression with
backward conditional selection indicated only two variables remained significant (Table 3). People who were employed full or part-time were more likely to report a problem than people who were not working (p < .0001; OR = 3.58; CI = 1.69 to 7.61), as were people who were younger (p = .002; OR = .96; CI = .94 to .98).

Figure 1: Dimensions of problems
Table 1. Sociodemographic variable relationships with ungrouped (UG) and Social Problems in getting a colonoscopy

<table>
<thead>
<tr>
<th>Frequencies n (%)</th>
<th>UG, Self, time off work 5.5%</th>
<th>Social, driver time off work 8.2%</th>
<th>Social, find other to come with 6.9%</th>
<th>Social, getting ride 5.5%</th>
<th>Any Social Problem 11.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total = 1785</td>
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<tr>
<td>1. Race</td>
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</tr>
<tr>
<td>AA 266 (15.3)</td>
<td>X² = 8.3ᵃ</td>
<td>X² = 10.9ᵇ</td>
<td>X² = 5.0</td>
<td>X² = 2.4</td>
<td>X² = 16.7ᵈ</td>
</tr>
<tr>
<td>White 1328 (76.6)</td>
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<td></td>
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<tr>
<td>Other 140 (8.1)</td>
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<tr>
<td>2. Sex</td>
<td></td>
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<tr>
<td>Female 1100 (61.3)</td>
<td>X² = 3.8ᵃ</td>
<td>X² = 0.3</td>
<td>X² = 0.1</td>
<td>X² = 0.1</td>
<td>X² = 0.1</td>
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<tr>
<td>Male 694 (38.7)</td>
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<tr>
<td>3. Income</td>
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<tr>
<td>0K-20K 428 (27.4)</td>
<td>X² = 6.6</td>
<td>X² = 2.2</td>
<td>X² = 7.8ᵃ</td>
<td>X² = 5.6</td>
<td>X² = 6.6</td>
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<tr>
<td>20K-50K 426 (27.2)</td>
<td></td>
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<tr>
<td>50K-80K 296 (18.9)</td>
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<td>80K+ 414 (26.5)</td>
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<tr>
<td>4. Employment (FT/PT)</td>
<td>X²=32.7ᵈ</td>
<td>X² = 36.5ᵈ</td>
<td>X² = 6.7ᵃ</td>
<td>X² = 9.0ᵃ</td>
<td>X² = 34.0ᵈ</td>
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<tr>
<td>Yes 945 (54.9)</td>
<td></td>
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<tr>
<td>No, Disabled 225 (13.1)</td>
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<tr>
<td>No, other 552 (32.1)</td>
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<tr>
<td>5. Live with driver</td>
<td>X² = 2.3</td>
<td>X² = 2.5</td>
<td>X² = 46.6ᵈ</td>
<td>X² = 37.0ᵈ</td>
<td>X² = 22.9ᵈ</td>
</tr>
<tr>
<td>Yes 1216 (70.2)</td>
<td></td>
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<tr>
<td>No 516 (29.8)</td>
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<tr>
<td>6. Married/partnered</td>
<td>X² = 0.7</td>
<td>X² = 3.3</td>
<td>X² = 29.3ᵈ</td>
<td>X² = 24.8ᵈ</td>
<td>X² = 26.9ᵈ</td>
</tr>
<tr>
<td>Yes 1157(67.2)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 565 (32.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Hispanic Descent</td>
<td>X² = 6.4ᵃ</td>
<td>X² = 1.4</td>
<td>X² = 0.4</td>
<td>X² = 0.5</td>
<td>X² = 2.9</td>
</tr>
<tr>
<td>Yes 91(5.3)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>No 1635(94.7)</td>
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</tr>
</tbody>
</table>

Notes:
- a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z

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Social Problems

Both colonoscopy sites required that patients be driven to the center and that the driver stay on the premises from check in to discharge. Using logistic regression (Table 3), the first social problem, the driver being able to get time off work, was higher for people who were working full or part time (p = .029; OR = 1.79; CI = 1.02 to 3.14) or who were not working due to disability (p < .0001; OR = 4.40; CI = 2.34 to 8.30). Younger age (p < .05; OR = .97; CI = .96 to .98) was also associated with the problem. The second social problem, finding someone to go with them, was associated with not living with the driver (p < .0001; OR = 3.65; CI = 2.35 to 5.66). Lastly, problems with getting a ride also was associated with not living with the driver (p < .0001; OR = 3.37; CI = 2.06 to 5.45).

Just under 1/8 (11.9%) of the participants reported having any of the 3 social problems. Three bivariate relationships remained significant in the logistic regression. Having any social problem was related to not working due to disability (p < .0001; OR = 2.67; CI = 1.62 to 4.39), not living with the driver (p = .001; OR = 1.83; CI = 1.30 to 2.57), and younger age (p = .014; OR = .98, CI = .97 to .997).

Practical Problems

Bivariate analyses for practical problems are listed in Table 2. The most frequent practical problem, cost of the procedure was (based on logistic regression, Table 3) more of an issue in the

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<table>
<thead>
<tr>
<th>8. Health Status</th>
<th>X² = 1.51</th>
<th>X² = 8.23</th>
<th>X² = 8.60</th>
<th>X² = 8.67</th>
<th>X² = 11.12¹</th>
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</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>5.4%</td>
<td>7.6%</td>
<td>4.7%</td>
<td>3.6%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Very Good</td>
<td>5.1%</td>
<td>8.4%</td>
<td>7.8%</td>
<td>5.1%</td>
<td>12.6%</td>
</tr>
<tr>
<td>Good</td>
<td>6.4%</td>
<td>6.2%</td>
<td>6.2%</td>
<td>5.7%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Fair</td>
<td>4.8%</td>
<td>11.7%</td>
<td>7.4%</td>
<td>5.3%</td>
<td>15.5%</td>
</tr>
<tr>
<td>Poor/Very</td>
<td>3.8%</td>
<td>13.5%</td>
<td>14.8%</td>
<td>13.0%</td>
<td>23.6%</td>
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<table>
<thead>
<tr>
<th>9. Education</th>
<th>t = -3.2²</th>
<th>t = -0.2</th>
<th>t = -1.4</th>
<th>t = -0.9</th>
<th>t = -0.5</th>
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<tr>
<td>M=14.20 (s.d. 2.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean no for problem (s.d)</td>
<td>14.17 (2.3)</td>
<td>14.22 (2.3)</td>
<td>14.19 (2.3)</td>
<td>14.20 (2.3)</td>
<td>14.19 (2.3)</td>
</tr>
<tr>
<td>Mean yes for problem (s.d)</td>
<td>14.99 (2.3)</td>
<td>14.26 (2.4)</td>
<td>14.53 (2.4)</td>
<td>14.44 (2.4)</td>
<td>14.28 (2.4)</td>
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<table>
<thead>
<tr>
<th>10. Health Literacy</th>
<th>t = -1.3</th>
<th>t = 2.6³</th>
<th>t = 0.6</th>
<th>t = 1.3</th>
<th>t = 2.6⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>M=16.84 (s.d. 2.9)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mean no for problem (s.d)</td>
<td>16.84 (3.0)</td>
<td>16.92 (2.9)</td>
<td>16.86 (2.9)</td>
<td>16.88 (3.0)</td>
<td>16.91 (2.9)</td>
</tr>
<tr>
<td>Mean yes for problem (s.d)</td>
<td>17.26 (2.5)</td>
<td>16.24 (3.4)</td>
<td>16.70 (2.7)</td>
<td>16.47 (3.0)</td>
<td>16.31 (3.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. Age</th>
<th>t = 6.5⁵</th>
<th>t = 3.4⁶</th>
<th>t = 2.9⁷</th>
<th>t = 1.4</th>
<th>t = 3.9⁸</th>
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<tbody>
<tr>
<td>M=53.76 (s.d. 12.8)</td>
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<tr>
<td>Mean no for problem (s.d)</td>
<td>54.07 (12.7)</td>
<td>53.18 (12.9)</td>
<td>55.3 (12.9)</td>
<td>53.74 (12.9)</td>
<td>54.20 (12.9)</td>
</tr>
<tr>
<td>Mean yes for problem (s.d.)</td>
<td>45.33 (13.7)</td>
<td>50.08 (12.1)</td>
<td>50.4 (12.4)</td>
<td>51.83 (12.4)</td>
<td>50.63 (12.1)</td>
</tr>
</tbody>
</table>

¹ p < .05, ² p < .01, ³ p < .001, ⁴ p < .0001
Social vs. Practical Problems in Attaining a Colonoscopy: Different Patient Profiles?

Curbow et al.

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< $20K (p = .019; OR = 2.06; CI = 1.13 to 3.75) and $20K to <$50K income categories (p = .008; OR = 2.06; CI = 1.20 to 3.52), for employed participants (p = .018; OR = 1.79; CI = 1.11 to 2.87), and for younger individuals (p < .0001; OR = .97; CI = .96 to .99). Cost was less of an issue for individuals in the “excellent” (p = .016, OR = .30; CI = .11 to .80) and “good” (p = .013; OR = .34; CI = .143 to .80) health categories. A problem getting an appointment was associated with race; both African Americans (p = .002; OR = .19; CI = .07 to .54) and Whites (p = .048, OR = .54; CI = .30 to .99) were less likely to have a problem than members of the “other” race category. The final practical problem, finding child/dependent care was significantly associated with income, age, employment, and health status. Logistic regression indicated that individuals in the <$20K (p = .008; OR = 2.26; CI = 1.24 to 4.14) and $20K to <$50K (p = .003; OR = 2.24; CI = 1.30 to 3.85) income groups, younger individuals (p = .008; OR = 2.26; CI = 1.24 to 4.14) and $20K to <$50K (p = .003; OR = 2.24; CI = 1.30 to 3.85) income groups, younger individuals (p = .001; OR = .97; CI = .96 to .99) and individuals who were employed (p = .012; OR = 1.85; CI = 1.14 to 2.99) had more problems finding child/dependent care. People in the “excellent” (p = .017; OR = .30; CI = .11 to .81) and “good” (p = .018; OR = .35; CI = .15 to .84) categories had fewer problems compared to the reference group (poor/very poor).

Table 2. Sociodemographic variable relationships with Practical Problems in getting a colonoscopy

<table>
<thead>
<tr>
<th>Frequencies n (%)</th>
<th>Practical, Cost (Yes=11.6%)</th>
<th>Practical, Appointment (Yes=7.1%)</th>
<th>Practical, Find care (Yes=2.8%)</th>
<th>Any, practical (yes= 17.4%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA 266 (15.3)</td>
<td>X² = 4.2</td>
<td>X² = 11.2b</td>
<td>X² = 13.7c</td>
<td>X² = 15.6d</td>
</tr>
<tr>
<td>White 1328 (76.6)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Other 140 (8.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female 1100 (61.3)</td>
<td>X² = 3.9a</td>
<td>X² = 0</td>
<td>X² = 1.5</td>
<td>X² = 1.5</td>
</tr>
<tr>
<td>Male 694 (38.7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0K-&lt;20K 428 (27.4)</td>
<td>X² = 18.1d</td>
<td>X² = 7.7a</td>
<td>X² = 1.8</td>
<td>X² = 2.5</td>
</tr>
<tr>
<td>20K-&lt;50K 426 (27.2)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>50K-&lt;80K 296 (18.9)</td>
<td></td>
<td></td>
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<tr>
<td>80K+ 414 (26.5)</td>
<td></td>
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</tr>
<tr>
<td><strong>4. Employment FT/PT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes 945 (54.9)</td>
<td>X² = 11.8b</td>
<td>X² = 1.4</td>
<td>X² = 1.7</td>
<td>X² = 9.3b</td>
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<tr>
<td>No, Disabled 225 (13.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, other 552 (32.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5. Live with driver</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 552 (32.1)</td>
<td>X² = 0.0</td>
<td>X² = 1.0</td>
<td>X² = 0.5</td>
<td>X² = 0.2</td>
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</table>
About 1/6 of the group (17.4%) had any practical problem in getting the colonoscopy. Logistic regression indicated that having practical problems was less likely with African American race \((p = .005; \text{OR} = .40; \text{CI} = .21 \text{ to } .76)\) compared to the reference group (“other” race) and “excellent” health status \((p = .040; \text{OR} = .43; \text{CI} = .19 \text{ to } .96)\). A higher likelihood of practical problems was found for lower health literacy \((p = .033; \text{OR} = .94; \text{CI} = .89 \text{ to } .99)\) and younger age \((p < .0001; \text{OR} = .97; \text{CI} = .96 \text{ to } .98)\).
Table 3. Summary of logistic regression analyses

<table>
<thead>
<tr>
<th>Problem</th>
<th>Significant Relationships</th>
<th>Variable</th>
<th>p</th>
<th>Exp(B)</th>
<th>L.C.I.</th>
<th>U.C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ungrouped Self, Getting time off work</td>
<td>full or part-time employment, younger age</td>
<td>Employment</td>
<td>&lt;.0001</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Full/PT</td>
<td>.001</td>
<td>3.58</td>
<td>1.69</td>
<td>7.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disability</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No (Ref)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age</td>
<td>.002</td>
<td>.96</td>
<td>.94</td>
<td>.98</td>
</tr>
<tr>
<td>SP-1. Driver getting time off work</td>
<td>full or part-time employment or not working because of disability, younger</td>
<td>Employment</td>
<td>&lt;.0001</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Full/PT</td>
<td>.042</td>
<td>1.79</td>
<td>1.02</td>
<td>3.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disability</td>
<td>&lt;.0001</td>
<td>4.40</td>
<td>2.34</td>
<td>8.30</td>
</tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>Age</td>
<td>.029</td>
<td>.97</td>
<td>.96</td>
<td>.98</td>
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<tr>
<td>SP-2. Finding someone to come with patient</td>
<td>not living with driver</td>
<td>Live With</td>
<td>&lt;.0001</td>
<td>3.65</td>
<td>2.35</td>
<td>5.66</td>
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<tr>
<td>SP-3. Getting a ride</td>
<td>not living with driver</td>
<td>Live With</td>
<td>&lt;.0001</td>
<td>3.37</td>
<td>2.06</td>
<td>5.45</td>
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<tr>
<td>Dimension 1. Any social problem (11.9 %)</td>
<td>not working because of disability, not living with driver, younger age</td>
<td>Employment</td>
<td>&lt;.0001</td>
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<tr>
<td></td>
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<td>Full/PT</td>
<td>.019</td>
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<td>1.13</td>
<td>3.75</td>
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<td></td>
<td></td>
<td>Disability</td>
<td>NS</td>
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<td>20-&lt;50K</td>
<td>.008</td>
<td>2.06</td>
<td>1.20</td>
<td>3.52</td>
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<tr>
<td></td>
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<td>50-&lt;80K</td>
<td>NS</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>80+K (Ref)</td>
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<tr>
<td></td>
<td></td>
<td>Live With</td>
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<td>1.83</td>
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<td></td>
<td></td>
<td>Age</td>
<td>.014</td>
<td>.98</td>
<td>.97</td>
<td>.997</td>
</tr>
<tr>
<td>PP-1. Costs</td>
<td>lower income, poor health, younger age</td>
<td>Income</td>
<td>.037</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>&lt;20K</td>
<td>.019</td>
<td>2.06</td>
<td>1.13</td>
<td>3.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-&lt;50K</td>
<td>.008</td>
<td>2.06</td>
<td>1.20</td>
<td>3.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-&lt;80K</td>
<td>NS</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>80+K (Ref)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Health</td>
<td>.018</td>
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<tr>
<td></td>
<td></td>
<td>Excellent</td>
<td>.016</td>
<td>.30</td>
<td>.11</td>
<td>.80</td>
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<td></td>
<td></td>
<td>Very Good</td>
<td>NS</td>
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<td></td>
<td>Good</td>
<td>.013</td>
<td>.34</td>
<td>.14</td>
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<td></td>
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<td>Fair</td>
<td>NS</td>
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<td></td>
<td></td>
<td>Poor (Ref)</td>
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</table>
DISCUSSION

Pre-colonoscopy survey data were used to examine these questions: (1) What are the most frequently reported problems in attaining a colonoscopy? (2) Are there discernable dimensions among the reported problems? (3) Do reported problems vary by sociodemographic characteristics? Overall, 27.3% of colonoscopy examined patients reported problems in...
completing the procedure. Among the most frequent were: cost (11.6%), driver or “other” getting time off from work (8.2%), getting an appointment (7.1%), and finding someone to come with them (6.9%). Using multiple correspondence analyses, we identified two dimensions among the problems as those that were more social in nature and those that were more practical.

The Importance of Young Age

The most consistent demographic associated with having a problem was younger age. Means associated with “younger age” shifted considerably with a range of 42.43 for finding child/dependent care to 50.08 for driver/other getting time off from work. Within this context, it is likely that younger aged patients are having colonoscopies because they are symptomatic (Curbow, et al., 2015) and thus may find it more taxing to navigate the colonoscopy process. Additionally, they are likely experiencing a different life stage than the older participants (e.g. young children at home, lower paying or less flexible jobs) and more difficulty with insurance coverage.

Stretching the Social Network

For social problems, not living with the driver and not being employed due to disability were important factors. For individuals not living with the driver, 37.4% (compared to 13% overall) had to go outside of their family network to find someone to go with them for the procedure. Of note, within this sample, there was little evidence of the role of faith based organizations, only two patients from the entire sample (both did not live with their driver) were accompanied by a pastor or church member. Finding a driver is more than just an inconvenience; the driver could potentially lose up to a full day of work. Additionally, providers prefer to deliver follow-up care directions and results to a caregiver if the patient is still affected by sedation (Hyams, et al., 2018), thus the potential for both interpersonal and legal issues when conveying confidential health information. Patients not working due to a disability had a slightly higher rate of going outside the family network (17%); however, this group was also more likely to be single (51.4%) compared to patients who were employed (29.2%) or unemployed for other reasons (31.1%). Social isolation is a risk factor for increased morbidity and mortality, often through loneliness and depression (Holt-Lundstat, et al., 2015). Our findings suggest that social isolation or having to draw from an expanded network may hinder the ability to attain certain types of health care, in particular those that require an onsite caregiver.

Is 27.3% a lot?

The key message is that over a quarter of the colonoscopy completers reported problems accomplishing the procedure. This suggests that (1) the patients who attained the colonoscopy were motivated to do so and (2) patients with less motivation may have dropped out of the process along the way. Unlike medical screening a patient can undergo during a routine visit, colonoscopy patients must go through a series of steps (appointment, payment, picking up the medications, preparation, transportation) with the potential to drop out at any step. Because colonoscopy serves as both a primary screening test and the default confirmatory procedure for less invasive procedures, there is a strong need to adjust the delivery of this service so that it is available to all subgroups.

Limitations and Strengths

A limitation of the study is the bounded geographic region; while the two clinics draw from a large rural/suburban area, both are academic-affiliated. A second limitation is that patients were engaged immediately pre-colonoscopy; therefore, we have no comparisons to people who were never referred, never made an appointment, or were “no shows” for appointments. Additionally,
while the sample size was large and representative of the region, there was not enough variation to examine racial groups other than Whites and Blacks and some interesting clues regarding Hispanic status could not be followed up. These limitations are counterbalanced by several strengths: a large sample size, high participation rate, characterization of non-responders, and findings that are suggestive for potential interventions. Implications

As noted, the colonoscopy process needs to be redesigned to fit the reality of the lives of major subgroups of patients (e.g., those with limited social networks, those who have jobs without paid sick leave, and those who must care for dependents). At the very least, clinics should offer Saturday hours so that patients and their drivers can maintain a standard work week. Additionally, when considering the procedure, all costs must be factored in: patient co-pays, lost time from work, transportation costs, and dependent care remain meaningful expenses (Petryszyn, et al., 2014). Also, clinics need to be creative in the use of patient navigators, faith-based volunteers, and community health workers to serve as surrogate network members. To reduce CRC disparities, we need to equalize access to fit low-income, socially marginalized patients’ lives, particularly for younger patients for whom survival, once diagnosed with CRC, remains significantly disparate (Holowaty, et al., 2016).

REFERENCES


Social vs. Practical Problems in Attaining a Colonoscopy: Different Patient Profiles?


