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Psychological "Risks" of Colonoscopy are Greater Amongst Fecal Immunohistochemical Test Positive Individuals Than Those With Inflammatory Bowel Disease

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Abstract

Background: Colorectal cancer (CRC) screening by Fecal Immunohistochemical Testing (FIT) followed by colonoscopy reduces colorectal cancer mortality. Barriers to colonoscopy should be minimised.

Objective: To compare psychological "risks" of colonoscopy in FIT positive (FIT+) subjects and those with Inflammatory Bowel Disease (IBD).

Method: IBD patients undergoing colonoscopic CRC surveillance were age and gender matched with FIT+ individuals awaiting colonoscopy. Subjects completed Spielberger State and Trait Scales for current levels of anxiety, depression, anger and curiosity, versus long term personality tendencies.

Results: 70 IBD respondents were matched with 70 FIT+ respondents, (57% male, mean age 57.6 years). FIT+ subjects demonstrated greater scores for state Anxiety (22.3 vs 20.3 p=0.024), Curiosity (24.3 vs 21.8 p=0.036), Anger (13.7 vs11.5 p=0.037) and Depression (23.8 vs21.2 p=0.002).

Conclusion: FIT+ patients experience more anxiety and depression prior to their colonoscopy than IBD patients, which may reduce colonoscopy uptake and is important to address.

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Introduction

Colonoscopy for the early detection of Colorectal Cancer (CRC) is commonly practised in the setting of long standing Inflammatory Bowel Disease (IBD)[1] [2] [3]as well as in individuals returning a positive Fecal Immunohistochemical Test (FIT+)[4].

Whilst surveillance colonoscopy has yet to demonstrate convincing CRC mortality reduction amongst IBD patients[1] a mortality benefit has been shown favouring colonoscopic screening in FIT+ individuals[5], most commonly identified and referred by General Practitioners. This contrasting benefit from colonoscopy for different indications may also be accompanied by differing risks.

Whilst colonoscopic risk data for "hard" outcomes such as mortality, perforation and bleeding are well represented in the literature and appear similar across indications, it is not known whether potential psychological harm associated with the procedure differs by clinical indication. The contrasting health experiences of IBD patients and those without chronic disease could be reasonably expected to produce differing psychological reactions to the need for colonoscopy and the possibility of a cancer diagnosis.

Currently no data exist comparing psychological responses to the need for colonoscopy in those with and without chronic bowel disease, even though these lesser known risks are important determinants of colonoscopy uptake[6]. These potential barriers to CRC detection may reduce the benefit of screening and are thus important to identify and manage.

Aims

To investigate and compare psychological parameters and QOL in FIT positive (FIT+) subjects and those with IBD in whom colonoscopy is indicated. Specifically we will examine Quality of Life, the Locus of Control to which subjects attribute health outcomes, and psychological state and trait including anxiety, depression, anger and curiosity.

Methods and Materials

A cross sectional postal questionnaire study was performed. IBD subjects were identified by interrogation of a tertiary hospital IBD database which includes public and private patients in South Australia currently enrolled in a colonoscopic CRC surveillance program based on IBD duration of more than 8 years and / or coexistent Primary Sclerosing Cholangitis (PSC)[7]. At the time of study, individuals enrolled in the surveillance program also needed to meet disease extent criteria of ulcerative colitis extending proximal to the sigmoid colon or Crohn's colitis affecting > 1/3 of the colon. These individuals had received information from their treating specialist regarding the increased risk of CRC associated with long standing colitis or coexisting PSC and had consented to colonoscopic surveillance. All of these subjects were scheduled to undergo colonoscopy every 2 years, and thus at the time of this cross sectional study were at variable places within the 2 year cycle, some soon due for colonoscopy and others having recently undergone the procedure.

Fecal Immunohistochenical testing in Australia is performed on average risk individuals from the age of 50 as a screening tool to enable early detection of CRC, with colonoscopy the recommended test in individuals returning a positive result[4]. Local FIT+ subjects in Southern Adelaide are enrolled in a database derived from the same geographical and demographic catchment as the IBD surveillance population.

143 patients enrolled in the IBD and 140 patients in the FIT database were mailed a questionnaire exploring their demographics, Quality of Life, Health Locus of Control and psychological state and trait as below.

Demographic Details

Subjects in each group were mailed a questionnaire requesting demographic details such as age, gender, country of origin, primary language spoken, occupational status, car and house ownership, highest educational qualification and marital status. The questionnaire also sought data regarding QOL, individuals' Health Locus of Control and psychological state and traits.

Quality of Life

The four week SF 36 questionnaire[8] was used to assess Quality of Life QOL, divided into mental and physical components and aiming to assess the level of limitation of daily activities imposed by symptoms over the past 4 weeks. Subjects were asked to respond to 36 questions which yield scores in 8 domains comprising physical function, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health. A score out of 100 is calculated for each subject in each domain, then in overall physical and mental domains, where 100 indicates a better state of health or well being, and lower scores are associated with reduced QOL. Australian population SF 36 data were used to compare QOL in overall physical and mental domains with each IBD cohort[9].

Health Locus of Control

The Levenson Multidimensional Locus of Control Scale[10] was incorporated into the questionnaire to determine the tendency of individuals to attribute control of health events to their own actions, that of others or to chance alone, and to compare these attributes between cohorts. This test asks subjects to numerically rate attitudinal statements according to how much they agree (+4 to +6) or disagree (+1 to +3) with each statement. Of the 18 statements, 6 indicate an "Internal" locus of control, 6 a "Powerful Others" Locus, and a further 6 a "Chance" related locus of control. Each subject earns a numerical score on each locus to indicate their tendency to attribute health events to that locus of control. Mean scores for FIT+ and IBD cohorts were then compared for each locus.

Anxiety, Depression, Anger and Curiosity

The Spielberger State-Trait Personality Inventory[11, 12] (STPI) was used to assess and compare depressive symptoms, anxiety, anger and curiosity between cohorts in both the immediate (state) and long term (trait or personality characteristic). Subjects were asked to respond to 80 questions in total using a scale of 1 to 4 in terms of how they feel at that moment in time and also in the longer term (ranging from almost never to almost always) in response to a series of attitudinal statements. The lowest score is 20 and the highest score 80, higher scores indicating a greater level of anxiety, depression, anger or curiosity. This test has been shown to be reliable and valid[13].

Questionnaires returned within 3 months of mailing were analysed, with one reminder letter sent after one month if no response was received.

Ethical Considerations

This study was approved by the Flinders Clinical Research Ethics Committee (FCREC) of Flinders University, South Australia (314/08). Informed consent on behalf of participants was implied in the form of a completed and returned questionnaire.

Statistics

All data from completely answered questionnaires were analysed using SPSS v[17] using Chi-Square or the Independent Sample T-Test. Significance was reported at the 0.05 level.

Results

Demographics

Respondents who were aged less than 39 or more than 80 years were excluded from the analysis, as well as 4 respondents who had returned an incomplete questionnaire. The remaining participants were matched for gender and as closely as possible for age. There remained 140 subjects in total, 70 FIT+ and 70 with IBD. Response rate was 78/143 (56%) amongst IBD subjects versus 70/140 (50%) FIT subjects (p=0.48). Age, gender and occupational characteristics are presented in Table 1. Of the IBD subjects, 24 (34%) had Crohn's Disease (CD), 44 (63%) Ulcerative Colitis (UC) and 2 (3%) Indeterminate Colitis. FIT + subjects were scheduled for colonoscopy within 3 months, and the mean lead time to next surveillance colonoscopy amongst IBD subjects was 7.1 months.

IBD subjects were more likely to describe their occupation as "not working" than FIT+ subjects, who were more likely to report being retired (35.7% vs 11.4%, p<0.01) (Table 1). This decreased workforce participation in IBD has been reported by other groups[14].

No significant differences were noted between groups in relation to car ownership, housing, educational qualifications or marital status.

Quality of Life

IBD subjects reported poorer QOL than FIT+ subjects across 8 domains of QOL measured by the SF-36 tool. The most affected subareas within the 8 domains included general health, activity and work limitation, satisfaction with the amount of activity achieved, ability to perform duties, bodily pain, energy levels, fatigue, susceptibility to illness, and perceived health compared with others (Table 2). Overall Physical and Mental Component Summary Scores (PCS and MCS) were significantly decreased amongst IBD subjects indicating poorer QOL than FIT+ subjects, but interestingly IBD subjects' scores were not dissimilar to mean SF 36 scores in the general Australian population[9] (Table 2).

Spielberger State and Trait Scale

FIT+ subjects demonstrated significantly greater scores for current "state" Anxiety (22.3 vs 20.3 p=0.02), Curiosity (24.3 vs 21.8 p=0.04), Anger (13.7 vs11.5 p=0.04) and Depression (23.8 vs21.2 p<0.01) compared with their IBD counterparts, with both cohorts demonstrating increased anxiety and depression relative to population norms (Table 3). The "trait" scale indicating long term characteristics produced similar scores across FIT+ and IBD groups, suggesting that there were no significant stable differences in behaviour and personality between cohorts (Table 3).

Health Locus of Control

FIT+ subjects scored significantly higher on the "chance" locus of control than their IBD counterparts

Table 1: Demographic Characteristics

	FIT + N=70	IBD N=70	P value
Male	40 (57%)	40 (57%)	1.0
Mean Age (yrs) (+/1 SD)	58.2(± 7.4)	57.1(± 9.8)	0.49
Age Range (yrs)	50 – 76	40 – 79	
Not working	8 (11.4%)	25 (35.7%)	<0.01

Table 2: Mean Quality of Life Scores by SF 36 in FIT + versus IBD Surveillance Subjects: Areas of significant difference and Physical and Mental Component Summary Scores

		Mean	Std. Deviation	Std. Error Mean	P value
General Health	FIT +	62.69	25.258	3.019	<0.01
	IBD	47.86	25.446	3.041	
Accomplished less than intended	FIT +	71.43	45.502	5.438	0.02
	IBD	52.86	50.279	6.009	
Activities limited	FIT +	80	40.289	4.815	0.03
	IBD	62.86	48.668	5.817	
Difficulty in performing work	FIT +	72.86	44.791	5.354	0.05
	IBD	57.14	49.844	5.958	
More bodily pain	FIT +	74.13	29.116	3.505	0.05
	IBD	64.57	26.631	3.183	
Less energy	FIT +	52.46	27.246	3.28	0.03
	IBD	41.77	29.752	3.556	
More worn out	FIT +	68.86	25.169	3.008	0.01
	IBD	57.23	24.899	2.976	
More tired	FIT +	60.29	23.638	2.846	<0.01
Become ill more easily	FIT +	85.22	20.227	2.435	<0.01
	IBD	70.36	31.362	3.748	
Not as healthy as others	FIT +	69.93	30.189	3.634	<0.01
	IBD	51.34	33.426	3.995	
Physical Component Summary (PCS)	FIT +	60.87	22.125	2.89	
	IBD	46.91	24.854	2.756	0.03
Australian median PCS9 Mental Component Summary (MCS)		46.6			
	FIT +	57.22	26.923	2.901	0.04
Australian Median MCS9	IBD	49.12	27.738	2.674	
		50.8			

Table 3: Spielberger State and Trait Scale comparing FIT+ and IBD Subjects

		N	Mean	Std. Deviation	Std. Error Mean	P value	Mean Adult Norm[12]
State Anxiety	FIT +	70	22.3000	6.57697	.78610	***0.02***	*18.51*
	IBD	70	20.3000	3.24082	.38735		
State Curiosity	FIT +	70	24.3286	7.70981	.92150	***0.04***	*26.51*
	IBD	70	21.8000	6.31446	.75472		
State Anger	FIT +	70	13.6571	7.73077	.92400	***0.04***	*13.83*
	IBD	70	11.5286	3.44195	.41139		
State Depression	FIT +	70	23.7571	5.82457	.69617	***<0.01***	*14.59*
	IBD	70	21.2000	3.16044	.37775		
Trait Anxiety	FIT +	70	16.5143	2.97693	.35581	0.60	18.63
	IBD	70	16.2571	3.14705	.37614		
Trait Curiosity	FIT +	70	18.4000	6.29562	.75247	0.61	29.48
	IBD	70	17.9000	5.29465	.63283		
Trait Anger	FIT +	70	12.9429	5.00980	.59879	0.11	18.90
	IBD	70	11.6000	4.84364	.57893		
Trait Depression	FIT +	70	11.1429	3.68029	.43988	0.46	18.06
	IBD	70	10.7000	3.40652	.40716		

(21.8 vs 19.6 p=0.01). This suggests FIT+ subjects are more likely to attribute health events and outcomes to chance than are IBD subjects, who may attribute more responsibility to themselves, their doctors and others, although these other locus of control scores did not significantly differ between groups (Table 4).

Discussion

This is the first study comparing psychological parameters in two different patient groups undergoing colonoscopy to manage their enhanced risk of Colorectal Cancer.

We have demonstrated that FIT positive individuals experience more anxiety and depression prior to colonoscopy, and this may provide a barrier to colonoscopy uptake and render screening at a General Practice level less effective. Our patients undergoing colorectal cancer screening for IBD, whilst having poorer quality of life through their chronic disease, have less psychological distress compared to previously healthy FIT+ patients. This suggests that, whilst the benefit of a surveillance colonoscopy in IBD compared with screen detected FIT positive patients may be lower in terms of reduction of colorectal cancer mortality, the risk of psychological harm is also lower. This helps maintain a favourable risk benefit ratio for colorectal cancer surveillance in patients with inflammatory bowel disease.

The finding of higher levels of anxiety and depression amongst FIT positive individuals awaiting colonoscopy is consistent with population based Danish data[15]. A Swedish study also demonstrated a similar phenomenon to our cohort whereby FIT+ individuals had higher rates of "severe worry" regarding CRC than those not positive, and this decreased after the

Table 4: Multidimensional Health Locus of Control in FIT+ versus IBD Subjects

		N	Mean	Std. Deviation	Std. Error Mean	P value
Internal	FIT +	70	26.0143	5.08619	.60792	0.15
	IBD	70	24.6429	6.04581	.72261	
Chance	FIT +	70	21.8429	4.40236	.52618	***0.01***
	IBD	70	19.5714	6.08531	.72733	
Powerful Others	FIT +	70	18.9000	3.53102	.42204	0.96
	IBD	70	18.9429	5.40769	.64634	

examination, whereby most appreciated the experience one year later. The rate of "worry" was 60% in FIT+ subjects, to an extent where it affected daily life in 15%. Interestingly, lower educational level significantly increased worry in this study. A similar recent study reported similar elevated worry levels after FIT+ testing, but that recovery from this concern was seen within 4 months after colonoscopy[16]. This strengthens the argument for rapid cancer diagnostic pathways which have been shown to improve psychological wellbeing[17], and improved access to colonoscopy services, particularly given that anxiety and depression prior to confirmed CRC diagnosis have been found to promote delays in treatment[18].

In contrast, state anxiety and depression were not elevated in IBD patients awaiting their surveillance colonoscopy. This is consistent with a Swedish IBD cohort in which 41 patients having colonoscopic surveillance did not report increased anxiety or impaired general health status related to surveillance[19]. This may suggest a degree of psychological adaptation to the risk of CRC which has been reported previously in a surveillance context[20]. Such adaptation may be the result of multiple previous experiences of and thus familiarisation with colonoscopy, and the benefit of long term chronic disease education and support by consistent and available health care providers, such as was the case in our cohort.

A similar UK study, however, demonstrated 24% of IBD subjects feeling frightened and anxious prior to colonoscopy[20], which contrasts with our findings of lower levels of short term anxiety than FIT+ subjects. Critically, this anxiety affected health behaviour in that one third of patients in the UK study indicated they might not opt to continue with colonoscopic cancer surveillance.

It is of interest that FIT positive patients were more likely to perceive chance as a significant influence upon their health. In previously well patients, an unexpected potential adverse health finding in the psychologically unprepared may lead to this perception, however a chance locus of control has been associated with negative affect and emotion focused coping rather than problem focused coping and positive affect[21]. We have demonstrated in these patients that such a locus of control was associated with an increase in state anxiety and depression, consistent with previous work.

This study was affected by several limitations, the most important of which is the 4 month difference in lead time to colonoscopy at the time of survey between cohorts. This may have favoured higher anxiety levels in those whose procedure was imminent. Additionally, the magnitude of difference between Spielberger state scores between cohorts was small, suggesting that FIT subjects suffered only a mild level of increased anxiety and depression compared with IBD subjects, thus the clinical significance of this finding is uncertain. This

subtle increase in anxiety may be subclinical and remain undetected unless sought, yet still impact upon the decision to undergo colonoscopy.

More detailed analysis of psychological parameters adjusted for IBD type, extent and duration may also be informative. A participation bias may also apply, favouring those with higher anxiety levels.

Also, whilst the Spielberger test used in this study has been validated amongst English speaking populations in general, it has not been specifically validated in the Australian population. Use of a behaviour specific health locus scale may have improved sensitivity in examining locus of control differences than the more general Levenson scale.

Despite these methodological limitations, this is the first study to suggest indication based differences in psychological reaction to the need for colonoscopy. To minimise anxiety duration and maximise colonoscopy uptake, we recommend expedited colonoscopy as soon as possible after FIT+ diagnosis, along with early and comprehensive patient counselling. Further, larger studies are warranted to explore the impact of psychological reactions on the uptake of colonoscopic colorectal cancer screening.

Conflicts of interest:

None of the above authors has a financial, professional or personal conflict of interest with regard to this unfunded work. No writing assistance was provided.

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