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Research paper

Colorectal cancer – applying a gender lens

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ABSTRACT

Background Colorectal cancer (CRC) is a major global health problem with survival varying according to stage at diagnosis. The incidence of CRC is much higher in patients with lower bowel symptoms. The symptoms are non-specific and are commonly experienced in the general population. Biological and environmental factors account for the high incidence and poor prognosis of CRC in men.

Objective To review the behavioural factors influencing patient delay in seeking help for lower bowel symptoms using a gender lens.

Methods An extensive literature search was performed using various databases including Medline, PubMed, CINAHL Plus, EMBASE and PsycINFO (1993–2013). Various search terms including rectal bleeding, prevalence, colorectal cancer, consultation, help-seeking, gender differences and men were used. A systematic methodology including systematic data extraction and narrative synthesis was applied.

Results Thirty-two studies were included in the review. All studies except four were quantitative. Although there is some evidence that men delay more compared with women, there has not been any major improvement in the help-seeking behaviour for such symptoms over the past two decades. Several behavioural and demographic factors were associated with low rates of help-seeking.

Conclusion There are limited studies focusing on men's help-seeking behaviour for lower bowel symptoms. To facilitate timely help-seeking in men, it is important to understand their patterns of help-seeking for such symptoms. Further research to understand men's help-seeking behaviour is warranted.

Keywords: colorectal cancer, gender, general practice, help-seeking behaviour, primary care, quality improvement

How this fits in with quality in primary care

What do we know?
Delays in seeking assessment and treatment for symptoms of colorectal cancer adversely affect prognosis. There are limited studies focusing on men's help-seeking behaviour for lower bowel symptoms. To facilitate timely help-seeking in men, it is important to understand patterns of help-seeking for such symptoms.

What does the paper add?
There are limited studies focusing on men's help-seeking behaviour for lower bowel symptoms. There is some evidence that men delay more compared with women. A major reason for patient delay was the failure to appraise the symptoms as illness due to lack of adequate knowledge about the risk of colorectal cancer in those with persistent lower bowel symptoms. Several behavioural and demographic factors were associated with lower rates of help-seeking.

Introduction

Men's health literacy and health service utilisation

Men have lower health literacy and are less knowledgeable than women about specific diseases and risk factors, as well as about health in general.[1] They are also less anxious about health and are more likely to dismiss health symptoms until they become severe or life-threatening.[2,3] Owing to traditional masculine beliefs, men are less likely to access health information and apply it to improve their health.[2] Women, by contrast, are known to seek advice for their symptoms from general practitioners (GPs) as well as their lay network and are also instrumental in encouraging men to seek medical help.[4,5] It has been observed that women have more knowledge about the symptoms of colorectal cancer (CRC) and their significance than men.[6]

In Australia, men are less likely to consider their health as poor and seek medical advice.[7,8] In 2007–2008, it was reported that Australian men younger than 65 years were much less likely to consult their GP than women.[7]

Gender differences in CRC: are men more vulnerable?

Men are known to have increased risk, higher incidence and worse prognosis for CRC than women (Tables 1 and 2).[9–15] Men are more likely than women to develop CRC at all ages and the average age at diagnosis in men is four to eight years lower than that in women.[16] Furthermore, the incidence of advanced adenoma is higher in men at all stages of the disease.[17] In a recent study, Majek *et al.*[18] observed an overall survival advantage for women with CRC and a 14% lower excess risk of death compared with men. CRC symptoms such as rectal bleeding, change in bowel habit, abdominal pain and unintentional weight loss

Table 1 Gender differences related to the incidence and risk of developing colorectal cancer

	Males	Females
Incidence ASR (W)		
Worldwide	20.3	14.6
USA	34.1	25.0
UK	37.3	25.3
Australia	46.0	32.1
Europe	37.4	23.9
Risk of developing		
Polyps	OR 1.5	OR 1.0
Carcinoma	OR 1.4	OR 1.0
Advanced neoplasia (after adjusting for colonoscopic factors, age and family history)	OR 1.98	OR 1.0

ASR (W), age standardised rate per 100 000.[12,71] OR, odds ratio.

Table 2 Gender differences related to prognosis and mortality due to colorectal cancer

	Males	Females
Prognosis		
Average five-year survival rate (aged 15 to > 75 years)		
Left colon	64.68%	67.14%
Right colon	62.78%	65.3%
Rectum	61.66%	65.6%
Overall survival after resection	52.0 (1.3) months	57.8 (1.5) months
Disease-free survival after resection	46.0 (1.4) months	51.6 (1.7) months
Hazard ratio (adjusted for age, site, presentation and Duke's stage)	1	0.76
Mortality ASR (W)		
Worldwide	9.6	7.0
USA	9.9	7.7
UK	13.9	9.1
Australia	15.9	9.5
Europe	17.0	10.6

ASR (W), age standardised rate per 100 000.[12,14,71–73]

may also occur in the general population and in patients with relatively benign conditions such as inflammatory bowel disease (IBD);[19] nevertheless, men with IBD have been reported to have a 60% higher risk of CRC than women.[20]

Gender differences in the incidence and prognosis of CRC are associated with multiple biological, behavioural and environmental factors. The female sex hormone oestrogen has been associated with improved prognosis and reduced risk for CRC in pre-menopausal women and in post-menopausal women receiving hormone replacement therapy (HRT).[21,22] By contrast, high serum oestradiol concentration and the adverse effects of androgens on the immune system have been associated with increased risk of CRC and poor survival in women and men, respectively.[14,23] Apart from the sex hormones, other biological factors such as a sedentary lifestyle, metabolic syndrome and a high body mass index (BMI) have also been associated with an increased risk of adenomas and CRC in men compared with women.[24]

Patient delay in seeking medical advice

The natural progression of adenoma to carcinoma and the subsequent appearance of CRC symptoms may take up to 20 years.[25] Lower bowel symptoms are less common and less obvious early in the disease and prominent late when the cancer prognosis is poor.[26] Hady *et al.*[27] proposed that the development of CRC without any symptoms in its early stages may be one of the reasons of delayed presentation to the doctor.

The rate of seeking medical advice for rectal bleeding varies between 14% and 45%,[28,29] and there has not been any major improvement over the past two decades.[30,31] In a recent Australian study, it was found that up to 18% of people with rectal bleeding never consulted a doctor and nearly the same proportion delayed seeking medical help for more than one month after the onset of symptoms.[32] Similarly, 20% of people who experienced change in bowel habit never consulted a doctor and up to 37% delayed seeking medical advice for more than one month.

Given that men are less likely to be aware of the risk factors for CRC than women[33] and patients' late presentation to their GPs accounts for the longest delay in the diagnosis of CRC,[34] the role of seeking timely medical advice for lower bowel symptoms in better prognosis cannot be ignored. Against this background, we conducted a literature review of the factors influencing the decision to seek medical advice for lower bowel symptoms using a gender lens.

Methods

A search was conducted using Medline, PubMed, CINAHL Plus, EMBASE and PsycINFO (1993–2013) databases with various combinations of search terms including rectal bleeding, prevalence, colorectal cancer, consultation, help-seeking, gender differences and men. The relevant references and bibliographies of the included studies were also reviewed. The abstracts of all the relevant citations were screened independently by two reviewers before inclusion. The inclusion and exclusion criteria for the studies are outlined in Figure 1. When there was a conflict between the reviewers about the inclusion of papers, opinion from the third reviewer was sought. Common themes and concepts across various studies were identified via a narrative synthesis of the findings. Patient delay was defined as the interval between the onset of symptoms and the first medical consultation.

Results

A total of 3020 search results were obtained using various combinations of search terms, of which only 130 (4.3%) studies met our inclusion criteria (Figure 1). After further analysis, 32 studies were included in this review (See online appendix 1). The search was limited to studies published in the past two decades and nearly 50% of them were published in the past 10 years. Of these, 15 were carried out in Europe, 8 in the UK, 3 in the USA, 5 in Australia and 1 in Canada. Most of the studies evaluated help-seeking behaviour for CRC ($n = 30$), and only two studies focused on lower bowel symptoms. The sample size in the studies ranged between 6 and 1966. Only one study was qualitative, the rest were quantitative.

Delay interval

In this review, patient delay ranged between one week and one year. While 14 studies focused solely on patient delay, the remainder ($n = 18$) focused on patient as well as system delay. However, we only studied the factors associated with delay between the onset of symptoms and the first medical consultation.

Gender differences in patient delay

Of the 32 studies, 53% (9/17) provided information on help-seeking behaviour for lower bowel symptoms in both men and women and did not focus on gender differences in help-seeking.[30,35–42] Of the remaining studies, 35% (6/17) found that men delayed more

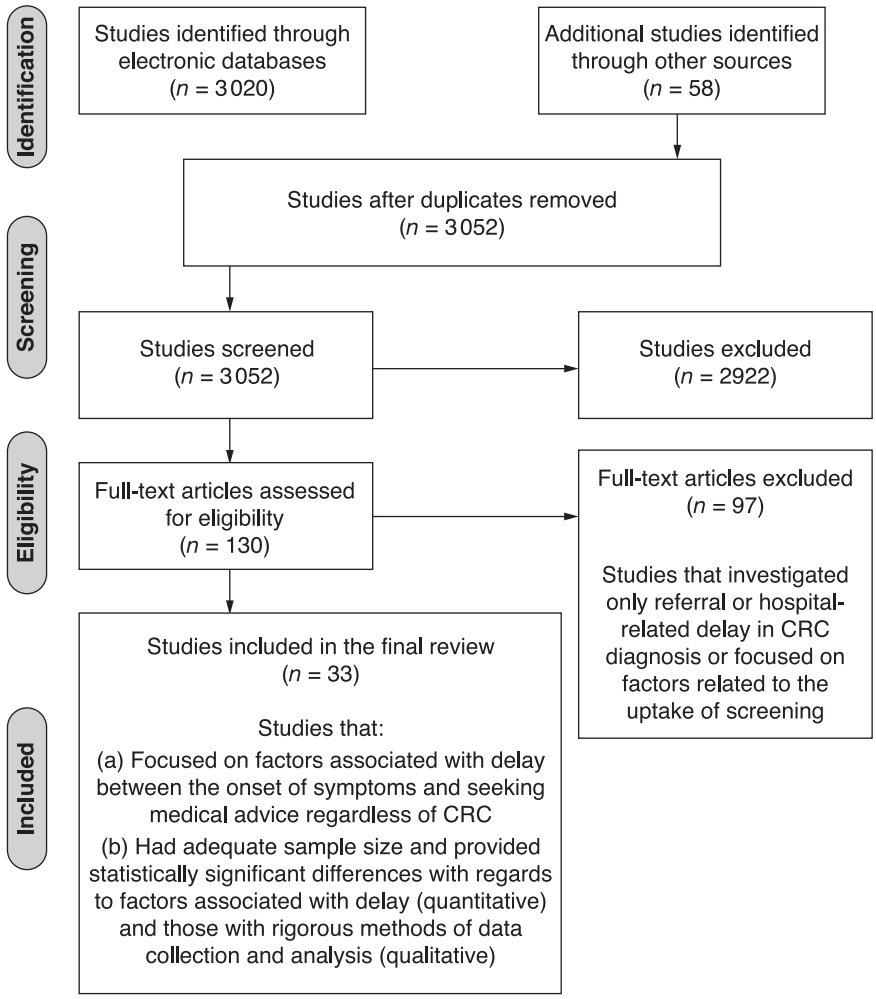

Figure 1 PRISMA flowchart for the flow of studies into the review

than women[4,32,43–46] and only one study (6%) showed longer delays in women.[47] One study reported a longer delay in men younger than 65 years and in women older than 80 years.[48]

Factors influencing a delay in seeking help

Most of the studies included in the review (n = 31) identified factors that increased patient delay and nearly 70% (n = 23) found factors that reduced delay. The various factors associated with patient delay are summarised in Box 1.

These factors were evaluated using Andersen's Model of Total Patient Delay as the theoretical framework.[49] The reason for delay were classified into the first four stages of the model: appraisal delay (time lapse between detection of symptoms by the patient and inferring illness); illness delay (delay occurs as the patient contemplates between consulting a medical practitioner or self-treating the illness); behavioural delay (delay in making an appointment with the GP); and scheduling delay (time lapse between making an appointment and the first medical consultation). The fifth stage of the model, the treatment delay (time between the first medical consultation and the initiation of treatment), was beyond the scope of this study as we focused exclusively on patient delay

Appraisal delay

Several factors were associated with patients' appraisal of their symptoms as illness. There was delay in seeking help when symptoms were attributed to a minor illness, were assumed to be part of the ageing process[44,46,50,51] or when patients failed to recognise symptom severity.[30,44,52–56]

The non-specific nature and a moderately high prevalence of lower bowel symptoms in the general population may lead to a delay between symptom onset and the initiation of treatment.[57] Specific symptoms such as rectal bleeding and abdominal pain were

Box 1 Factors impacting patient delay

Factors that increased patient delay
Demographic factors
- Educational level (low)
- Younger age (< 50 years) in men and older age in women
- Lack of health insurance
- Low income
- Living with spouse (rectal cancer)
- Living in rural areas
- Inadequate transportation facilities
- Difficulty in visiting GP or making appointment
- No screening advice received from the doctor
- Lack of social support or lay referral networks

Health belief factors
- Non-specific symptoms
- Attribution of symptoms to benign conditions and non-recognition of symptom severity
- Attribution of symptoms to changes in diet and lifestyle
- Fear of unpleasant investigations
- Fear of treatment
- Denial of cancer
- Lack of trust in the medical system
- Belief that the symptoms would resolve spontaneously
- Past history of anxiety and depression or of benign bowel disease
- Family history of cancer
- Relief from over-the-counter medications

Factors that reduced patient delay
Demographic factors
- Age (> 60 years) for males
- Retirement
- Educational level (high)

Health belief factors
- Persistent symptoms
- Aggravation of symptoms
- Blood mixed in stool
- Abdominal pain and discomfort
- Multiple symptoms occurring together
- Trust in GP
- Symptom disclosure to someone significant
- Knowledge about the cause of symptoms
- Opportunity to talk to GP about lower bowel symptoms during regular visit

Factors that had a mixed impact on delay
- Embarrassment about the symptoms
- Fear of cancer diagnosis
- Not living with spouse
- Socioeconomic status

associated with relatively less delay in seeking medical advice than non-specific symptoms such as change in bowel habit and unexplained weight loss.[40,55] Lack of knowledge and concern about the risks associated with the symptoms or self-treatment prior to seeking professional medical advice increased delay in some studies.[30,32] The lack of awareness of being at risk led to misinterpretation of symptoms that further delayed diagnosis and to the trivialisation of symptoms.[30,51] Cockburn *et al.* found that two in every three Australian adults were aware of rectal bleeding as a symptom of CRC; however, fewer than 50% had knowledge about other potential symptoms of cancer.[30] Carlsson *et al.* observed that only 1.5% of the population

warranted seeking medical help for change in bowel habit.[58] In some instances, patients consulted for bleeding in the toilet pan but not for blood on the toilet paper, thus underestimating the severity of the symptom.[59]

There were shorter delays in seeking help when the symptoms were frequent, severe or affected a person's daily life.[36,54,55] Delay was shorter especially when pain, vomiting and intestinal obstruction were the initial presenting symptoms.[60]

Illness delay

A number of factors were associated with patients' preference to seek medical advice over self-treatment. A few studies found that younger patients were more likely to delay,[34,35] whereas others found no relationship between age and help-seeking behaviour.[36,40] Low socioeconomic status and lack of additive private health insurance were other factors that contributed to delay in seeking treatment.[34,38] Bain *et al.*[50] observed that people who resided in rural areas were more likely to delay seeking advice than those who resided in urban areas; however, no such difference was observed by Robertson *et al.*[55]

Behavioural delay

A number of factors were associated with delay in making an appointment with the GP. The worsening of symptoms or the appearance of additional symptoms led to reinterpretation of symptoms by the patients and helped in inferring the illness. A number of patients delayed seeking help due to fear of unpleasant or embarrassing investigations, hoping for spontaneous resolution of symptoms.[32,34] Knowing a person with CRC within the family or among friends was observed to reduce patient delay.[34]

Cognitive–emotional factors such as fear of pain, concerns about the examination of private body parts and bowel preparation associated with invasive procedures may further discourage people with symptoms to seek early medical attention.[61] Fear of cancer or poor prognosis,[52,54,61] investigations and the consequences of treatment[34,54] also played a major role in preventing people from making an appointment with the GP. Ramos *et al.*[4] observed that women mentioned their symptoms directly to their GP, whereas men volunteered to discuss their symptoms during medical consultations for other health conditions. McCaffery *et al.*[62] observed that increased knowledge about CRC reduced negative perceptions and encouraged timely help-seeking for the symptoms. Social support by lay networks including family and friends played a major role in encouraging people to seek medical help.[52,54–56,60] The delay was found to be reduced in the cases where patients discussed their symptoms with a significant someone or did not wait for the spontaneous resolution of symptoms.[60] There is no clear relationship between marital status and seeking help as some studies observed shorter delays in married men, whereas other studies observed an increased delay.[30,34]

The literature also suggests that there is anxiety, hesitancy, taboo and embarrassment associated with digital rectal examination in men. These concerns may be magnified when examined by a female doctor and also in those who have previously been victims of sexual abuse.[63]

Scheduling delay

Patients who trusted their GPs or healthcare practitioners and believed that they could help them were more likely to consult.[36,47,52]

Some patients were not confident in discussing their symptoms with a GP, were worried about the outcome, or put off seeing a GP because of lack of time or other commitments.[30,32] A few were too busy to visit a GP or believed that consulting a GP would be unpleasant or embarrassing.[64]

Discussion

The major strength of the study was the use of a theoretical framework to analyse the factors associated with patient delay. The current review expanded on previous reviews on patient-related delays and the results were consistent with them.[65–68] In addition, we also focused on gender differences in help-seeking behaviour for lower bowel symptoms. One of the major reasons for patient delay was the failure to appraise the symptoms as illness due to lack of adequate knowledge about the risk of CRC in people with persistent lower bowel symptoms. This is in line with the Andersen's Model of Total Patient Delay proposed by Andersen *et al.* which suggested that appraisal delay was the major component of the entire model of patient delay.[69] In their study, de Nooijer *et al.*[52] mentioned that denial of illness could result in patient delay. However, other behavioural and cognitive–emotional factors were also responsible for longer delays in our review.

About 50% of the studies included in this either did not focus on or were equivocal about the role of gender in help-seeking. In three out of four that focused on gender differences in help-seeking behaviour, men were more likely than women to delay seeking medical advice. However, the gender-specific reasons for patient delay were not evaluated in these studies.

Several factors have been postulated for men's poor help-seeking behaviour compared with women. In their review, Smith *et al.* identified stoicism as one of the reasons for men's reticence because help-seeking was portrayed as a sign of weakness. The fear of being regarded as neurotic, hypochondriac or a time waster by the GP was also associated with men's poor help-seeking behaviour.[65] Ramos *et al.*[70] observed that 50% of primary healthcare patients knew about the modest to high survival rate after CRC diagnosis. Thus, fear of poor prognosis may also prevent people from seeking medical advice.

In this review, the evidence for men's poor help-seeking behaviour currently stems mostly from quantitative studies because there was only one qualitative study that focused on gender-specific delays and found that men delayed more than women.

Conclusion

The results of this review warrant the need for more qualitative studies and further research into men's help-seeking behaviour. The majority of the studies in this review were conducted on CRC patients and very few on patients with benign conditions. Research on patients with lower bowel symptoms regardless of cancer will increase our understanding about men's help-seeking patterns at different stages of the disease. Given that men are biologically more susceptible to bowel cancer, it may be worthwhile facilitating a change in attitude towards symptoms in order to encourage men to seek medical advice at an opportune time.

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REFERENCES

1 Courtenay WH. Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Social Science & Medicine* 2000;50:1385–401.
2 Galdas PM, Cheater F and Marshall P. Men and health help-seeking behaviour: literature review. *Journal of Advanced Nursing* 2005;49:616–23.
3 Peters E, Slovic P, Hibbard JH and Tusler M. Why worry? Worry, risk perceptions, and willingness to act to reduce medical errors. *Health Psychology* 2006;25:144.
4 Ramos M, Arranz M, Taltavull M *et al.* Factors triggering medical consultation for symptoms of colorectal cancer and perceptions surrounding diagnosis. *European Journal of Cancer Care* 2010;19:192–9. PubMed PMID: 19709162.
5 Andersen BL, Cacioppo JT and Roberts DC. Delay in seeking a cancer diagnosis: delay stages and psychophysiological comparison processes. *British Journal of Social Psychology* 1995;34:33–52.
6 Ramos M, Llagostera M, Esteva M *et al.* Knowledge and attitudes of primary healthcare patients regarding population-based screening for colorectal cancer. *BMC Cancer* 2011;11:408.
7 Australian Bureau of Statistics. *Men's Health.* ABS Australia Social Trends 4102.0. www.ausstats.abs.gov.au/ausstats/subscriber.nsf/LookupAttach/4102.0Publication30.06.104/$File/41020_MensHealth.pdf (accessed 13/02/2014).
8 Australian Bureau of Statistics. *National Health Survey: summary of results.* Australian Bureau of Statistics ABS cat. no. 4364.0. Canberra: Australian Bureau of Statistics, 2006.
9 McArdle CS, McMillan DC and Hole DJ. Male gender adversely affects survival following surgery for colorectal cancer. *British Journal of Surgery* 2003;90:711–15.
10 McCashland T, Brand R, Lyden E and de Garmo P. Gender differences in colorectal polyps and tumors. *American Journal of Gastroenterology* 2001;96:882–6.
11 Chou CL, Weng SF, Lin JK and Chang SC. Role for gender in colorectal cancer risk: a Taiwan population-based study. *International Journal of Colorectal Disease* 2013;28:1001–8.
12 GLOBOCAN. *Cancer Incidence and Mortality Worldwide (2008).* IARC CancerBase No. 10. globocan.iarc.fr (accessed 09/07/13).
13 Lawrenson R, Logie J and Marks C. Risk of colorectal cancer in general practice patients presenting with rectal bleeding, change in bowel habit or anaemia. *European Journal of Cancer Care* 2006;15:267–71.
14 Wichmann M, Müller C, Hornung H *et al.* Gender differences in long-term survival of patients with colorectal cancer. *British Journal of Surgery* 2001;88:1092–8.
15 Hendifar A, Yang D, Lenz F *et al.* Gender disparities in metastatic colorectal cancer survival. *Clinical Cancer Research* 2009;15:6391–7. PubMed PMID: 19789331.
16 Brenner H, Hoffmeister M, Arndt V and Haug U. Gender differences in colorectal cancer: implications for age at initiation of screening. *British Journal of Cancer* 2007; 96:828–31.
17 Regula J, Rupinski M, Kraszewska E *et al.* Colonoscopy in colorectal-cancer screening for detection of advanced neoplasia. *New England Journal of Medicine* 2006;355:1863–72.
18 Majek O, Gondos A, Jansen L *et al.* Sex differences in colorectal cancer survival: population-based analysis of 164,996 colorectal cancer patients in Germany. *PloS One* 2013;8:e68077.
19 Thompson W, Heaton K, Smyth G and Smyth C. Irritable bowel syndrome in general practice: prevalence, characteristics, and referral. *Gut* 2000;46:78–82.
20 Söderlund S, Granath F, Broström O *et al.* Inflammatory bowel disease confers a lower risk of colorectal cancer to

females than to males. *Gastroenterology* 2010;138:1697–703.e2.
21 Koo JH and Leong RW. Sex differences in epidemiological, clinical and pathological characteristics of colorectal cancer. *Journal of Gastroenterology and Hepatology* 2010;25:33–42.
22 Hendifar A, Yang D, Lenz F *et al.* Gender disparities in metastatic colorectal cancer survival. *Clinical Cancer Research* 2009;15:6391–7.
23 Wu H, Xu L, Chen J *et al.* Association of estrogen receptor beta variants and serum levels of estradiol with risk of colorectal cancer: a case control study. *BMC Cancer* 2012;12:276.
24 Harriss D, Atkinson G, George K *et al.* Lifestyle factors and colorectal cancer risk (1): systematic review and meta-analysis of associations with body mass index. *Colorectal Disease* 2009;11:547–63.
25 Ilyas M, Straub J, Tomlinson I and Bodmer W. Genetic pathways in colorectal and other cancers. *European Journal of Cancer* 1999;35:1986–2002.
26 Cappell MS. Pathophysiology, clinical presentation, and management of colon cancer. *Gastroenterology Clinics of North America* 2008;37:1–24.
27 Hady HR, Soldatow M, Lukaszewicz J *et al.* Surgical treatment of malignant and benign colorectal neoplasms based on authors' clinical data. *Advances in Clinical and Experimental Medicine* 2013;22:219–27. PubMed PMID: 23709378. Epub 2013 May 28.
28 Talley NJ and Jones M. Self-reported rectal bleeding in a United States community: prevalence, risk factors, and health care seeking. *American Journal of Gastroenterology* 1998;93:2179–83.
29 Eslick G, Kalantar J and Talley N. Rectal bleeding: epidemiology, associated risk factors, and health care seeking behaviour: a population-based study. *Colorectal Disease* 2009;11:921–6.
30 Cockburn J, Paul C, Tzelepis F *et al.* Delay in seeking advice for symptoms that potentially indicate bowel cancer. *American Journal of Health Behavior* 2003;27:401–7.
31 Crosland A and Jones R. Rectal bleeding: prevalence and consultation behaviour. *BMJ* 1995;311(7003):486–8.
32 Courtney RJ, Paul CL, Sanson-Fisher RW *et al.* Current state of medical-advice-seeking behaviour for symptoms of colorectal cancer: determinants of failure and delay in medical consultation. *Colorectal Disease* 2012;14:e222–9. PubMed PMID: 22381146.
33 Evans RE, Brotherstone H, Miles A and Wardle J. Gender differences in early detection of cancer. *The Journal of Men's Health & Gender* 2005;2:209–17.
34 Langenbach MR, Schmidt J, Neumann J and Zirngibl H. Delay in treatment of colorectal cancer: multifactorial problem. *World Journal of Surgery* 2003;27:304–8.
35 Mulcahy H and O'Donoghue D. Duration of colorectal cancer symptoms and survival: the effect of confounding clinical and pathological variables. *European Journal of Cancer* 1997;33:1461–7.
36 Mariscal M, Llorca J, Prieto D and Delgado-Rodríguez M. Determinants of the interval between the onset of symptoms and diagnosis in patients with digestive tract cancers. *Cancer Detection and Prevention* 2001;25:420.
37 Lynch BM, Baade P, Fritschi L *et al.* Modes of presentation and pathways to diagnosis of colorectal cancer in Queensland. *Medical Journal of Australia* 2007;186:288–91.
38 Hansen RP, Olesen F, Sørensen HT *et al.* Socioeconomic patient characteristics predict delay in cancer diagnosis: a Danish cohort study. *BMC Health Services Research* 2008;8:49.
39 Pedersen AF, Hansen RP and Vedsted P. Patient delay in colorectal cancer patients: associations with rectal bleeding and thoughts about cancer. *PloS One* 2013;8:e69700.
40 Majumdar SR, Fletcher RH and Evans AT. How does colorectal cancer present? Symptoms, duration, and clues to location. *American Journal of Gastroenterology* 1999;94:3039–45. PubMed PMID: 10520866.
41 Chaplin A, Curless R, Thomson R and Barton R. Prevalence of lower gastrointestinal symptoms and associated consultation behaviour in a British elderly population determined by face-to-face interview. *British Journal of General Practice* 2000;50(459):798–802.
42 Eslick GD, Kalantar JS and Talley NJ. Rectal bleeding: epidemiology, associated risk factors, and health care seeking behaviour: a population-based study. *Colorectal Disease* 2009;11:921–6.
43 Porta M, Gallen M, Belloc J and Malats N. Predictors of the interval between onset of symptoms and first medical visit in patients with digestive tract cancer. *International Journal of Oncology* 1996;8:941–9.
44 Young CJ, Sweeney JL and Hunter A. Implications of delayed diagnosis in colorectal cancer. *Australian and New Zealand Journal of Surgery* 2000;70:635–8.
45 Ristvedt SL and Trinkaus KM. Sex differences in responding to rectal cancer symptoms. *Psychology and Health* 2008; 23:935–44.
46 Tomlinson C, Wong C, Au HJ and Schiller D. Factors associated with delays to medical assessment and diagnosis for patients with colorectal cancer. *Canadian Family Physician* 2012;58:e495–501. PubMed PMID: 22972740.
47 Esteva M, Leiva A, Ramos M *et al.* Factors related with symptom duration until diagnosis and treatment of symptomatic colorectal cancer. *BMC Cancer* 2013; 13:87. PubMed PMID: 23432789.
48 Kemppainen M, Räihä I, Rajala T and Sourander L. Delay in diagnosis of colorectal cancer in elderly patients. *Age and Ageing* 1993;22:260–4.
49 Walter F, Webster A, Scott S and Emery J. The Andersen Model of Total Patient Delay: a systematic review of its application in cancer diagnosis. *Journal of Health Services Research & Policy* 2012;17:110–18. PubMed PMID: 22008712. Pubmed Central PMCID: PMC3336942. Epub 2011 October 20.
50 Bain NS, Campbell NC, Ritchie LD and Cassidy J. Striking the right balance in colorectal cancer care – a qualitative study of rural and urban patients. *Family Practice* 2002;19:369–74.
51 Ristvedt SL and Trinkaus KM. Psychological factors related to delay in consultation for cancer symptoms. *Psycho-Oncology* 2005;14:339–50.
52 de Nooijer J, Lechner L and de Vries H. A qualitative study on detecting cancer symptoms and seeking medi-

cal help; an application of Andersen's model of total patient delay. *Patient Education and Counseling* 2001; 42:145–57.
53 Ristvedt SL, Birnbaum EH, Dietz DW *et al.* Delayed treatment for rectal cancer. *Diseases of the Colon & Rectum* 2005;48:1736–41. PubMed PMID: 15981064.
54 Broughton M, Bailey J and Linney J. How can experiences of patients and carers influence the clinical care of large bowel cancer? *European Journal of Cancer Care* 2004; 13:318–27.
55 Robertson R, Campbell N, Smith S *et al.* Factors influencing time from presentation to treatment of colorectal and breast cancer in urban and rural areas. *British Journal of Cancer* 2004;90:1479–85.
56 Roncoroni L, Pietra N, Violi V *et al.* Delay in the diagnosis and outcome of colorectal cancer: a prospective study. *European Journal of Surgical Oncology* 1999; 25:173–8.
57 Korsgaard M, Pedersen L, Sorensen HT and Laurberg S. Reported symptoms, diagnostic delay and stage of colorectal cancer: a population-based study in Denmark. *Colorectal Disease* 2006;8:688–95.
58 Carlsson L, Håkansson A and Nordenskjöld B. Common cancer-related symptoms among GP patients. Opportunistic screening in primary health care. *Scandinavian Journal of Primary Health Care* 2001;19:199–203.
59 Summerton N, Mann S, Sutton J *et al.* Developing clinically relevant and reproducible symptom-defined populations for cancer diagnostic research in general practice using a community survey. *Family Practice* 2003;20:340–6.
60 Esteva M, Leiva A, Ramos M *et al.* Factors related with symptom duration until diagnosis and treatment of symptomatic colorectal cancer. *BMC Cancer* 2013;13:87.
61 Denberg TD, Melhado TV, Coombes JM *et al.* Predictors of nonadherence to screening colonoscopy. *Journal of General Internal Medicine* 2005;20:989–95.
62 McCaffery K, Wardle J and Waller J. Knowledge, attitudes, and behavioral intentions in relation to the early detection of colorectal cancer in the United Kingdom. *Preventive Medicine* 2003;36:525–35.
63 Macias DJ, Sarabia MJ and Sklar DP. Male discomfort during the digital rectal examination: does examiner gender make a difference? *American Journal of Emergency Medicine* 2000;18:676–8.
64 Courtney R, Paul C, Sanson-Fisher R *et al.* Current state of medical-advice-seeking behaviour for symptoms of colorectal cancer: determinants of failure and delay in medical consultation. *Colorectal Disease* 2012;14:e222–9.
65 Smith LK, Pope C and Botha JL. Patients' help-seeking experiences and delay in cancer presentation: a qualitative synthesis. *The Lancet* 2005;366(9488):825–31.
66 Mitchell E, Macdonald S, Campbell N *et al.* Influences on pre-hospital delay in the diagnosis of colorectal cancer: a systematic review. *British Journal of Cancer* 2007;98:60–70.
67 Carter S and Winslet M. Delay in the presentation of colorectal carcinoma: a review of causation. *International Journal of Colorectal Disease* 1998;13:27–31.
68 Liu S-k. Analytical review of reasons for delay in help-seeking for colorectal cancer related symptoms. Thesis, University of Hong Kong. DOI: dx.doi.org/10.5353/th_b4299734
69 Andersen BL and Cacioppo JT. Delay in seeking a cancer diagnosis: delay stages and psychophysiological comparison processes. *British Journal of Social Psychology* 1995;34:33–52. PubMed PMID: 7735731. Epub 1995 March 01.
70 Ramos M, Esteva M, Cabeza E *et al.* Lack of association between diagnostic and therapeutic delay and stage of colorectal cancer. *European Journal of Cancer* 2008;44: 510–21.
71 McCashland TM, Brand R, Lyden E and de Garmo P. Gender differences in colorectal polyps and tumors. *American Journal of Gastroenterology* 2001;96:882–6.
72 Ward KC, Young JL and Gloeckler Ries LA. Cancers of the colon and rectum. Seer Survival Monograph 2007: 33–41. seer.cancer.gov/archive/publications/survival/index. html (accessed 13/02/2014).
73 McArdle C, McMillan D and Hole D. Male gender adversely affects survival following surgery for colorectal cancer. *British Journal of Surgery* 2003;90:711–15.

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CONFLICTS OF INTEREST

None.

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