Psychological sequelae of colonic resections

Authors: A Powell-Chandler[1], K Boyce[1], O James[1], L Scourfield[2], J Torkington[2,3], J Bisson[2], JA Cornish [2,3,4] on behalf of PISA Trial Management Group

PISA Trial Management Group: A Powell-Chandler[1], K Boyce[1], O James[1], L Scourfield[2], A Pastellas[4], H Collins[6], L Smith[6], R Singh[6], J Torkington[2,3], J Bisson[2], JA Cornish[2,3,4], D Harris[5], G Williams[6], J Horwood[2,3]

1) Health Education and Improvement Wales
2) Cardiff University
3) University Hospital of Wales, Cardiff
4) Royal Glamorgan Hospital, Llantrisant
5) Morriston Hospital, Swansea
6) Royal Gwent Hospital, Newport

Correspondence to:
Mrs Julie Cornish. Department of Surgery, University Hospital of Wales, CF14 4XW. Cardiff
Email: Julie.Cornish@wales.nhs.uk

Conflicts of Interest: None
OP James is supported by a Joint Surgical Research Fellowship from the Royal College of Surgeons of England and Health Education and Improvement Wales

Word count: 2972

Abstract

Aim: The prevalence of anxiety, depression and post-traumatic stress disorder (PTSD) in the general population has been estimated to be 5.9, 3.3 and 4.4% respectively. The aim of this study is to determine whether psychological problems are more prevalent following colorectal surgery.

Method: Patients who had undergone colorectal resection in a 2-year period across 4 centres were asked to complete validated screening questionnaires for anxiety, depression and PTSD (GAD-7, PHQ-9, PCL-5) 12-48 months after surgery. Risk factors were identified using multiple linear regression analysis.

Results: After excluding those who had died or received palliative diagnoses, questionnaires were sent to 1150 patients. 371 responded (32.3% response rate); median age 67 (20-99) years, 51% were male. 58% of patients underwent surgery for cancer, 23% had emergency surgery. 28% of patients screened positive for at least one psychological condition, with 20% screening positive for anxiety, 22% for depression and 14% for PTSD. Patients who were younger, female, had surgery as an emergency, for benign conditions, had stomas and critical care stay were more likely to have poorer psychological outcomes. Multiple linear regression found only younger age (p=0.000) and female gender (p=0.048) were significant risk factors.

Conclusion: The prevalence of anxiety, depression and PTSD appears to be high in patients who have undergone colorectal surgery. Younger patients and women are particularly at risk. Further work is needed to determine how best to prevent, detect and treat people with adverse psychological outcomes following colorectal surgery.

What does this paper add to the literature?

There is very little literature on the psychological outcomes of colorectal surgery. This paper shows it to be a significant problem with over a quarter of patients appearing to have psychological problems after surgery. Increased awareness, preventative strategies and referral for psychological therapies may be needed.

Introduction

The surgical community recognises the importance of survivorship as a significant outcome measure following major surgery. Survivorship focuses on the health and life of a patient following treatment including late effects of treatment and quality of life [1]. Whilst there is a better awareness of the physical consequences of surgery and their impact on quality of life, there has been little investigation of the psychological consequences of the surgery that patients experience. Common mental health conditions, such as anxiety, depression and post-traumatic stress disorder (PTSD) not only cause significant distress but also directly impact physical recovery and social functioning.

The prevalence of anxiety, depression and PTSD in the general population has been estimated to be 5.9, 3.3 and 4.4% respectively [2]. Anxiety describes feelings of unease, worry and fear. It becomes a mental health problem when it affects daily living [3]. Depression is persistent low mood, associated with lack of enjoyment of life, feeling hopeless, tired, reduced concentration, altered sleep or appetite and suicidal thoughts [4]. PTSD is a disorder that can develop after a traumatic event where a person re-experiences the event, avoids reminders, develops negative thoughts and mood changes associated with the event and hyperarousal. Four post-traumatic stress trajectories are recognised; a resilient class which show few or no symptoms, a recovery class who experience initial distress but recover quickly, a delayed reaction class with initial low symptoms but increase over time, and a chronic distress class with persistently high levels of PTSD[5]. Effective psychological and pharmacological treatments are available for anxiety, depression and PTSD[6].

There is evidence that risk factors for the development of these psychological conditions include a feeling of vulnerability, threat of loss of life and perceived lack of support [7]. These are potential issues for many ,if not all, patients undergoing major surgery. Previous studies have found that patients undergoing treatment for cancer are more likely to suffer with anxiety and depression, with incidence rates of 6.8-44% and 5.2-50% respectively [8-12]. PTSD has also been shown to be highly prevalent following major surgery and surgery for cancer, with incidence rates of 19-32% after major surgery for benign conditions [13-15] (cardiac, spinal and aortic surgery) and 14- 34% after surgery for cancer [16-19] (gynaecological, prostate and breast cancers).

There is limited data on the psychological sequalae of colorectal resections. However, all patients undergoing colonic resection will have had major surgery and be at risk of complications. The stress of this surgery could potentially lead to anxiety and depression or even PTSD. Patients who have a stoma, due to any condition, are at risk of anxiety and depression in connection with adjustment to issues regarding body image, sexuality and the general social or religious issue regarding faeces [20]. For those who avoid a stoma, there is still the risk of bowel dysfunction. A report commissioned by the Department of Health as part of the National Cancer Survivorship Initiative (NCSI) demonstrated that 19% of all bowel cancer patients had difficulty controlling their bowels after surgery, and these patients were twice as likely to report lower quality of life than those with control [21].

The aim of this study was to assess the prevalence of anxiety, depression and PTSD in patients who have undergone colorectal resection, identify any risk factors associated with developing such psychological sequelae and to determine whether colorectal patients would benefit from improved access to psychological therapies.

Methods

Ethics approval was granted by South West- Frenchay Research Ethics Committee (REC 16/SW/0346). This study was initially piloted in one centre before being extended to three other centres. The pilot centre looked at all patients who had undergone colorectal resection from January 2014 to December 2015. The three other centres studied the period January 2015 to December 2016. All individuals who underwent colorectal resection were identified retrospectively through theatre databases. Potential participants were contacted once via post by a member of the colorectal team at the centre at which they had been treated. This method was chosen for convenience and as not all patients were still under clinical follow-up. Potential participants were sent an invitation letter and patient information sheet and asked that, should they consent to be included, to complete the included consent form and four questionnaires. They were sent a pre-paid envelope to return these documents. The medical records of those who agreed to participate were then reviewed to identify length of hospital stay, any critical care stay or complications. For any patients identified as potentially having anxiety, depression or PTSD, their GP was informed, and they were referred for psychological therapy. Method of referral and therapies available varied by trust.

Inclusion and exclusion criteria

Patients were included if they had undergone colonic or rectal resection during the study period, were over 18 years of age and had the capacity to consent in English. Patients who had undergone surgery in the last 12 months were excluded as the aim was to identify long-term problems rather than acute issues. Patients who had received a palliative diagnosis at the time of surgery or since were also excluded.

Validated tools

The 4 questionnaires used in this study have all been validated internationally and are widely used globally. The GAD-7 is a self-administered patient questionnaire which can be used as a screening tool and severity measure for generalised anxiety disorder [22]. The PHQ-9 questionnaire scores each of the nine DSM (Diagnostic and Statistical Manual of Mental Disorders) criteria for depression. It is used to assess the severity of depression and can be used to identify depression in an at-risk population with a high sensitivity and specificity of 88% for major depression [23]. The PCL-5 is self-reported measure that assesses the DSM symptoms of PTSD. It can be used to screen for PTSD as well as for making a diagnosis of PTSD and monitoring symptoms [24]. The EQ-5D-5L (a EuroQol five dimensions questionnaire) is a standardised tool for measuring generic health and can be used to determine quality- adjusted life years (QALY). It is one of the most commonly used health measures and has been shown to have good validity and reliability [25].

Primary outcome

1. The incidence of anxiety, depression or PTSD (as measured by GAD 7, PHQ 9 and PCL 5 questionnaires respectively)

Secondary outcomes

1. Quality of life (as measured by EQ 5D 5L questionnaire)
2. Risk factors for psychological sequalae following colonic resections

Analysis

Data analysis was carried out using SPSS Version 25 software [26]. Non-parametric tests were used for age and length of stay as these were confirmed to be non-normally distributed on normality plot and Shapiro-Wilk test. Chi squared test for association was used to analyse the observed and expected frequencies of having a psychological outcome for categorical exposures. A p-value of <0.05 was used for any differences deemed to be significant. Logistic regression was used to identify which risk factors alone were significant.

Results

Across the 4 sites, 1150 patients had undergone colorectal resection in a 2-year period and met eligibility criteria for inclusion in the study. 371 patients responded, giving an overall response rate of 32%. Median follow-up after surgery was 29 months (range 18-47 months).

Of the 371 patients who responded 190 (51%) were male. They had a median age of 67 years (range 20-99 years). The majority had undergone surgery electively; 286 (77%) compared with 85 (23%) emergency operations. Two hundred and nineteen (59%) underwent surgery for colorectal cancer and the remaining were for benign conditions (Table 1). One hundred and fifty-two (41%) had either a temporary or permanent stoma formed as part of their surgery.

Median length of stay was 9 days (range 2- 107). Nineteen percent required critical care stay in high dependency unit or intensive care. Thirty-two (8.6%) patients had a complication that was Clavien Dindo Grade 3 or higher [27]. Complications included anastomotic leak (9), collection requiring drainage (8), small bowel obstruction (3), mesenteric bleeding (1), ischaemia (1), stoma complications (1), dehiscence (1), other return to theatre (2), organ failure (2).

Compared with the patients who did not respond, respondents were more likely to be older (median age 65.5 v 62.1 years) and have had cancer (Table 1). However, data was less complete for those who had not responded with some values missing.

Of the 371 patients who responded, 105 patients had some form of psychological sequelae (28.3%). The incidence of anxiety, depression and PTSD were 19.7%, 21.6% and 14.3%

respectively. Patients who had psychological sequelae were more likely to be female, younger, have had emergency surgery, have benign disease, have had a stoma, required critical care and had a complication when compared with those who did not develop psychological sequelae (Table 2). However, on multiple regression analysis only younger age, female gender and critical care stay were statistically significant risk factors for developing psychological sequelae (Table 3).

On the quality of life visual analogue score (EQ-VAS), patients scored themselves a median of 80 out of 100 (range 9-100). Self-reported quality of life was significantly lower for patients who had emergency surgery, benign disease and critical care admission. Gender, age, complications and stoma formation were not associated with lower quality of life score. Quality of life highly correlated with psychological sequelae with those with psychological problems scoring a median of 55/100 compared with 82/100 for those without ($p=0.000$).

Referral for psychological therapy

The GPs of all patients identified as at risk for either anxiety, depression or PTSD were informed. The resources available varied by trust. Not all GPs had access to psychological therapies. We were able to refer participants directly to a liaison psychologist, but it was clear that this could only be done on a trial basis and that they would not be able to cope with the demand if this was required regularly. Where it was available, the participants who had been treated for cancer were referred to charities offering psychological support; this was not available for participants who had not had cancer. With consent, participants were referred. The number who accepted referral and attended appointments is not known.

Discussion

This study has shown that likely diagnosis of the psychological disorders investigated (anxiety, depression and PTSD) and reduced health-related quality of life are common in patients who have undergone colorectal surgery in the preceding 3 years and likely much more prevalent than in the general population. The risk was shown to be particularly high for younger and female patients, as has previously been shown for mental health problems [2] and for patients who required critical care stay, as has been shown in previous studies [28].

Interestingly, although not a significant risk factor, this study has shown a trend in patients who had surgery for cancer being less likely to have psychological problems compared to patients having surgery for benign conditions. Patients with benign conditions were younger, and this has been shown to be a risk factor, and the majority of cancer operations were performed electively, whereas there was a higher proportion of benign operations performed as an emergency. Those who underwent emergency surgery reported lower quality of life and were more likely to require critical care stay.

However, there is also more support available to patients with cancer. All cancer patients should have regular holistic needs assessment including assessment of psychological needs [29] and all MDTs should have access to a liaison psychiatrist or clinical psychologist [30] . Although we found that this was not always the case, all patients undergoing surgery for cancer did have access to a specialist nurse and to psychological therapies via local charities. Patients with inflammatory bowel disease (IBD) should also have access to supporting services including a psychologist or counsellor [31] but we found no psychological support available to the patients who had undergone surgery for any benign condition.

Contrary to previous studies [20], formation of a stoma was not associated with poorer quality of life and was not a significant risk factor for psychological sequelae. As patients who undergo emergency surgery are more likely to have a stoma, it may be that it is the emergency surgery, rather than the stoma that is associated with poorer quality of life. It may also be that the pre-operative counselling by stoma nurses or the enhanced contact with support services at home that these patients often have, may be effective in reducing mental health problems.

Given that a significant proportion of patients who have undergone these frequently performed procedures have psychological sequelae, it raises the need for better recognition and treatment of these mental health complications, along with physical complications. Potentially we should be screening patients with benign disease who undergo colorectal resection for psychological problems, in a way similar to which the holistic needs assessment does for patients with cancer. Patients who have had emergency surgery, complications or required ITU may be a group to focus on. However, as well as recognising patients at risk, access to psychological therapies needs to be improved.

Cross government strategy ‘no health without mental health’ (mental health strategy for England 2011) identified that some mental health problems are becoming more prevalent and that there is a need to improve access to treatment [32]. The improving access to psychological therapies (IAPT) programme is a large-scale initiative to increase availability of NICE recommended psychological treatment for depression and anxiety disorders within NHS England [33]. Although this was not an intended outcome of the study, it was incidentally found that there are few resources available to patients with benign disease and current services would not cope with the increased demand of increased diagnoses if they were on such a scale as this study suggests. Given the potential scale of the issue with emergency surgery and IBD surgery, one of the aspects that could be assessed is the provision of self-help or online resources for patients to access. Some studies have found internet-based cognitive behavioural therapy (CBT) to be beneficial to patients with PTSD but further work is needed to determine long term efficacy [34].

Of course, prevention is always better than treatment, and it is possible that increased support following surgery could reduce the incidence of psychological complications. Many critical care departments follow-up patients to screen for and treat psychological problems as recommended by NICE [35], but although critical care stay was one of the few significant risk factors found, the majority of patients with psychological problems had not required critical care. As mentioned, the pre-operative and ongoing support that is available to cancer and stoma patients is potentially reducing psychological morbidity in these groups and similar support should be offered to other patients, where possible, prior to surgery, and for those who have undergone emergency surgery, prior to discharge. Information provision is low-cost and requires few resources but has been shown to reduce psychological stress [36].

This study was designed to act as a building block for future research with a view to designing a prospective study and to provide for sample size calculations. As such there are significant limitations to the conclusions that can be drawn from this. We could not obtain a baseline mental health score to identify those patients with pre-existing conditions and therefore cannot ascertain whether undergoing surgery is the cause of any psychological problems identified. There is a low response rate (32%), however it is representative of many postal questionnaires for retrospective studies. Where it was reported, the other studies of psychological problems after surgery that we found [13-19], reported higher response rates but many of these had smaller sample sizes or reported shorter-term results. Due to the low

response rate, there may be an element of selection bias leading to an over- or underestimation of the problem. Patients who have psychological problems may be more likely to respond as they feel the questionnaires are more relevant to them, they may want to raise awareness of the issues they face or may have used it as an opportunity to access therapies. Equally, due to the stigma associated with mental health disorders, patients with psychological problems may choose not to respond to avoid such diagnosis. The response rate may have been improved by approaching potential participants in clinic, but not all patients were still under follow-up, and this would have likely led to more cancer patients being recruited. Sending a reminder may have also increased response, but it was limited by funding available.

Furthermore, the questionnaires that were used are designed as a screening tool. The sensitivity and specificity for these tools is over 80% [22, 23] but for a diagnosis of anxiety or depression to be made, patients require assessment by a doctor or mental health specialist. The PTSD screening tool used is a self-reported checklist corresponding to the DSM criteria for PTSD and therefore can be used for screening or to make a provisional diagnosis [24]. However, for a diagnosis of PTSD to be made, patients must be assessed by a mental health specialist. Therefore, the actual prevalence of these disorders is likely to be lower as not all patients who screen positive will have the diagnoses. However, there are varying cut-offs for these tools and we chose to use a higher cut-off score than some papers report in an attempt to reduce over-estimating the problem.

Despite these weaknesses we feel that this study represents a start in identifying need for further investigation of this area.

Conclusion

Patients who have undergone colorectal resection appear to be at higher risk of anxiety, depression and PTSD than the general population, with younger patients and women particularly at risk. Patients who had emergency surgery, benign disease and critical care admission had lower self reported quality of life. Prospective studies are required to more accurately understand the prevalence and how we can prevent, better recognise and treat psychological complications. Improved access to therapies is needed, especially for those who have undergone emergency surgeries for benign conditions, who generally have fewer resources available to them.

References

1. National Cancer Institute. *NCI Dictionary of cancer terms.* Available from: https://www.cancer.gov/publications/dictionaries/cancer-terms/def/survivorship [Accessed 12 Dec 2019}.

2. Mind. *Mental health facts and statistics.* Available from: https://www.mind.org.uk/information-support/types-of-mental-health-problems/statistics-and-facts-about-mental-health/how-common-are-mental-health-problems/#.XPPOAq3Mw_U[Accessed 2 June 2019].

3. Mental Health Foundation. *Anxiety.* Available from: https://www.mentalhealth.org.uk/a-to-z/a/anxiety [Accessed 12 Dec 2019}.

4. Mental Health Foundation. *Depression.* Available from:https://www.mentalhealth.org.uk/a-to-z/d/depression [Accessed 12 Dec 2019}.

5. Bryant, R.A. (2019) Post-traumatic stress disorder: a state-of-the-art review of evidence and challenges. *World Psychiatry, 18 (3): 259-69.* doi: 10.1002/wps.20656

6. National Institute for Health and Care Excellence. Common mental health problems: identification and pathways to care. Clinical Guideline, CG123. 2011. Available from: https://www.nice.org.uk/guidance/cg123/chapter/1-Guidance#steps-2-and-3-treatment-and-referral-for-treatment [Accessed 18 Nov 2019]

7. Brewin, C.R., Andrews, B., Valentine, J.D. (2000) Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol., 68(5): 748-66.* doi: 10.1037//0022-006x.68.5.748

8. Doubova, S.V., Aguirre-Hernandez, R., Gutierrez-de la Barrera, M., Infante-Castaneda, C., Perez-Cuevas, R. (2015) Mexican adult cancer patients: validation of the Mexican version of the Short-Form Supportive Care Needs Questionnaire (SCNS-SFM). *Supportive Care in Cancer, 23(9):2711-9.* doi: 10.1007/s00520-015-2634-8

9. Goerling, U., Foerg, A., Sander, S., Schramm, N., Schlag, P.M. (2009) The impact of short-term psycho-oncological interventions on the psychological outcome of cancer patients of a surgical-oncology department - a randomised controlled study. *European Journal of Cancer, 47(13):2009-14.* doi:10.1016/j.ejca.2011.04.031

10. Lien, C.Y., Lin, H.R., Kuo, I.T., Chen, M.L. (2009) Perceived uncertainty, social support and psychological adjustment in older patients with cancer being treated with surgery. *Journal of Clinical Nursing, 18(16):2311-9.* doi: 10.1111/j.1365-2702.2008.02549.x

11. Holch, P., Absolom, K.L., Pini, S., Hill, K.M., Liu, A., Sharpe, M., Richardson, A., Hosker, C., Velikova, G., NCRI COMPASS Supportive and Palliative Care Collaborative. (2011) Oncology professionals' views on the use of antidepressants in cancer patients: a qualitative interview study. *BMJ supportive & palliative care, 1(3):301-5.* doi: 10.1136/bmjspcare-2011-000076

12. Admiraal, J.M., Reyners, A.K., Hoekstra-Weebers, J.E. (2013) Do cancer and treatment type affect distress? *Psycho-Oncology, 22(8):1766-73.* doi: 10.1002/pon.3211

13. Stoll, C., Schelling, G., Goetz, A.E., Kilger, E., Bayer, A., Kapfhammer, H.P. et al. (2000) Health-related quality of life and post-traumatic stress disorder in patients after cardiac surgery and intensive care treatment. (2000) *Journal of Thoracic & Cardiovascular Surgery*, *120(3):505-12.*

14. Deisseroth, K., Hart, R.A. 92012) Symptoms of post-traumatic stress following elective lumbar spinal arthrodesis. *Spine, 37(18):1628-33.* doi:10.1097/BRS.0b013e318255e214

15. Liberzon, I., Abelson, J.L., Amdur, R.L., King, A.P., Cardneau, J.D., Henke, P., Graham, L.M. (2006) Increased psychiatric morbidity after abdominal aortic surgery: risk factors for stress-related disorders. *Journal of Vascular Surgery, 43(5):929-34.*

16. Posluszny, D.M., Edwards, R.P., Dew, M.A., Baum, A. (2011) Perceived threat and PTSD symptoms in women undergoing surgery for gynecologic cancer or benign conditions. *Psycho-Oncology, 20(7):783-7.* doi: 10.1002/pon.1771

17. Anastasiou, I., Yiannopoulou, K.G., Mihalakis, A., Hatziandonakis, N., Constantinides, C., Papageorgiou, C., Mitropoulos, D. (2011) Symptoms of acute posttraumatic stress disorder in prostate cancer patients following radical prostatectomy. *American Journal of Mens Health,* 5(1):84-9. doi: 10.1177/1557988310365168

18. Tjemsland, L., Soreide, J.A., Malt, U.F. (1998) Posttraumatic distress symptoms in operable breast cancer III: status one year after surgery. *Breast Cancer Research & Treatment,* 47(2):141-51

19. O'Connor, M., Christensen, S., Jensen, A.B., Moller, S., Zachariae, R. (2011) How traumatic is breast cancer? Post-traumatic stress symptoms (PTSS) and risk factors for severe PTSS at 3 and 15 months after surgery in a nationwide cohort of Danish women treated for primary breast cancer. *British Journal of Cancer,* 104(3):419-26. doi: 10.1038/sj.bjc.6606073

20. Ang, S., Chen, H., Siah, R., He, H., Klainin-Yobas, P. (2013) Stressors relating to patient psychological health following stoma surgery: an integrated literature review. *Oncology Nursing Forum,* 40(6):587-94. doi: 10.1188/13.ONF.587-594

21. Department of Health, Macmillan Cancer Support & NHS Improvement. *Living with & Beyond Cancer: Taking Action to Improve Outcomes, 18455*. 2013. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/181054/9333-TSO-2900664-NCSI_Report_FINAL.pdf. [Accessed 2 June 2019]

22. Spitzer, R.L., Kroenke. K., Williams, J.B., Lowe, B. (2006) A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*, 166 (10): 1092-7.

23. Kroenke, K., Spitze, R.L., Williams, J.B. (2001) The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16 (9): 606-13.

24. Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., Schnurr, P.P. (2013). The PTSD Checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov. [Accessed 2 June 2019]

25. Herdman, M., Gudex, C., Lloyd, A., Janssen, M.F., Kind, P., Parkin, D. et al. (2011) Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). *Quality of Life Research,* 20 (10): 1727-36. doi: 10.1007/s11136-011-9903-x

26. IBM SPSS Statistics for Macintosh, Version 25.0.

27. Dindo, D., Demartines, N., Clavien, P. (2000) Classification of surgical complications. *Annals of Surgery*, 240 (2): 205-13. doi: 10.1097/01.sla.0000133083.54934.ae

28. Wade D, Hardy R, Howell D, Mythen M. (2013) Identifying clinical and acute psychological risk factors for PTSD after critical care: a systematic review. *Minerva Anestesiologica,* 79(8): 944-63.

29. Department of Health, Macmillan Cancer Support & NHS Improvement. National Cancer Survivorship Initiative Vision, 12879. 2010 Available from: https://webarchive.nationalarchives.gov.uk/20100809113601/http://www.improvement.nhs.uk/cancer/LinkClick.aspx?fileticket=4apVUSvGcow%3d&tabid=214 [Accessed 2 June 2019]

30. National Institute for Health and Care Excellence. Improving Outcomes in Colorectal Cancers. 2004. Available from: https://www.nice.org.uk/guidance/csg5/evidence/full-guideline-pdf-2188969885 [Accessed 18 Nov 2019]

31. National Institute for Health and Care Excellence. Inflammatory Bowel Disease Quality Standard, QS81. 2015. Available from: https://www.nice.org.uk/guidance/qs81/chapter/quality-statement-2-multidisciplinary-team-support#quality-statement-2-multidisciplinary-team-support [Accessed 2 June 2019]

32. Department of Health. No Health Without Mental Health: A Cross-Government Mental Health Outcomes Strategy for People of All Ages, 14679. 2011. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/213761/dh_124058.pdf [Accessed 2 June 2019]

33. The National Collaborating Centre for Mental Health. Improving Access to Psychological Therapies Manual, 08101. 2018. Available from: https://www.england.nhs.uk/wp-content/uploads/2019/02/improving-access-to-psychological-therapies-manual.pdf [Accessed 2 June 2019]

34. Lewis, C., Roberts, N., Simon, N., Bethell, A., Bisson, J. (2019) Internet-based cognitive behavioural therapy (i-CBT) for post-traumatic stress disorder (PTSD): systematic review and meta-analysis. Acta Psychiatrica Scandinavica [Epub ahead of print]. doi: 10.1111/acps.13079

35. National Institute for Health and Care Excellence. Rehabilitation after critical illness in adults Quality Standard, QS158. 2017. Available from: https://www.nice.org.uk/guidance/qs158/chapter/Quality-statement-4-Follow-up-after-critical-care-discharge [Accessed 4 Jan 2020]

36. Husson O, Mols F, van de Poll-Franse LV. (2011) The relationship between information provision and health-related quality of life, anxiety and depression among cancer survivors: a systematic review. *Annals of oncology;* 22(4):761-772.

Tables and figures

		Respondents n=371	**Non-respondents n = 779**	**p Value**
Male-	Yes	190 (51%)	293 (47%)	0.163
	No	181 (49%)	328 (53%)	
	Unknown	0	158	
Age-	Median	65.5 years	62.1 years	0.002
	Range	20-99	18-94	
	Missing	0	151	
Surgery-	Elective	286 (77%)	460 (73%)	0.118
	Emergency	85 (23%)	166 (27%)	
	Unknown	0	153	
Cancer-	Yes	219 (59%)	375 (48%)	0.000
	No	59 (41%)	369 (47%)	
	Unknown	0	35 (5%)	
Pathology-	Colorectal cancer	219 (59%)	375 (48%)	0.000
	Diverticular disease	47 (13%)	81 (10%)	
	Benign polyp(s)	30 (8%)	50 (6%)	
	Crohn's disease	19 (5%)	73 (9%)	
	Ulcerative colitis	12 (3%)	42 (5%)	
	Ischaemia	6 (2%)	10 (1%)	
	Unspecified colitis	5 (1%)	13 (2%)	
	Volvulus	5 (1%)	15 (2%)	
	Unspecified perforation	5 (1%)	19 (2%)	
	Unspecified benign mass	4 (1%)	30 (4%)	
		3 (1%)	8 (1%)	
	Appendicitis	3 (1%)	3 (<1%)	
	Hernia	13 (4%)	60 (8%)	
	Other/ Unknown			
Operation-	Right hemicolectomy	134 (36%)	278 (36%)	
	Anterior resection	79 (21%)	124 (16%)	
	Hartmann's	45 (12%)	56 (7%)	
	Total colectomy	36 (10%)	112 (14%)	
	Sigmoid colectomy	30 (8%)	107 (14%)	
	APER	17 (5%)	30 (4%)	
	Left hemicolectomy	15 (4%)	27 (3%)	
	Proctectomy	5 (1%)	25 (3%)	
	Pelvic clearance	4 (1%)	8 (1%)	
	Ileocolic resection	4 (1%)	6 (1%)	
	Transverse colectomy	2 (1%)	2 (<1%)	
	Missing	0 (0%)	4 (1%)	

Table 1. Comparison of respondents and non-respondents

	Any psychological sequelae (anxiety, depression or PTSD) n=105	**No psychological sequelae n=266**	**p Value**
Follow-up (months)	30 (range 18-43)	28.5 (range 18-47)	0.326
Male	42 (40%)	148 (56%)	0.007
Median age (years)	60 (range 20-85)	70 (range 22-99)	0.000
Emergency surgery	32 (30%)	53 (20%)	0.029
Cancer	46 (44%)	173 (65%)	<0.0001
Stoma	52 (50%)	100 (38%)	0.038
Critical care stay	28 (27%)	43 (16%)	0.021
Median length of stay (days)	9 (range 3-77)	9 (range 2-107)	0.087
Complication (Clavien Dindo 3+)	12 (11%)	20 (8%)	0.227
Operation Right sided Left sided Total Colectomy Proctectomy/ APER/ TPE	 36 (34%) 44 (42%) 17 (16%) 8 (8%)	 104 (39%) 125 (47%) 19 (7%) 18 (7%)	 0.062

Table 2. Comparison of patients with and without psychological sequelae

Risk factor	Odds ratio	95% Confidence Interval	p Value
Increasing age	0.939	0.918-0.961	**0.000**
Emergency surgery	1.574	0.802-3.088	0.187
Cancer	1.110	0.592-2.082	0.745
Stoma	1.381	0.780-2.443	0.268
Critical care	2.593		**0.006**
Female gender	1.815	1.033-3.187	**0.038**

Table 3. Risk factors on logistic regression