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Honors Thesis Proposal:

Predictors of psychosocial and physiological distress in colorectal cancer patients

Project purpose:

My goal is to determine what patient characteristics contribute to psychological and physiological distress in colorectal cancer patients, and whether there is any association between different measures of distress in these patients. In accomplishing this objective, I will answer the following questions: 1. Are there any demographic or clinical factors among colorectal cancer patients that are associated with higher distress levels? 2. Are different measures of patient distress (i.e. psychosocial and physiological) correlated with each other? 3. Are there certain unmet patient needs, such as physical and sociological insufficiencies, that are predictive of patient distress?

Project Importance:

In addition to conventional vital signs such as pulse, respiration, and blood pressure, distress is now recognized as an important indicator of cancer patient status (1, 2). Cancer-related distress is defined as “as psychological, social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms, and its treatment” (3) and is correlated with adverse clinical outcomes. As such, understanding what patient characteristics are associated with high levels of distress is crucial both to understanding the nature of distress in cancer patients, as well as implementing proper intervention to minimize adverse patient outcomes due to distress.

Although the relationship between distress and negative outcomes in cancer patients has been examined in the literature, further exploration is required to elucidate its role in specific

cancer populations (4). Specifically, the role that distress plays in colorectal cancer patient outcomes has not been explored in the literature as much as when compared to other leading cancers despite the fact that colorectal cancer is the third most common and second most lethal cancer in the United States (9). By narrowing our sample to patients taken from the colorectal cancer population, my team and I hope to produce results that are both enlightening and practical for physicians who interact with and treat colorectal cancer patients.

Project Overview

Data collection:

Data collection for this study has already been completed. Our sample cohort includes 238 colorectal cancer patients seen in the University of Michigan Comprehensive Cancer Center (UMCCC) between June 2012 and May 2014. At the time of their first appointment, each patient was given survey that included three items: the Distress Thermometer and Impact Thermometer (collectively DIT), the Problem List, and the Hospital Anxiety and Depression Survey (HADS). Both the DIT and the Problem List are tools developed by the National Comprehensive Cancer Network (NCCN) (3). The DIT includes two measures which patients rate on a 1-10 scale: first, the distress they are experiencing, and second, the impact that distress has on their day-to-day life. The Problem List allows patients to indicate unmet needs contributing to their distress, divided into emotional, physical, spiritual, social, and practical needs. The HADS is a validated diagnosis tool which scores each patient based on separate criteria for anxiety and depression and designates the patient as normal, borderline, or abnormal for both illnesses (4, 5). In addition to these survey measures, we abstracted demographic and clinical data from patient charts. Collected demographic data includes age, sex, race, and insurance information. Clinical data includes cancer type, cancer stage, and physical/mental comorbidities.

Distress Measures:

In examining the various predictors and effects of patient distress, we have elected to measure three different potential indicators of patient distress: self-reported distress, salivary cortisol levels, and patient frailty. By doing so, we hope to establish patient characteristic associations with both psychosocial and physiological indicators of distress.

Self-reported distress is a measure obtained from the DIT given to each patient which asks patients to rate their distress on a 1-10 scale. In addition to the survey, participating patients were asked to provide a salivary cortisol sample following their appointment. Cortisol released by the adrenal gland is a stress-induced bodily response, and we hypothesize that it will be a useful indicator of distress in addition to the DIT. Patients were provided with a saliva collection kit (Sarstedt Inc.) and were instructed to chew a cotton roll at 3 pm on one day during the week following their appointment. This time was chosen because it has the highest likelihood of producing an unaffected, undistorted cortisol measurement, and the consistency of the time across all patients reduces the effect of confounding variables (6).

Patient frailty was determined by abstracting CT scans collected as part of the initial work up for each CRC patient. Katherine Maturen, MD, Professor of Radiology, calculated two morphometric indicators of frailty from these scans: psoas muscle area and lean psoas muscle area. Muscle frailty and wasting, similar to the cortisol response, represents a physiological indicator of patient distress (7, 8).

Analysis:

Because I joined this project after the data had been collected, my role on the team has been to lead the analysis, generate possible hypotheses, and discover novel associations between

the distressed measures and patient characteristics. I began the analysis this past summer as an intern at the S-SPIRE surgical research center at the Stanford School of Medicine. My mentor, Dr. Morris, left the University of Michigan after the data was collected to lead the S-SPIRE research center and has remained involved with her team at the UM. However, because of various factors including her move to Stanford much of the potential of this dataset has been unanalyzed, and nothing has yet been published on it. When I arrived at Stanford, Dr. Morris gave me primary responsibility for analysis of the data, allowing me to decide what to explore, which hypotheses to examine, and to determine plausible analytical narratives for future publications. Despite having now returned to BYU, I am still working remotely with Dr. Morris to complete the analysis.

I am performing the analysis for this study using R statistics software. Relationships between demographic, clinical, problem and distress measures were assessed using chi-squared tests, spearman-rank correlations, and Wilcoxon rank-sum tests. Indicators of distress are defined as self-reported distress (DIT), salivary cortisol levels, and frailty measures. Demographic variables including gender, race, and relationship status will be assessed for possible associations with any of these three distress indicators, and the same analysis will be applied for clinical factors (cancer type, cancer stage, etc.) and Problem List/HADS variables (depression, anxiety, physical problems, emotional problems etc.). I am performing analyses for each of these variable sets stratifying at three different age levels: 15-49, 50-65, and 66+. I will also perform Kaplan-Meier survival analysis for different groupings of cancer patients based on characteristics such as age, race, and level of distress.

Qualifications of Thesis Committee:

Faculty Advisor: Dr. Piccolo

Dr. Piccolo is a bioinformatics professor at BYU with whom I have a relationship both through research and through classwork. He has a PhD in biomedical informatics from the University of Utah and has expertise in biostatistical methods. He has mentored and supported me in many ways during my time here at BYU, and his extensive experience with medical, translational research makes him an excellent fit as a committee member for my thesis.

Faculty Reader: Dr. Morris

Dr. Morris is a colorectal cancer surgeon and is the director of the S-SPIRE center at the Stanford School of Medicine and was my mentor this past summer. Prior to her time at S-SPIRE, she was the leader of 4-year program related to colorectal cancer research at the University of Michigan, during which time the data for this study was collected. She is an prolific researcher who with her medical expertise leads the S-SPIRE center in producing impactful research targeted at improving surgical patient outcomes. Her expertise, in addition to the mentor relationship I already have with her through this project, makes her an ideal member of my thesis committee.

Project Timeline:

November	December	January	February	March	April	May	June
Completion of Data Analysis							
		Write-up and Submission of Manuscript for Publication					
		Write-up and Preparation of Thesis				Thesis Defense	

IRB Approval:

IRB approval for this project has already been obtained through the University of Michigan Institutional Review Board. ID: HUM00067945

Funding:

No additional expenses for this project are anticipated

Culminating Experience:

My experiences with this project will prepare me for a career as an academic physician. My mentor and I intend to publish the results of my research, as well as present the results at relevant academic conferences. Additionally, Dr. Morris has offered me a position as a Research Analyst at the S-SPIRE center at Stanford following graduation. Working with her closely on this thesis will allow me to develop an important mentor relationship that has the potential not only for immediate impact via publication, but also for lasting import as I continue my career at the S-SPIRE center after my time here at BYU.

Sources:

1. Bultz BD, Carlson LE. Emotional Distress: The Sixth Vital Sign in Cancer Care. *J Clin Oncol*. September 10, 2005 2005;23(26):6440-6441.
2. Bultz BD, Carlson LE. Emotional distress: the sixth vital sign--future directions in cancer care. *Psychooncology*. Feb 2006;15(2):93-95.
3. National Comprehensive Cancer Network. *NCCN Clinical Practice Guidelines in Oncology: Distress Management, version 3.2012*. Fort Washington, PA: National Comprehensive Cancer Network; 2012, March 2012.
4. Carlson LE, Waller A, Mitchell AJ. Screening for distress and unmet needs in patients with cancer: review and recommendations. *J Clin Oncol*. Apr 10 2012;30(11):1160-1177.
5. Mitchell AJ. Short screening tools for cancer-related distress: a review and diagnostic validity meta-analysis. *J*. Apr 2010;8(4):487-494.
6. Dev R, Hui D, Dalal S, et al. Association Between Serum Cortisol and Testosterone Levels, Opioid Therapy, and Symptom Distress in Patients with Advanced Cancer. *Journal of Pain and Symptom Management*. 2011;41(4):788-795.

7. Poterucha T, Burnette B, Jatoi A. A decline in weight and attrition of muscle in colorectal cancer patients receiving chemotherapy with bevacizumab. *Med Oncol*. Jun 2012;29(2):1005-1009.
8. Caram M, Bellile E, Englesbe M, et al. The Impact of Sarcopenia On Transplant-Related Outcomes in Patients with Non-Hodgkin's and Hodgkin's Lymphoma. *American Society for Blood and Marrow Transplantation and Center for International Blood and Marrow Transplant Research, BMT Tandem Meetings*. Salt Lake City, UT2013.
9. Jemal A, Simard EP, Dorell C, et al. Annual Report to the Nation on the Status of Cancer, 1975–2009, Featuring the Burden and Trends in Human Papillomavirus (HPV)–Associated Cancers and HPV Vaccination Coverage Levels. *J Natl Cancer Inst*. January 7, 2013 2013.