Anxiety, Depression, and Resilience among Sexual Minority Colorectal Cancer Survivors: A Secondary Analysis

Dillon B. Van Rensburg

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Rachel Ceballos

& Hallie Pritchett

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Abstract

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Dillon B. Van Rensburg

Chair of the Supervisory Committee:

Rachel Ceballos

Department of Health Systems and Population Health

This secondary research study explores potential relationships between mental health counseling and anxiety, depression, and resilience among sexual minority group colorectal cancer (SMG CRC) survivors through secondary data analyses. It employs secondary data analysis using data from a cross-sectional research study conducted by Boehmer and colleagues from 2015-2019. Descriptive statistics, chi-square tests, independent sample t-tests, Analysis of Variance (ANOVA), and analysis of covariance (ANCOVA) were used to determine the effects of mental health counseling on primary outcomes. All hypotheses regarding lower levels of anxiety and depression and higher levels of resilience in those who never used mental health counseling vs. ever were not supported by the data. However, mental health counseling should remain an important component of cancer care for SMG CRC survivors and more tailored interventions considering SMG potential stress inducers in cancer survivorship should be evaluated.

Introduction

Sexual Minority Groups (SMGs) are individuals identifying as gay, lesbian, or bisexual, and/or find themselves attracted to people of the same gender (APA, n.d.; Gordon et al., 2019). The health statuses and implications of sexual orientation on health outcomes of SMG populations have been scarcely studied in recent decades (Lisy et al., 2018). The inferences of sexual orientation on colorectal cancer (CRC) survivorship is even less explored. A recent meta-analysis suggested SMG CRC survivors have high levels of anxiety and depression that are often exacerbated by cancer diagnosis and treatment (Weeldreyer, 2019). It also emphasized the need for more intervention data to treat mental health conditions within SMG CRC survivors, such as through counseling. Building on these insights, this secondary research study explores potential relationships between mental health counseling and anxiety, depression, and, additionally, resilience among SMG CRC survivors through secondary data analyses.

Cancer is "a disease in which human cells grow uncontrollably and spread to other areas of the body" (NCI, 2021). The reality is that cancer impacts many individuals and their families throughout the world (WHO, n.d.). In the United States, the American Cancer Society predicts almost 2 million new cancers will be diagnosed in 2022 and over 600,000 will result in death (ACS, 2021). Of these estimates, over 150,000 will be diagnosed as new colorectal cancer cases in the United States (ACS, 2022). The high magnitude of disease burden from cancer makes this topic of particular importance as a public health issue. Many organizations have strategic plans aiming to reduce and eliminate cancer in our society as a result (e.g., American Cancer Society, National Cancer Institute). However, there is a need for more data to bridge gaps in cancer health equity. Studies concluded more research on psychological outcomes of cancer in SMG populations is necessary, and the inclusion of SMG-related research is an effective strategy for eliminating

disparities within this population (Lisa A. Eaton et al., 2015; Quinn et al., 2015). Both the impact of disease burden and the need for CRC survivorship research in SMG populations make this study of interest to be added to current literature.

The term "cancer survivor" refers to individuals alive from the time of cancer diagnosis until the end of their life (NCI, n.d.). Research on cancer survivorship has grown over the past decades with numbers increasing since the early inclusion of these research studies in the 1980s (Harrop et al., 2011). A noticeable surge in cancer survivorship research happened in 1996 when the Office of Cancer Survivorship was created within the National Cancer Institute (Harrop et al., 2011; Rowland et al., 2001). CRC survivorship was a part of this research growth, with noticeable reductions in CRC morbidity and mortality rates seen over time. In addition, a paradigm shift in patient mindset had been noted regarding CRC changing from a deadly disease to an increasingly curable one (Buccafusca et al., 2019; Denlinger & Barsevick, 2009). This information provides promising notions around advancements in CRC treatment and how patients can still achieve a long, fulfilling life with a cancer diagnosis. Nevertheless, research from the American Cancer Society notes that declines in overall CRC incidence rates have actually masked increases in CRC incidence within younger adults (≤ 50 years) by 2% each year, thus their *qualified* recommendations for CRC screenings now start at age 45 vs. the standard 50 years of age (Siegel et al., 2020; Wolf et al., 2018).

Cancer survivorship research is continuously evolving. New CRC survivorship opportunities but also challenges have emerged from increased understanding of early detection, therapeutic strategies, and widespread use of combined modality therapy (i.e., surgery, chemotherapy, and radiotherapy) (Aziz, 2002). Opportunities such as the interplay between medical sociocultural factors (i.e., environmental conditions impacting healthy, adaptive behavior)

and health equity have become critical focus areas to increase the life spans of CRC patients and cancer survivors in general (Aziz, 2002; Boehmer, Potter, et al., 2021; Siegel et al., 2012). Research has exemplified that psychosocial and behavioral health interventions have excellent potential to improve the health-related quality of life, functioning, and medical status of cancer survivors when combined with medical treatment (Aziz & Rowland, 2003; Vijayvergia & Denlinger, 2015). In addition, challenges such as poor integration of comprehensive cancer survivorship services (i.e., preventative services, surveillance, interventions, and care coordination) in primary care settings and the ability to treat significant mental health conditions (e.g., depression and anxiety) from adverse sequelae of cancer, particularly CRC, have been noted in the literature (Aziz, 2002; Cowens-Alvarado et al., 2013; Rubinstein et al., 2017; Siegel et al., 2012).

Medical experts advise counseling to lower psychological distress in cancer survivors as they navigate their life journeys. Siler et al. describe mental health counseling as "an interdisciplinary, multifaceted, holistic process of the (1) promotion of healthy lifestyles, (2) identification of individual stressors and personal levels of functioning, and (3) preservation or restoration of mental health" (Seiler, 1979). Psychosocial support services are widely recognized as an essential component of cancer survivorship care which often requires transdisciplinary approaches (Hewitt, 2006). The reality is that cancer diagnosis and treatment can both take a toll on patients' mental health. Research suggests cancer survivors face unique short and long-term mental health outcomes and that they may occur during or even after treatment (Aziz, 2007; Denlinger & Barsevick, 2009; Naughton & Weaver, 2014). As it relates to CRC, anxiety, and depression are often reported in CRC survivors but, admittedly, can be difficult to assess due to overlapping symptoms of fatigue and physical pain (Peng et al., 2019). One review article found

depression and anxiety to be in 13%–25% of CRC patients (Massie, 2004). Another article reported that 24% of CRC survivors had depression scores high enough to merit clinical depression evaluation (Kahana, 2006). What is important to recognize is that the need for mental health counseling for cancer patients continues to grow; it is encompassed in many peer-reviewed journal articles to date. Research also suggests a high prevalence of mental health conditions among cancer patients, but small proportions of these patients actually seek counseling support (Wang et al., 2020). This raises questions about why cancer survivors may not seek psychosocial support services despite recommendations as a component of comprehensive cancer care. Although many reasons are justified, cancer disparities research does make a connection between psychosocial distress and sexual orientation (Boehmer, Ozonoff, et al., 2021).

SMG cancer survivors are an important yet underrepresented population in cancer research (Boehmer et al., 2011; Kamen et al., 2015) Limited studies suggest that SMG cancer survivors experience higher baseline rates of psychosocial distress (e.g., anxiety, depression) compared to their heterosexual counterparts (Gordon et al., 2019; Lisy et al., 2018). These higher rates are largely credited to additional cancer care barriers unique to this sub-population. For example, intrapersonal and structural-related care barriers, such as obtaining health insurance and lack of SMG provider training, are potential reasons for lower healthcare service engagement noted within SMGs. The Institute of Medicine has even reported verbal abuse and treatment refusal of SMGs from providers in past years which ultimately affected SMG survivors' use of the healthcare system (Medicine, 2011). Regrettably, SMGs tend to report higher levels of discrimination, social stigma, and clinic cultural incompetence from providers as well (Lisy et al., 2018). The issue is that barriers to care increase psychosocial distress, which has numerous concerns for cancer survivorship. Cancer survivors with increased levels of psychological distress are more likely to be diagnosed

with multiple medical conditions, report poorer health from self-assessments, and have higher mortality rates (Gordon et al., 2019; Naughton & Weaver, 2014). As a result, it seems that mental health counseling services, particularly for SMG CRC survivors, are a necessary resource to be shared within this population.

Based on data collected from this study's literature review and particular insights from Wheeldreyer et al., a concept map was developed to better illustrate the relationship between mental health conditions and counseling services predicted by this research team. Figure 1a presents a conceptual model of stressors that impact anxiety, depression, and resilience in SMG CRC populations and Figure 1b demonstrates the impact of mental health counseling. Potential stress inducers were derived from qualitative research studies to describe psychosocial stress inducers that may be experienced within CRC survivors (e.g., inability to work, recent diagnoses). In addition, the figure also includes stressors unique to the SMG cancer experience. Stressors such as heterocentric care, social stigma, and homophobia are reported as barriers to healthcare within these populations as well as diminishers of quality of life and, thus, were added to this model. These stressors are taken into consideration to explore not only how anxiety, depression, and resilience can be altered with mental health counseling but why these mental health conditions may have been exacerbated in the first place. Figure 1a then transitions between SMG CRC survivors who never participated in mental health counseling to those who had ever participated at some point in life. Anxiety, depression, and resilience are listed with the predicted directions these mental health conditions will change based on counseling services or a lack thereof. The

research team ultimately views that mental health counseling will decrease anxiety and depression and increase resilience in SMG CRC survivors.

Figure 1a: Comparing anxiety, depression, and resilience amongst lesbian, gay, and bisexual colorectal cancer survivors without counseling

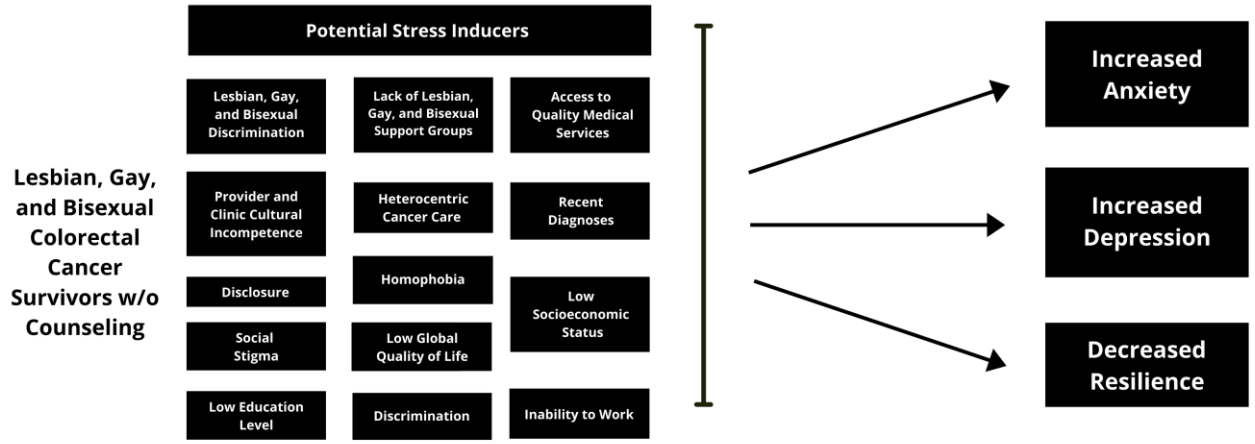
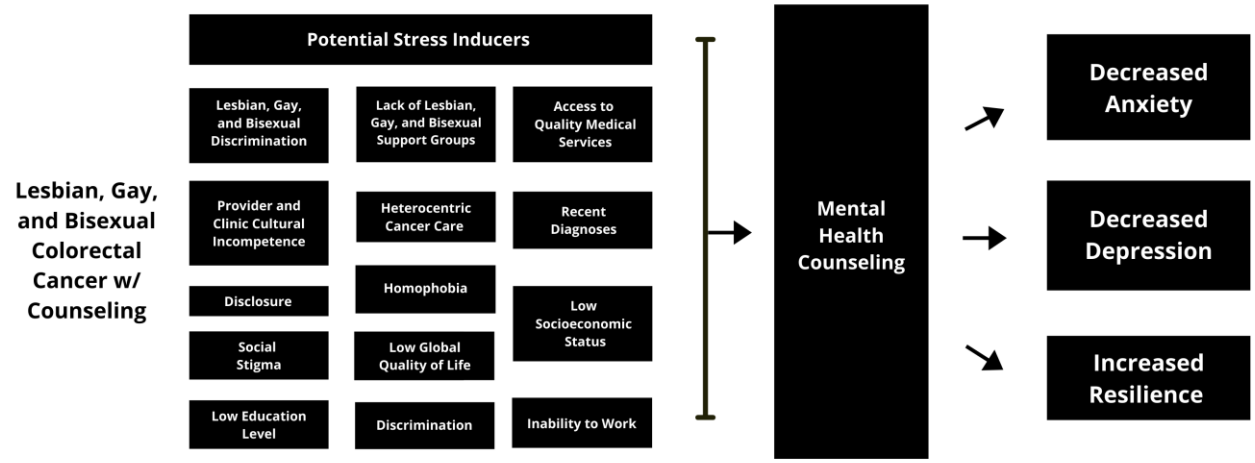


Figure1b: Comparing anxiety, depression, and resilience among lesbian, gay, and bisexual colorectal cancer survivors with counseling



This proposed research study explores the research question, are there differences in anxiety, depression, and resilience levels based on whether an SMG CRC survivor was never in mental health counseling vs. ever. As a result, there are three research aims:

Aim 1. Examine if depression levels are different between SMG CRC survivors who have never vs. ever used mental health counseling.

- H1 | Lesbian, Gay, and Bisexual CRC survivors who have ever used mental health counseling will have lower depression than Lesbian, Gay, and Bisexual CRC survivors who have never used mental health counseling.

Aim 2. Examine if anxiety levels are different between SMG CRC survivors who have never vs. ever used mental health counseling.

- H2 | Lesbian, Gay, and Bisexual CRC survivors who have ever used mental health counseling will have lower anxiety than Lesbian, Gay, and Bisexual CRC survivors who have never used mental health counseling.

Aim 3. Examine if resilience levels are different between SMG CRC survivors who have never vs. ever used mental health counseling.

- H3 | Lesbian, Gay, and Bisexual CRC survivors who have ever used mental health counseling will have higher resiliency levels compared to Lesbian, Gay, and Bisexual CRC survivors who have never used mental health counseling

Methods

Study Population

The current study employs secondary data analysis using data from a cross-sectional research study conducted by Boehmer and colleagues from 2015-2019 (Boehmer, Ozonoff, et al., 2021). The parent study utilized Surveillance, Epidemiology, and End Results (SEER) from four

state cancer registries to assess differences in anxiety and depression between heterosexual and sexual minority colorectal cancer survivors. Mailed packages were sent to participants that included a study recruitment letter, consent form without signature requirement, screening questionnaire, and a pre-addressed stamped return envelope for the screening questionnaire. Those interested in participation completed a questionnaire that assessed anxiety and depression levels. It also conducted short interviews with individuals that agreed to participation. During this time, additional data, including individual factors such as participant sexual orientation, were collected as sexual orientation is not asked as part of SEER data assessment.

There were 6,370 completed screenings collected at a response rate of 35.7%. The initial recruitment letter also explained that survivors may be contacted by a member of the study team to participate in a phone screening. A survivor was eligible for a telephone survey if they sent back a completed screening questionnaire or if they did not opt out of the study. Of the 6,370 survivors who completed the screening questionnaire, 5,750 were eligible for a phone screening. All who self-identified as a member of a sexual minority group and every 10th heterosexual survivor were invited to complete a 45-minute telephone survey. Researchers attempted up to 10 phone calls and 3 voicemails for each participant in order to ensure due diligence in contact attempts. Out of those invited, a total of 719 survivors ultimately received an invitation to complete a telephone screening. Out of the 719 invites, 127 could not be located for the telephone survey, 108 refused to participate, and 4 were deemed ineligible at the time. Ultimately, 480 survivors participated in the telephone screening.

Selection of Study Subjects

To be considered eligible for this secondary study, participants must:

- Identify as man or woman based on the binary male/female "sex" categorization from the cancer registries
- Have received a diagnosis of colorectal cancer or rectal carcinoma less than 5 years prior to the study
- Have a diagnosis of cancer stage I, II, or III at time of diagnosis
- Be 21 years of age or older
- Speak English
- Identify as a SMG (i.e., lesbian, gay, or bisexual)

Of the 480 individuals that participated in the parent study, 127 identified as a SMG. Those 127 participants are the focus of the current study.

Data Collection Measurements:

Anxiety and Depression Scales. Anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS) that accounts for symptoms over the past week. Scores ranged from 0 to 21, a score of 8 or higher indicated the presence of depression or an anxiety disorder. In addition, questions were pulled from the health-related anxiety scale of the European Organisation for Research and Treatment of Cancer (EPRTC) module for colorectal cancer. Based on the results, researchers dichotomized the findings of this 0-100 scale into <50 or 51+ categories to distinguish elevated health-related anxiety.

Resilience Scale. An RS-14 scale was used to assess resilience levels in participants. Questions on the test ranged in different topic areas such as life management, attitude and beliefs towards oneself, and sense of purpose in life, amongst other factors. The scores ranged from 14-98 with higher scores indicating superior levels of resilience tendencies.

Demographic Information. Individual factors were captured from questions regarding sexual orientation, sex, and age at diagnosis. The questionnaire utilized the Index of Concentration at the Extremes (ICE) to capture spatial social and economic polarizations between survivors. In addition, registry data measures provided geographic distribution, income levels, education levels, and discrimination experiences.

Analysis Plan:

All variables were checked for normality and the presence of outliers. Variables were then selected to address the research aims and hypotheses of the study. Descriptive statistics and chi-square tests were used to provide sociodemographic characteristics of participants at baseline. Simple associations using independent sample t-tests and ANOVA between demographic and outcome variables (i.e., anxiety, depression, and resilience) were conducted to determine the need for control variables. Analysis of covariance (ANCOVA) with relevant control variables and post hoc analyses were used to determine the effects of mental health counseling on primary outcomes.

Results

Sociodemographic Characteristics. Table 1 refers to sociodemographic characteristics of participants at baseline. All data were compared to both individuals who had never and ever

received mental health counseling services. Statistically significant differences were derived using chi-square tests.

Mental Health Counseling. Out of all 127 individuals identifying as a sexual minority group and colorectal cancer survivor, the majority of individuals (N = 90, 70.9%) had never participated in mental health counseling services while 40 individuals (N = 37, 29.1%) did participate at some point in their life.

Age at Diagnosis. Divided into quartiles (i.e., 23-53, 54-62, 63-70, and 71-83) to balance the distribution in the study sample. Most of the SMG CRC survivors in the study were diagnosed with CRC above the age of 40, with limited individuals in their 20s and 30s. There was no statistical significance to suggest age had an influence on those never in mental health counseling services vs. ever.

Geographic Location. Distribution was more heavily weighted towards those located in California (57, 44.9%) while the remaining individuals resided in Florida (31, 24.4%), Georgia (19, 15.0%), and Washington (20, 15.7%), respectively. The majority of participants who had never (35, 61.4%) and ever (22, 38.6%) been in mental health counseling were from California. There was no statistical significance to suggest geographic location by state influenced mental health counseling participation.

Sex. Almost half of the sample (60, 47%) identified as male while the remaining identified as female (67, 52.8%). There was statistical significance to suggest sex was a predicting variable between those identifying as male and female and those never in mental health counseling vs. ever.

Education levels. Varied amongst participants ranging from high school education or less to graduate level. Most individuals in the study completed some level of college/vocational school

or higher (N = 109, 86.5%) compared to those with a high school education level or less (17, 13.5%). Although close, there was no statistical significance between education levels and never vs. ever mental health counseling participation found in the analysis (p = .07). However, as the education level increased, mental health counseling usage substantially increased.

Discrimination. Dichotomized into either no experience of discrimination or any level of discrimination that a person felt in their lifetime. Less than half of SMG CRC survivors (N = 52, 41.3%) indicated experiences with discrimination at some point in their life. Despite those indicating some level of experience with discrimination, the majority of participants (N = 40, 76.9%) had never participated in mental health counseling. There was no statistical significance found between discrimination scores and mental health counseling use.

Table 1

Sociodemographic Characteristics of Participants at Baseline

	All SMG CRC survivors n (%)	Never received MHC n (%)	Ever received MHC n (%)	p
SMG CRC Survivors	127 (100)	90 (70.9)	37 (29.1)	
Age at diagnosis				.25
71-83	24 (18.9)	19 (79.2)	5 (20.8)	
63-70	31 (24.4)	25 (80.6)	6 (19.4)	
54-62	45 (35.4)	28 (62.2)	17 (37.8)	
23-53	27 (21.3)	18 (66.7)	9 (33.3)	
Geographic Region				.16
California	57 (44.9)	35 (61.4)	22 (38.6)	
Florida	31 (24.4)	23 (74.2)	8 (25.8)	
Georgia	19 (15.0)	15 (78.9)	4 (21.1)	
Washington	20 (15.7)	17 (85.0)	3 (15.0)	

Sex				.03
Male	60 (47.2)	48 (80.0)	12 (20.0)	
Female	67 (52.8)	42 (62.7)	25 (37.3)	
Education				.07
HS grad or less	17 (13.4)	15 (88.2)	2 (11.8)	
Vocational /technical /some college	36 (28.3)	28 (77.8)	8 (22.2)	
Graduate from college	39 (30.7)	27 (69.2)	12 (30.8)	
Completed grad school	34 (26.8)	19 (55.9)	15 (44.1)	
Discrimination				.19
No Discrimination	74 (58.7)	49 (66.2)	25 (33.8)	
Any Discrimination	52 (41.3)	40 (76.9)	12 (23.1)	

Table 2 describes the scale variable of median household income used to elicit more context on the financial stability of participants within the analysis. Although it did not indicate the personal income of each participant, the mean household income for each sexual minority CRC survivor was $69,949 (SD = 28,893) with a wide range from $14,087 to $143,688 for the participants in the study.

Table 2

Descriptive Statistics for Median Household Income

	N	Mean (SD)	Min, Max
Median household income ($)	127	69,949 (28,893)	14,087, 143,688

Potential Confounders. Table 3 provides the results of independent sample T-Tests that examine sex and discrimination on anxiety, depression, and resilience levels. Statistically significant findings were used as covariates to control for confounding in the ANCOVA.

Anxiety. Levels of anxiety between male and female were similar around a score of 4 on a HADS scale. There was no statistical significance demonstrating a difference between means of sex ($p = .21$). Discrimination yielded similar results with a score around 4 on a HADS scale. There were no statistically significant results found between discrimination scores and anxiety levels ($p = .86$).

Depression. Scores were slightly higher in those identifying as males ($M = 3.73$, $SD = 3.05$) compared to female counterparts ($M = 3.40$, $SD = 3.48$). However, no statistical significance found between depression levels and sex of participants ($p = .57$). Average depression levels based on discrimination were roughly the same at around 3.5. No statistical significance was found between sex ($p = .57$) and discrimination ($p = .90$) and their influence on depression levels.

Resilience. Average resilience levels based on sex were similar between male ($M = 85.5$, $SD = 11.23$) and female ($M = 85.95$, $SD = 10.22$) participants. Participant resilience scores were generally high suggesting higher level of resilience tendencies among all participants. However, there was no statistical significance in mean values between resilience levels and sex ($p = .83$) and discrimination scores ($p = .32$).

Table 3

Results of Independent Sample T-Tests Examining Sex and Discrimination on Anxiety, Depression, and Resilience Levels

	Anxiety			Depression			Resilience		
Sex	*M (SD)*	*t*	*p*	*M (SD)*	*t*	*p*	*M (SD)*	*t*	*p*
Male	4.12 (3.89)	-1.26	.21	3.73 (3.05)	.57	.57	85.55 (11.23)	-.21	.83
Female	4.96 (3.70)			3.40 (3.48)			85.96 (10.22)		
Discrimination Score									
None	4.54 (4.04)	-.18	.86	3.59 (3.38)	.13	.90	86.61 (9.02)	.96	.32
Any	4.67 (3.44)			3.52 (3.18)			84.57 (12.65)		

Note: All variables have equal variances assumed with the exception of discrimination scores to resilience levels.

Table 4 provides the results of one-way ANOVA that examine geographic region, age, and education on anxiety, depression, and resilience levels. Statistically significant findings were used as covariates to control for confounding in the ANCOVA.

Anxiety. Mean scores based on geographic location were similar between the four states. The p-value for the geographic region on anxiety levels was .68 revealing no statistical significance within the population of this study. Average scores of anxiety, however, differed substantially by age of diagnosis, particularly 23-53 (M = 6.11, SD = 4.10) compared to 71-83 age brackets (M = 3.17, SD = 3.03). Education levels also revealed statistically significant difference between groups. Specifically, individuals with a high school education or less reporting higher anxiety levels (M = 7.00, SD = 4.01) compared to those with a graduate-level education (M = 4.35, SD = 4.55).

Depression. Between group differences in geographic regions, age at diagnosis, and education levels were not significantly different for depression levels.

Resilience. There was a statistically significant difference between resilience levels by geographic location of the participant (p = .04). The highest average levels of resilience were reported in California (M = 87.87, SD = 8.52) with the lowest in Florida (M = 81.32, SD = 14.90). There was no data to support that resilience levels differed based on age at diagnosis and education levels.

Table 4
Results of One-Way ANOVA Tests Examining Geographic Region, Age, and Education on Anxiety, Depression, and Resilience Levels

	Anxiety			**Depression**			**Resilience**		
	M (SD)	*F*	*p*	*M (SD)*	*F*	*p*	*M (SD)*	*F*	*p*
Geographic Region									
CA	4.85 (4.42)	.50	.68	3.68 (3.41)	.37	.78	87.87 (8.52)	2.78	.04
FL	3.84 (3.14)			3.71 (3.24)			81.32 (14.90)		
GA	4.79 (2.64)			3.68 (3.54)			85.26 (9.05)		
WA	4.65 (3.87)			2.85 (2.81)			85.76 (7.88)		
Age at diagnosis									
23-53	6.11 (4.10)	3.06	.03	4.37 (4.10)	.95	.42	87.63 (11.64)	.62	.60
54-62	4.81(3.80)			3.62 (3.70)			84.30 (11.43)		
63-70	3.94 (3.70)			2.97 (2.44)			86.58 (9.26)		
71-83	3.17 (3.03)			3.29 (2.14)			85.34 (9.92)		
Education Level									
HS grad or less	7.00 (4.01)	4.03	.009	4.53 (3.43)	1.27	.29	83.04 (15.21)	1.31	.28
Vocational /technical/	4.89 (3.26)			4.08 (3.77)			85.85 (8.18)		

some college			
Graduate from college	3.35 (3.00)	3.15 (3.08)	84.46 (11.19)
Completed grad school	4.35 (4.55)	3.06 (2.80)	88.50 (9.60)

Primary Outcomes. Table 5 presents the results of an ANOCOVA analysis examining anxiety, depression and resilience between the never MH counseling and ever MG counseling groups.

Anxiety. Sex, age at diagnosis, and education levels were covariates controlled for confounding in this analysis. Although close, a statistically significant difference was not present in levels of anxiety between the never vs. ever users of mental health counseling groups ($p = .08$).

Depression. Sex was the only variable controlled for in the ANCOVA analysis for depression. Depression did not yield statistically significant differences between never and ever MH counseling groups ($F = 1.20$, $df = 1$, $p=.27$)

Resilience. Sex and the geographic region were covariates controlled in the resilience analysis. No statistical significance was found between resilience levels and never vs. ever users of mental health counseling ($F =.03$, $df = 1$, $p = .86$). The average values of resilience scores were roughly the same within the study population.

Table 5

Results of ANOCOVA Analysis Examining Mental Health Counseling (Never vs. Ever) on Anxiety, Depression, and Resilience Levels Controlled for Confounding

	Anxiety			Depression			Resilience		
Mental Health Counseling	*M (SE)*	*F*	*p*	*M (SE)*	*F*	*P*	*M (SE)*	*F*	*P*
Never	4.17 (.39)	3.09	.08	3.35 (.35)	1.20	.27	85.88 (1.15)	.03	.86
Ever	5.48 (.62)			4.07 (.54)			85.50 (1.82)		

Discussion

Key findings and Implications

All hypotheses regarding lower levels of anxiety and depression and higher levels of resilience in those who never used mental health counseling vs. ever were not supported by the data. Although there was not statistically significant difference in resilience between the never vs. ever group, the average resilience scores suggested a high level of self-reported resilience across the two groups. Interestingly, the difference in mean values were opposite for anxiety and depression then what was hypothesized. Specifically, anxiety and depression were slightly higher in the ever users of mental health counseling when covariates were added into the model, however this difference was not statistically significant therefore was likely due to chance, not use of mental health counseling services.

Nonetheless, it was hypothesized that anxiety and depression levels would be lower in those who ever used mental health counseling because of the vast literature supporting mental health counseling as an effective intervention to decrease anxiety and depression as part of comprehensive cancer care. However, this was not observed. One explanation for this phenomenon

is that individuals who reported higher levels of anxiety and depression may have been more likely to be users of mental health counseling services in the first place. Another explanation could be the use of cross sectional data used in the analyses and that the difficulties to accurately assess anxiety and depression scores, and even resilience, at a single point in time is difficult. Further research within this population is necessary to build stronger inferences on the impact of mental health counseling on SMG CRC survivors.

Although sex, age at cancer diagnosis, education, and geographic region were ultimately controlled in the ANCOVA for confounding on mental health services, these variables still made for excellent key findings in the secondary analysis as important factors to evaluate potential influences on anxiety, depression, and resilience levels. In addition, a chi-square test found statistical significance between never vs. ever usage of mental health counseling services. More women participated in mental health counseling services than men. This leads to further questions as to whether biological and/or societal factors may be at play. Also, most SMG CRC survivors indicated they had never utilized mental health counseling despite it being a recommended resource for comprehensive cancer care. Further qualitative research is critical to investigate why there is a lack of mental health counseling involvement within this subpopulation. In addition, when the age of cancer diagnosis was divided into quartiles (i.e., 23-53, 54-62, 63-70, and 71-83), a Tukey test from the initial one-way ANOVA revealed statistical significance found in the 23-53 year age bracket. Mental health counseling may benefit from targeted and tailored interventions specifically within younger ages due to potentially higher averages of anxiety and depression. Nevertheless, further qualitative research is still needed to assess how the age of cancer diagnosis influences anxiety, depression, and resilience levels within SMG CRC survivors.

Education also had statistical significance with a Tukey test showing a difference in average anxiety, depression, and resilience levels between those who completed graduate school and those with a high school education or less. Education is often seen in literature as a critical factor in determining health disparities and inequities (CDC, 2022). This secondary analysis reinforced the notion that education was likely a factor in psychosocial levels in SMG CRC survivors. Education may be a useful variable when bearing in mind social determinants of health of SMG CRC survivors and its implications on anxiety, depression, and resilience levels. Lastly, geographic region ($p = .04$) made for curious discussions around its influence on resilient tendencies within its inhabitants. Further research is needed to uncover why differences may exist in resilience scores between California, Florida, Georgia, and Washington if differences truly exist.

Study strengths and limitations

Data for this secondary analysis was derived from Boehmer et al. One of the strengths of this research study was that it added new insights that had yet to have been analyzed among SMG CRC survivors specifically. Mental health participation both before and after cancer diagnosis was addressed as a descriptive characteristic of the population in the original study. This secondary analysis took it a step further by exploring the crossroads of mental health services and cancer care within a population often overlooked in research. The fact that this study could deepen the understanding of data already in the literature was certainly an added benefit. In addition, the secondary analysis was also cost-effective both financially and time-wise. Primary data collection had already been completed prior to the beginning of this project. The research team was able to synthesize findings in a much more efficient manner for this reason.

Because this is a secondary analysis, pre-existing limitations from the parent study by Boehmer et al. were likely carried over. For example, data were collected from participants in a one-time survey. Associations could be made about the results, but the research team could not derive any measures of causality as it would be deemed inappropriate from a one-time measure (Boehmer, Ozonoff, et al., 2021). The same can be said about the data in this secondary analysis and that, although statistical significance was found, the results of the analyses should *not* be used to suggest causality of any measure. In addition, even though the measures of anxiety, depression, and resilience were used on a HADS (alpha = .89) and RS-14 scale (alpha = .89) tested for validity and reliability, all data were self-reported. Self-reported bias (e.g., social desirability, recall) is common amongst observational studies (e.g., cross-sectional) and can, inadvertently, create some systematic error in data collection (Althubaiti, 2016). Considering anxiety, depression, and resilience levels were an integral part of the secondary analysis, it is possible this limitation may have caused some systematic error in data collection and, subsequently, the analysis.

Mentioned previously, and to build on the idea of data collected from a one-time measure, cross sectional data were used to answer this study's research question on anxiety, depression, and resilience levels and potential differences in SMG CRC survivors who never used mental health counseling vs. ever. Looking retrospectively, mental health counseling in the context of a person's lifespan would likely have been better assessed using longitudinal data due to the research question considering psychosocial levels over the course of a person's life. In other words, it is difficult to accurately determine implications of mental health counseling on self-reported anxiety, depression, and resilience levels at a single point in time when there can be a multitude of reasons why someone feels the way they do.

Some of the potential stress inducers in the concept map were also not represented in the study by Boehmer et al. This made inferences of those stress inducers and their implications on never vs. ever use of mental health counseling services and anxiety, depression, and resilience levels unknown. Potential stress inducers were identified based on a literature review to gather credible evidence of the experience the SMG population reportedly have in mental health counseling and cancer care. Although stress inducers were grounded in research, most of these variables were not asked in the original survey with the exception of discrimination. This is a common limitation in secondary analysis where researchers can only work with what data is available.

Although SMG CRC survivors are a very specific subgroup of the population, the sample size was likely a limiting factor for the secondary analysis. Cross-sectional data were collected in the original analysis by Boehmer et al. across four states, and this was successful in identifying 127 individuals who identified themselves as both a CRC survivor and SMG. If there was a larger sample size, however, it might be possible that some of the data analyses could have garnered either statistical significance and/or more accuracy in the analysis. For example, education compared to mental health counseling had a p-value of .07. Education may have likely been a variable needed to control for confounding but, with the sample, the p-value was unable to move past a .05 threshold needed for inclusion in the subsequent analyses. However, SMG CRC survivors were almost a 50-50 split between males and females which made comparisons between sex and anxiety, depression, and resilience levels naturally of equal variances in the study. Although out of the scope of this secondary analysis, such a great distribution of sex in the sample could merit more comparisons between other variables and highlight differences, if any, that exist.

Conclusion

Mental health counseling should remain an important component of cancer care for SMG CRC survivors. However, more tailored interventions considering SMG potential stress inducers in cancer survivorship should be evaluated. This secondary analysis concludes that more research around this population is necessary to build stronger inferences on mental health counseling and its implications on SMG CRC survivors. Lastly, analyzing the impact of social determinants of health and the influence of CRC diagnoses at younger ages on anxiety, depression, and resilience would also better inform the development of tailored mental health counseling interventions because of the interplay that exists between health, circumstances, and the environment.

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