

Seminary's Silent Struggle: A Quantitative Analysis of the Prevalence of Depressive Symptoms
among Seminarians

by

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Duke Global Health Institute
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Date: March 21, 2024

Approved:

David Eagle, Supervisor

Eve Puffer

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Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
in the Duke Global Health Institute in the Graduate School of
Duke University
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ABSTRACT

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Abstract

Background: The mental well-being of seminary students is a vital yet often overlooked aspect of theological education. This study examines depression symptoms, associated risk and protective factors, and the changes in symptoms in students enrolled in a 3-year Master of Divinity program.

Methods: Data from the Seminary to Early Ministry study were utilized, focusing on two entering cohorts (2019 and 2020) from a United Methodist-affiliated divinity school in the Southeast United States. Surveys were administered at enrollment, mid-program, and graduation, assessing depressive symptoms via the Center for Epidemiologic Studies Depression Scale – Revised (CESD-R) and gathering information on demographics, exercise, prayer, and adverse childhood experiences (ACEs). Logistic regression and Generalized Linear Mixed Models (GLMMs) analyzed the predictors of depressive symptoms and their changes over time.

Results: The study revealed a consistent baseline level of depressive symptoms across all rounds. At baseline, adverse childhood experiences (ACEs) and anxiety diagnoses were associated with elevated symptoms. GLMM analysis revealed temporal changes in depressive symptoms were significant at round 2, potentially indicative of a mid-program crisis. Demographic factors like race, gender, sexual orientation, and prayer practices did not significantly predict depressive symptoms.

Conclusions: The findings highlight seminary students' evolving mental health landscape and emphasize the importance of continuous support. Personal history factors, such as ACEs and anxiety diagnoses, play a crucial role in mental health, while demographic factors show less impact. This study contributes essential insights for developing support systems in theological education.

Keywords: Mental Health, Seminary Students, Depression, Longitudinal Study, Risk Factors, Theological Education.

Dedication

This master's thesis is lovingly dedicated to my husband, whose unwavering support and belief in my abilities have been the cornerstone of my journey through higher education. Your endless encouragement, patience, and love have been my guiding light, making this achievement as much yours as it is mine.

I also dedicate this work to my hardworking immigrant parents. Your sacrifices, resilience, and unyielding pursuit of a better life have been the greatest inspiration. You have instilled in me the values of perseverance, dedication, and the importance of education. This accomplishment is a testament to your extraordinary journey and the enduring strength you have given me.

To my family - thank you for being my motivation, support system, and greatest blessing. This achievement reflects your love and sacrifices.

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1. Introduction

Embarking on the transformative journey of higher education brings forth many challenges, especially in environments where academic, spiritual, and personal growth continually intertwines (Winkelmes, 2004). For students in seminary preparing for careers in religious leadership, navigating the unique landscape that combines theological exploration with personal and professional development presents distinct challenges (Lim et al., 2023). Research on the health and well-being of graduate students has revealed a high prevalence of symptoms consistent with anxiety and depression (Evans et al., 2018). Understanding and addressing the mental health burden of graduate students is critical; these concerns extend also to the mental health and well-being of seminarians (Bopp et al., 2014). This study investigates the prevalence of depressive symptoms, protective factors, and risk factors associated with elevated depressive symptoms among a group of seminary students throughout their three-year Master of Divinity program. This investigation aims to fill a meaningful gap in understanding the holistic well-being of seminary students, often overshadowed by academic and spiritual pursuits.

Seminary education, characterized by its spiritual focus and intellectual inquiry, cultivates an environment conducive to personal growth and reflection (Lowe et al., 2022). However, the innate challenges of balancing rigorous academic expectations, spiritual commitments, and the pressures of personal development can take a toll on mental well-being (Lowe et al., 2022). In the wake of recent global events, such as the COVID-19 pandemic, understanding the mental health trajectories of all students, seminarians included, has gained research interest (Marashi & Heisz, 2022; Scorsolini-Comin et al., 2021; Qin et al., 2023).

Attending seminary is a common path pursued by people interested in careers in religious leadership and ministry (these schools are sometimes called theological, or divinity schools and the term seminary is generally applied to stand-alone institutions, whereas divinity or theological school is often used for institutions affiliated with a university, the terms are used here interchangeably). This study focuses on students pursuing a Master of Divinity (M.Div) degree at

a Divinity School in the Southeastern United States, which prepares students with the comprehensive skills and knowledge necessary for ordained ministry. Amid coursework in biblical studies, church history, theology, ethics, pastoral counseling, and practical ministry, M.Div programs also require field education placements in churches and other religious institutions, providing hands-on experience in leading worship, offering pastoral care, and engaging in community outreach.

Leading a congregation presents a unique set of challenges for clergy people. Clergy often deal with burnout, compassion fatigue, and the weight of spiritual responsibility (Jacobson et al., 2013; Proeschold-Bell et al., 2011). They are responsible for guiding and nurturing their congregations, providing spiritual counsel, leading worship services, and addressing the diverse needs of their communities. This multifaceted role can be emotionally and psychologically demanding, leading to unique mental health challenges. Maintaining spiritual, mental, and emotional well-being while supporting others through various life crises adds another layer of complexity to clergy health and well-being. Previous research has shown that the emotional well-being of people supporting others through various life crises adds another layer of complexity to the seminarian's journey and career trajectories. This research has also shown that religious leaders are not immune to the stressors that affect mental health outcomes (Posselt, 2020). Most research on graduate student mental health symptomology is cross-sectional, and we lack a longitudinal perspective, which is essential to capturing the nuances of how mental health symptoms change over time, enabling a deeper understanding of how mental health symptoms, such as anxiety and depression, evolve across a seminarian's educational journey.

The seminary's academic and spiritual components also provide unique opportunities for developing and applying protective factors that support mental well-being. Research has indicated that engaging in spiritual practices, cultivating a sense of community, and using effective coping mechanisms can protect against mental health challenges (Berry et al., 2011; Lowe et al., 2022; Malik et al., 2023; Proeschold-Bell et al., 2023). Conversely, the same environment may harbor

risk factors exacerbating mental health symptoms. A lack of appropriate coping strategies, feelings of isolation (Lee & Jeong, 2014), and an inability to manage the demands of a seminary program could contribute to developing or escalating mental health concerns (Proeschold-Bell et al., 2023).

While the existing literature acknowledges the complicated dynamic between graduate education and mental health (Evans et al., 2018; Posselt, 2020; Park et al., 2021; Kundu et al., 2021), a gap remains in the comprehensive exploration of seminary education. Understanding the trajectory of mental health symptoms and the factors that may predispose students to poor mental health is vital for developing targeted interventions (Conley et al., 2017), curricular adjustments, and support systems (Wan et al., 2023) for seminary students. Moreover, this study explores the influence of protective and risk factors, which contributes to our understanding of the mental health experiences among seminary students. Against this backdrop, the primary aim of this study is to investigate longitudinal changes in self-reported mental health symptoms (specifically anxiety and depressive symptoms) among mainline seminary students over their three-year M.Div. program. Furthermore, this study seeks to identify the protective factors promoting positive mental health outcomes and the risk factors contributing to deteriorating mental health among seminary students.

Motivated by personal experiences as a graduate student and gaps in existing literature, this study seeks to uncover the mental health dynamics among seminary students, with a particular focus on depressive symptoms. Our central research question aims to investigate the trajectory of depressive symptoms over a three-year Master of Divinity (M.Div.) program, considering a range of factors such as age, gender, race, anxiety, and adverse childhood experiences (ACEs). Specifically, we hypothesize that seminary students will experience a peak in depressive symptoms at the program's midpoint, followed by a gradual decline towards the third year. Drawing from previous insights, we underscore the critical significance of adverse childhood experiences (ACEs) in shaping the mental health landscape. Recent research has

revealed students in our study sample have significantly elevated ACE scores compared to a demographically similar group of Americans (Holleman et al., 2023). Additionally, we aim to explore how other factors, such as age, race, gender, sexuality, anxiety, prayer, and exercise, influence the trajectory of depressive symptoms throughout the M.Div. program. The variables have been selected based on previous research that has hinted at their relationship with depression symptoms. For example, research shows specific demographic groups are at greater risk of depression symptoms (Akhtar-Danesh & Landeen, 2007; Steffens et al., 2009); there is also research linking anxiety and depression as comorbidities (Sartorius et al., 1996; Hirschfeld, 2001; Cummings et al., 2014), and motivation to increase exercise is typically pushed onto the general population due to being linked to better health outcomes, depression, among them (Kvam et al., 2016; Schuch et al., 2016), and lastly in many religious groups prayer is seen a protective factor against depression (Boelens et al., 2009; Anderson & Nunnelley, 2016). By exploring the impact of these factors, we seek to provide insights for educators, administrators, and mental health professionals within seminary and related educational settings. Through this exploration, we attempt to inform decision-making processes surrounding the development of tailored educational support systems. The goal is to cultivate an environment conducive to learning and well-being for seminary students, addressing the nuanced challenges they face throughout their academic journey.

2. Methods

2.1 Setting

This research was conducted using data from the Seminary to Early Ministry (SEM) study, one of the few major longitudinal studies of seminarians that follows students through their schooling and into the early years of their careers (Eagle et al., 2023). The study spans the critical transition period from seminary education to early ministry experiences. The study is ongoing at a United Methodist-affiliated divinity school in the Southeastern United States (called Mainline Divinity School, or MDS).

2.2 Participants

All entering students in 2019, 2020, 2021, and 2022 were invited to participate in the study at matriculation. This study focuses on two groups of students from MDS with at least three waves of data – those who began an M.Div. program in either 2019 or 2020. The study sample at baseline consisted of 171 students, comprising 50.9% of students from the 2019 (n=87) and 49.1% from the 2020 (n=84) entering cohorts.

2.3 Procedures

Data collection procedures involved self-administered online surveys at multiple time points throughout the 3-year educational program: round one at matriculation, round two halfway through the program, and round three at graduation. Among other topics, the surveys asked students to answer questions about a range of mental health dimensions, demographics, and other known protective and risk factors associated with mental illness.

2.4 Measures

2.4.1 Dependent Variables

2.4.1.1 Clinical History of Depression Diagnosis

This study used two primary dependent variables. First, we used an indicator variable for students with a clinical diagnosis of depression for descriptive purposes. At each point the survey

was administered, participants were asked if a health professional had ever told them they had major depression/major depressive disorder. Students who reported yes were coded as “1”, no, “0”.

2.4.1.2 The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R)

Second, depressive symptoms were captured using The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R), a 20-item scale validated among adults in the United States (Eaton et al., 2004). The CESD-R captures nine components of depressive symptoms. These are Sadness, Loss of Interest, Appetite, Sleep, Thinking/Concentration, Guilt/Worthlessness, Tiredness/Fatigue, Movement/Agitation, and Suicidal Ideation. Total scores range from 0-60, with higher scores indicating more severe depressive symptoms. For descriptive statistics, scores were categorized into low, moderate, and high-risk groups. Scores less than or equal to 15 represent the low-risk group; scores between 16 –23 represent the moderate-risk group, while scores 24-60 represent the high-risk group. We created a binary variable in the regression analyses where “1” represented the high or moderate-risk group and “0” the low-risk group.

2.4.2 Key Predictor Variables

2.4.2.1 Demographics

Demographic variables included age, gender, and race/ethnicity, which were gathered through the survey. Age was calculated by subtracting the year the survey was completed from the year of birth reported by the participant. Gender was gathered by asking participants for their current gender identity. The options included man, woman, trans male/trans man, trans female/trans woman, genderqueer/gender non-conforming, or different identity. This was collapsed into a three-item variable indicating the responding was a man, woman, or other gender identity. Race was collected by asking participants individually if they identified as Black or African American; White; American Indian or Alaska Native, Asian, Hawaiian or Pacific Islander; or Another Racial Identity. There were no reported American Indian/Indigenous/Alaska

Native or Hawaiian/Pacific Islanders, so these categories were dropped. Participants could select multiple options; if they did, they were coded as “other/multiracial” category.

Finally, sexual orientation was collected by asking participants which of the listed sexual orientations they consider themselves to be. The options were heterosexual or straight, gay or lesbian, bisexual, or another sexual orientation. Answers were then collapsed into two categories: heterosexual/straight and not heterosexual/straight.

2.4.2.2 Clinical History of Anxiety Diagnosis

At each point the survey was administered, participants were asked if a health professional had ever told them they had an anxiety disorder. We created a binary variable, coded as “1” for yes and “0” for no.

2.4.2.3 Adverse Childhood Experiences (ACEs)

ACEs scored were measured using guidance from the CDC’s Behavioral Risk Factor Surveillance System (BRFSS), which gathered information relating to the following domains, which must have occurred before age 18 years: whether the respondent lived with someone with a serious mental illness, with a substance use disorder, or who was incarcerated, and whether the respondent had experienced parental separation/divorce, interpersonal violence, physical abuse, and sexual abuse (Giano et al., 2020). The items were summed to create a total ACE score.

2.4.2.4 Exercise Frequency

Using guidelines provided by the authors of the Godin Activity scale, physical activity was measured as total minutes of exercise per week (Amireault & Godin, 2015). Participants were asked how many times per week and how long they engage in the following types of exercise: strenuous (heart beats rapidly) exercise, moderate (not exhausting) exercise, and mild/light (minimal effort) exercise. The mean of reported minutes was multiplied by the frequency of exercise in each category, and the total number of minutes of exercise per week, weighted by intensity, was calculated.

2.4.2.5 Regular Prayer

Participants were asked if they regularly prayed, and their response was either yes or no. We created a binary variable, coded as “1” for yes and “0” for no.

2.5 Analysis

Descriptive statistics were summarized at baseline (round one), round two, and round three to understand cross-sectional changes in the prevalence of depressive disorder diagnosis and symptoms and key predictor variables at each survey wave.

Logistic regression analysis was conducted with baseline data to analyze the predictors of moderate to high risk for depressive symptoms, as measured by the Center for Epidemiologic Studies Depression Scale (CESD-R). The model included the predictors: race, age, gender, sexual orientation, ACEs, regular prayer, and total weekly exercise.

Then, generalized linear mixed modeling (GLMM) was used to analyze changes in depressive symptoms, modeled as a continuous variable, over time. Before the analysis, continuous variables like age and total minutes of exercise were centered to reduce multicollinearity and improve model interpretability. Models were fit using the *lmer* function in R (Bates et al., 2015). The base model included only the *round* variable with a random intercept for each study participant. A more comprehensive model incorporated additional predictors, such as age, gender, race, and sexual orientation. The full model added total exercise (centered), indicators for regular prayer, and an ACEs score of three or more.

Model diagnostics were performed to check the assumptions of homoscedasticity and normality of residuals. This included residual versus fitted plots and QQ plots. The final chosen model was presented visually through effect plots generated from the *sjPlot* package (Lüdtke, n.d.). These plots show the average CESD-R scores at each round of the survey.

2.6 Ethics Approval

All participants provided informed consent, and the Duke Campus Institutional Review Board approved the study procedures.

3. Results

3.1 Characteristics of Study Sample at Baseline

Table 1 displays the sample's demographic components and baseline key measure characteristics. The sample was relatively gender-balanced, with 47.4% female and 52.0% male seminarians. They had a mean age of 28.7 years ($SD=9.99$), with the distribution skewed towards the younger ages (median=24, range 21-70 years). Most participants identified as White (72.5%), followed by Black (16.4%), Other/Multiracial (4.68%), and Asian (5.85%). Most participants identified as heterosexual or straight (88.3%), with 10.5% identifying as not heterosexual or straight. The cohorts had similar proportions of seminarians with a clinical history of depression (cohort 2019: 18.4%; cohort 2020: 19.0%) and anxiety (cohort 2019: 21.8%; cohort 2020: 21.4%). Also, they had comparable baseline distribution across low (69.6%), moderate (14.0%), and high (11.7%) depression risk categories based on CESD-R symptom scores. More than two-thirds of participants reported at least one adverse childhood event (69.0%), with cohort 2019 having a mean ACE score of 2.12 ($SD=1.75$) and cohort 2020 having 1.61 ($SD=1.81$). There was high involvement in regular prayer (90.6%) but varying average weekly exercise minutes (mild/light: 131.8; moderate: 111.6; strenuous 99.1).

Table 1: Demographics and Sample Descriptive Statistics at Baseline

	Cohort 2019 (N =87)	Cohort 2020 (N = 84)	Overall (N= 171)
Gender			
Female	41 (47.1%)	40 (47.6%)	81 (47.4%)
Male	46 (52.9%)	43 (51.2%)	89 (52.0%)
Other	0 (0%)	1 (0.01%)	1 (0.01%)
Age			
Mean (SD)	28.1 (9.58)	29.3 (10.4)	28.7 (9.99)
Median (Min, Max)	24 (21, 70)	25 (21, 63)	24 (21, 70)
Missing	1 (0.01%)	0 (0%)	1 (0.01%)
Race			
Asian	6 (6.90%)	4 (4.76%)	10 (5.85%)
Black	14 (16.1%)	14 (16.7%)	28 (16.4%)
Other/Multiracial	6 (6.90%)	2 (2.38%)	8 (4.68%)
Native American/Indigenous	0 (0%)	0 (0%)	0 (0%)
White	60 (69.0%)	64 (76.2%)	124 (72.5%)
Hawaiian/Pacific Islander	0 (0%)	0 (0%)	0 (0%)
Missing	1 (1.15%)	0 (0%)	1 (0.58%)
Sexual Orientation			
Heterosexual/Straight	80 (91.9%)	71 (84.5%)	151 (88.3%)
Not Heterosexual/Straight	5 (9.19%)	13 (15.5%)	18 (10.5%)
Missing	2 (2.29%)	0 (0%)	2 (1.17%)
Clinical History of Depression Diagnosis			
Yes	16 (18.4%)	16 (19.0%)	32 (18.7%)
No	64 (73.6%)	61 (72.6%)	125 (73.1%)
Not Sure	4 (4.60%)	2 (2.39%)	6 (3.51%)
Missing	3 (3.45%)	5 (5.95%)	8 (4.68%)
CESD Risk Category			
Low	59 (67.8%)	58 (69.05%)	117 (68.42%)
Moderate	13 (14.9%)	11 (13.1%)	24 (14.0%)
High	12 (14.3%)	8 (9.52%)	20 (11.7%)
Missing	3 (3.45%)	7 (8.33%)	10(5.85%)
Clinical History of Anxiety Diagnosis			
Yes	19 (21.8%)	18 (21.4%)	37 (21.6%)
No	63 (72.4%)	58 (69.0%)	121 (70.8%)
Not Sure	2 (2.30%)	3 (3.57%)	5 (2.92%)
Missing	3 (3.45%)	5 (5.95%)	8 (4.68%)
Adverse Childhood Events (ACEs)			
Mean (SD)	2.12 (1.75)	1.61(1.81)	1.87(1.79)
Atleast 1 event	67(77.0%)	51 (60.7%)	118(69.0%)
3+ events	31(35.6%)	22(26.2%)	53(31.0%)
Missing	3 (3.45%)	5 (6.17%)	8(4.68%)
Exercise Frequency (minutes per week)*			
Mild/Light	116.1 (97.4)	145.7 (284.2)	131.8 (217.4)
Moderate	91.7 (60.2)	130.4 (133.8)	111.6 (106.1)
Strenuous	104.2 (129.7)	94.7 (107.9)	99.1 (118.1)
All Exercise Combined	271.4 (149.8)	366.7 (443.4)	318.7 (332.5)
Regular Prayer			
Yes	83 (95.4%)	72 (85.7%)	155 (90.6%)
No	4 (4.60%)	12 (14.3%)	16 (9.36%)
Missing	0 (0%)	0 (0%)	0 (0%)
* There were a few missing values in this category. Reporting in strenuous exercise has 32 missing values, reporting in moderate exercise had 23 missing values, and reporting in mild/light exercise had 26 missing values.			

3.2 Descriptive Statistics at Round 2

The data presented in Table 2 characterize the student sample on measures of interest a year later at round 2 of the survey. Compared to baseline (Table 1), the proportion with a clinical history of diagnosed depression rose slightly from 18.7% to 22.4% by round 2, potentially indicative of emerging mental health challenges. Clinical history of diagnosed anxiety slightly dropped from 21.6% to 18.7%; please note that there were many missing responses this round (13.8%). However, the distribution across CESD-R risk categories for depressive symptoms remained relatively consistent from baseline to round 2. Most seminarians were still clustered in the low-risk group (63.8% vs 69.6% at baseline), while there was an overall increase in the high-risk group (11.7% to 17.2%).

Regarding health behaviors, engagement in regular prayer diminished but was still common (71.8% vs 90.6% at baseline). This aligned with the complex spiritual questioning and exploration that begins to emerge during seminary education (Williamson & Sandage, 2009) and increased time pressures. Average weekly physical activity minutes also declined across mild, moderate, and strenuous exercise.

Table 2: Descriptive Statistics of Measures of Interest at Round 2

	Cohort 2019 (N = 84)	Cohort 2020 (N = 90)	Overall (N = 174)
Clinical History of Depression Diagnosis			
Yes	20 (23.8%)	19 (22.1%)	39 (22.4%)
No	61 (72.6%)	61 (67.8%)	122 (70.1%)
Not Sure	2 (2.38%)	2 (2.22%)	4 (2.30%)
Missing	1 (1.19%)	8 (8.89%)	9 (5.17%)
CESD Risk Category			
Low	59 (70.2%)	52 (57.8%)	111 (63.8%)
Moderate	8 (9.52%)	11 (12.2%)	19 (10.0%)
High	14 (16.7%)	16 (17.8%)	30 (17.2%)
Missing	3 (3.45%)	11 (12.2%)	14 (8.05%)
Clinical History of Anxiety Diagnosis			
Yes	19 (22.6%)	13 (14.4%)	32 (18.7%)
No	57 (67.9%)	58 (64.4%)	115 (66.1%)
Not Sure	0 (0%)	3 (3.57%)	3 (1.72%)
Missing	8 (9.52%)	16 (17.8%)	24 (13.8%)
Exercise Frequency (minutes per week)*			
Mild/Light	103.2 (104.8)	119.8 (97.63)	111.6 (101.2)
Moderate	86.5 (90.8)	87.2 (95.2)	86.9 (92.8)
Strenuous	82.9(121.4)	67.1 (84.9)	74.8 (104.2)
All Exercise Combined	246.9 (202.8)	262.1 (188.0)	254.5 (195.1)
Regular Prayer			
Yes	64 (76.2%)	61 (67.8%)	125 (71.8%)
No	18 (21.4%)	20 (22.2%)	38 (21.8%)
Missing	2 (2.38%)	9 (10.0%)	11 (6.32%)
* There were a few missing values in this category. Reporting in strenuous exercise has 28 missing values, reporting in moderate exercise had 29 missing values, and reporting in mild/light exercise had 29 missing values.			

3.3 Descriptive Statistics at Round 3

The round 3 follow-up presented in Table 3 showcases evolving mental health dynamics at graduation. The proportion of students with a clinical history of depression rose to 27.6% overall. A similar pattern is seen in clinical anxiety diagnosis, which increased to 22.8% overall. This pattern aligns with prior indications that intensifying academic, spiritual, and personal demands involved in seminary training can negatively impact mental health over time (Ellison et al., 2010). However, the distribution of CESD-R risk categories remained relatively stable. Most seminarians were still clustered in the low-risk group (72.4%), though the high-risk category increased for the 2019 cohort (20.6% vs. 14.3% at baseline). This cohort-specific change may reflect acute timepoint stressors near program completion.

Prayer engagement slightly increased from round 2 but decreased overall from baseline (77.2% vs 90.6%). A similar pattern appeared in physical activity, which persisted at round 3 as well. Average weekly exercise continued to increase from the dip in round 2 and slightly surpassed the initial baseline averages.

Table 3: Descriptive Statistics of Measures of Interest at Round 3

	Cohort 2019 (N =68)	Cohort 2020 (N = 59)	Overall (N= 127)
Clinical History of Depression Diagnosis			
Yes	19 (27.9%)	16 (27.1%)	35 (27.6%)
No	46 (67.6%)	39 (66.1%)	85 (66.9%)
Not Sure	3 (4.41%)	0 (0%)	3 (2.36%)
Missing	0 (0%)	4 (6.78%)	4 (3.14%)
CESD Risk Category			
Low	46 (67.6%)	46 (78.0%)	92 (72.4%)
Moderate	6 (8.82%)	6 (10.2%)	12 (9.45%)
High	14 (20.6%)	4 (6.78%)	18 (14.2%)
Missing	2 (2.94%)	3 (5.08%)	5 (3.94%)
Clinical History of Anxiety Diagnosis			
Yes	17 (25.0%)	12 (20.3%)	29 (22.8%)
No	37 (54.4%)	35 (59.3%)	72 (56.7%)
Not Sure	3 (4.41%)	1 (1.69%)	4 (3.15%)
Missing	11 (16.18%)	11 (18.6%)	22 (17.32%)
Exercise Frequency (minutes per week)*			
Mild/Light	173.3 (335.2)	148.6 (152.6)	161.7 (264.2)
Moderate	105.7 (138.4)	116.5 (128.4)	110.57 (113.4)
Strenuous	79.5 (99.6)	85.3 (102.9)	82.1 (100.7)
All Exercise Combined	345.0 (387.2)	328.2 (230.1)	337.1 (321.9)
Regular Prayer			
Yes	54 (79.4%)	44 (74.6%)	98 (77.2%)
No	12 (17.6%)	14 (23.7%)	26 (20.5%)
Missing	2 (2.94%)	1 (1.69%)	3 (2.36%)
* There were a few missing values in this category. Reporting in strenuous exercise has 24 missing values, reporting in moderate exercise had 23 missing values, and reporting in mild/light exercise had 19 missing values.			

3.4 Logistic Regression at Baseline

In the logistic regression analysis conducted at baseline (Table 4), several key variables were assessed to determine their association with the outcome variable. Race did not show a

significant association with the outcome, Black (OR = 1.45, 95% CI [0.43, 4.57], $p = 0.5$), Asian (OR = 1.81, 95% CI [0.24, 9.59], $p = 0.5$), and Other/Multiracial (OR = 1.62, 95% CI [0.25, 8.85], $p = 0.6$). Similarly, age and gender (female compared to male) were not significantly associated with the outcome, with ORs of 0.97 (95% CI [0.91, 1.01], $p = 0.2$) and 0.74 (95% CI [0.32, 1.66], $p = 0.5$), respectively. Sexual orientation, categorized as 'heterosexual or straight' versus 'not heterosexual or straight,' also did not demonstrate a significant association (OR = 1.42, 95% CI [0.39, 4.90], $p = 0.6$).

In contrast, having at least three adverse childhood experiences was significantly associated with the outcome, with participants having three or more ACEs having significantly elevated odds (OR = 2.37, 95% CI [1.03, 5.46], $p = 0.042$) of a clinical diagnosis of depression.

Moreover, the presence of an anxiety diagnosis showed a strong association, with individuals diagnosed with anxiety having more than four times the odds of a clinical diagnosis of depression compared to those without an anxiety diagnosis (OR = 4.40, 95% CI [1.82, 10.9], $p = 0.001$). Regular prayer did not significantly affect the outcome (OR = 1.93, 95% CI [0.48, 10.4], $p = 0.4$).

Table 4: Logistic Regression at Baseline for Moderate-High Risk Category using CESD-R

Characteristic	OR[†]	95% CI[†]	p-value
Race			
White	—	—	
Black	1.45	0.43, 4.57	0.5
Asian	1.81	0.24, 9.59	0.5
Other/Multiracial	1.62	0.25, 8.85	0.6
Age	0.97	0.91, 1.01	0.2
Gender			
Male	—	—	
Female	0.74	0.32, 1.66	0.5
Sexual Orientation			
Heterosexual or Straight	—	—	
Not Heterosexual or Straight	1.42	0.39, 4.90	0.6
Had ACEs Score of at least 3			
No	—	—	
Yes	2.37	1.03, 5.46	0.042
Clinical Anxiety Diagnosis			
No	—	—	
Yes	4.40	1.82, 10.9	0.001
Participated in Regular Prayer			
No	—	—	
Yes	1.93	0.48, 10.4	0.4

[†] OR = Odds Ratio, CI = Confidence Interval

3.5 Generalized Linear Mixed Model

The Generalized Linear Mixed Model (GLMM) analysis was conducted across three models: Model 1, which only includes the rounds as predictors, and Model 2, which expands on Model 1 by also including age (centered), gender, race, and sexual orientation, and finally Model 3 that adds total-exercise (centered), participation in regular prayer, and an ACE score of at least three as predictor variables. The results for each model are presented in Table 5.

3.5.1 Model 1

The intercept for Model 1 was statistically significant, indicating an average baseline CESD-R score of 12.94 (95% CI [11.06, 14.81], $p < 0.001$). A significant temporal effect was observed for Round 2 (Estimate = 1.88, 95% CI [0.18, 3.57], $p = 0.030$). The coefficient in round 3 was negative but only marginally significant (Estimate = -1.42 , 95% CI [-3.28, 0.44], $p = 0.13$).

3.5.2 Model 2

The intercept for Model 2 was statistically significant, at 11.49 (95% CI [8.74, 14.24], $p < 0.001$). Similarly to Model 1, a significant positive temporal effect was observed for Round 2 (Estimate = 2.02, 95% CI [0.27, 3.77], $p = 0.024$). Round 3 coefficient was negative but, gain, marginally significant (Estimate = -1.57 , 95% CI [-3.49, 0.36], $p = 0.11$). Age, when centered, had a slight negative but non-significant association with CESD-R total scores (Estimate = -0.13 , 95% CI [-0.30, 0.05], $p = 0.17$). Gender (female) and race (Black, Asian, Other/Multiracial) all had large p -values ($p = 0.79$, $p = 0.58$, $p = 0.80$, $p = 0.44$). Non-heterosexual orientation had a large, positive association with elevated symptoms but was just outside of significance (Estimate = 4.65, 95% CI [-0.97, 10.27], $p = 0.11$).

3.5.3 Model 3

As with the previous models, the intercept for Model 3 was statistically significant, with the adjusted baseline CESD-R total score estimated at 11.48 (95% CI [7.59, 15.37]), $p < 0.001$). A positive temporal effect was observed for round 2 (Estimate = 1.68, 95% CI [-0.14, 3.49], $p = 0.07$). Round 3 coefficient was negative but now non-significant (Estimate = -0.84 , 95% CI [-

2.82,1.15], $p = 0.41$). Additional variables included in the final model, such as exercise-centered, regular prayer, and having at least three adverse childhood experiences (ACEs), did not significantly correlate with CESD total scores.

3.5.4 Random Effects

Random effects analysis revealed significant variation at the respondent level (ICC > 0.6 in all models), indicating substantial clustering.

In summary, the GLMM analysis highlighted the temporal changes in CESD total scores across rounds, with a significant increase from baseline noted in round 2 and a non-significant decrease from baseline in round 3, which can be visualized in Figure 1. Age, gender, race, sexual orientation, exercise, prayer practices, and adverse childhood experiences did not significantly predict the CESD-R scores when controlling for other factors. The high ICC values suggest that individual differences at the respondent level contributed substantially to the variation in CESD total scores.

Table 1: Generalized Linear Mixed Models

<i>Predictors</i>	Model 1			Model 2			Model 3		
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	12.94	11.06 – 14.81	<0.001	11.49	8.74 – 14.24	<0.001	11.48	7.59 – 15.37	<0.001
Round 2	1.88	0.18 – 3.57	0.030	2.02	0.27 – 3.77	0.024	1.68	-0.14 – 3.49	0.070
Round 3	-1.42	-3.28 – 0.44	0.134	-1.57	-3.49 – 0.36	0.111	-0.84	-2.82 – 1.15	0.407
Age Centered				-0.13	-0.30 – 0.05	0.167	-0.10	-0.27 – 0.08	0.275
Gender - Female				0.47	-2.96 – 3.90	0.788	0.14	-3.28 – 3.55	0.938
Race - Black				1.33	-3.44 – 6.10	0.584	-0.72	-5.82 – 4.39	0.782
Race - Asian				-0.96	-8.44 – 6.53	0.802	-1.07	-8.38 – 6.23	0.773
Race – Other/Multiracial				3.07	-4.77 – 10.91	0.442	3.31	-4.38 – 10.99	0.398
Sexual Orientation – Not Heterosexual or Straight				4.65	-0.97 – 10.27	0.105	3.47	-2.25 – 9.19	0.234
Total Exercise Centered							-0.00	-0.00 – 0.00	0.919
Participated in Regular Prayer							0.02	-2.79 – 2.83	0.988
Had ACEs Score of at least 3							0.88	-2.88 – 4.65	0.645
Random Effects									
σ^2	55.28			55.81			52.03		
τ_{00}	100.80	studyID		95.83	studyID		89.64	studyID	
ICC	0.65			0.63			0.63		
N	186	studyID		163	studyID		156	studyID	
Observations	443			405			375		
Marginal R ² / Conditional R ²	0.011 / 0.650			0.038 / 0.646			0.031 / 0.644		

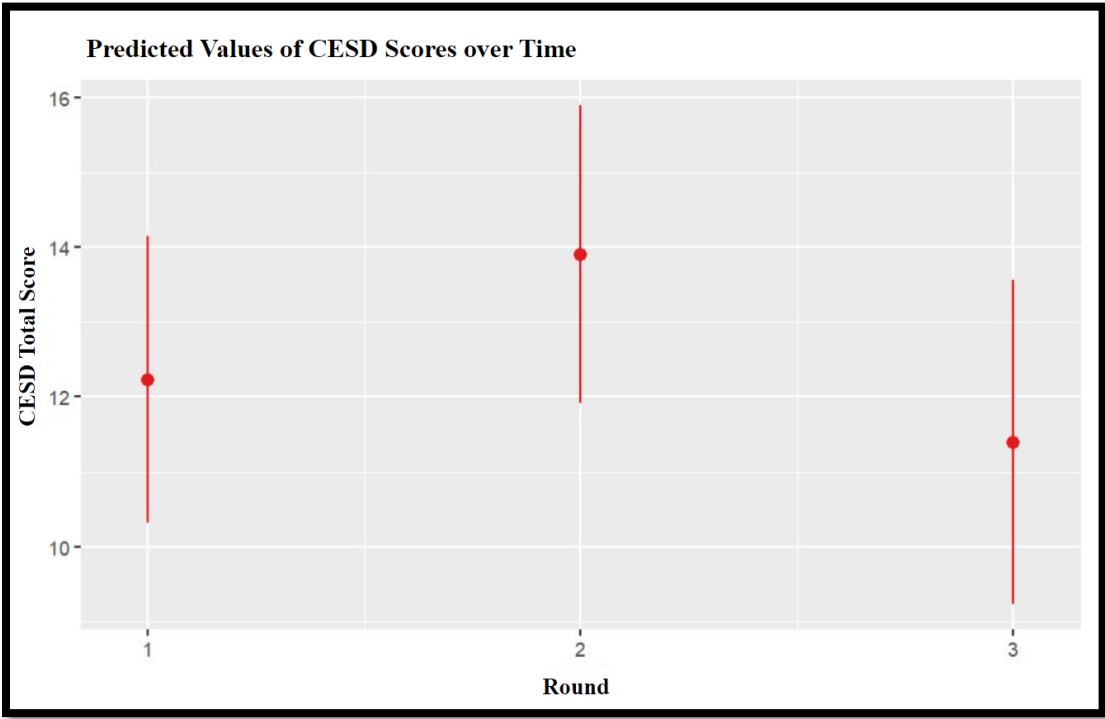


Figure 1: CESD-R Total Score Means Over Time (Rounds)

4. Discussion

4.1 Interpretation of Findings

This exploration into the mental health dynamics of M.Div. students revealed important insights into the predictors and temporal fluctuations of depressive symptoms throughout their academic journey.

In line with our research question and hypotheses, our findings challenge conventional assumptions (McCann et al., 2020) and offer insights into the intricate mental health dynamics within religious educational environments. Notably, sexual orientation did not exhibit a significant association with depressive symptoms among seminary students in the logistic regression analysis at baseline ($p > 0.1$). However, for consideration, the use of sequential addition of variables in the logistic model was not explored, suggesting the possibility that elevated adverse childhood experiences (ACEs) among non-heterosexual individuals could be a significant predictor, suggesting that this factor may underlie the association between sexual orientation and depression (Holleman et al., 2023). Conversely, an ACE score of three or more emerged as a significant predictor, indicating an elevated risk of depressive symptoms among individuals with a history of ACEs. Furthermore, the strong association between anxiety diagnosis and depressive symptoms underscores the interconnected nature of mental health conditions and highlights the need for comprehensive assessment and intervention strategies.

Interestingly, regular prayer did not demonstrate a significant impact on depressive symptoms, suggesting that spiritual practices alone may not be sufficient protective factors against mental health challenges in this population. This finding can likely be attributed to the sample's saturation of participants actively engaging in prayer. This variable would be better explored for effect in a sample that had more spread-out representation of regular and nonregular prayer engagement. These findings underscore the importance of considering diverse risk factors and promoting holistic well-being among seminary students.

The Generalized Linear Mixed Model (GLMM) analysis further illustrated the temporal dynamics of depressive symptoms. Notably, a significant increase in CESD-R scores during round 2 suggested a potential mid-program crisis point characterized by heightened academic and spiritual challenges. However, the negative coefficient in Round 3 (approaching significance) can imply a possible adaptive response or coping mechanism emerging as students near graduation, reflecting a solid development of coping strategies or anticipation of program completion.

In summary, our findings provide support for our hypotheses regarding the trajectory of depressive symptoms among seminary students and underscore the multifaceted nature of mental health dynamics within this population.

4.2 Limitations

The focus on a single seminary institution limits the generalizability of findings to broader seminary populations, particularly for racial minorities who are underrepresented in the study sample. Given the importance of diversity in understanding mental health dynamics, the lack of sufficient representation from racial minority groups may constrain the applicability of these results to these marginalized populations. Additionally, the self-reported nature of the data could introduce response biases, potentially influencing the accuracy of reported mental health symptoms and related factors. The small sample size also limits the ability to identify patterns among subgroups, such as gender and sexual minorities (GSMs). As the sample size of the SEM study continues to increase, the data will become more robust, allowing for more confidence in the generalizability of the findings. Future studies addressing this research's limitations could benefit from including a more diverse range of seminary institutions to address the adequate representation of social minorities.

4.3 Implications

The identified association between adverse childhood experiences (ACEs) and depressive symptoms highlights the importance of early intervention and trauma-informed care within seminary education. Institutions should prioritize implementing comprehensive support

systems to address the underlying trauma and provide necessary resources for healing and resilience-building among affected students.

The strong association between anxiety diagnosis and depressive symptoms underscores the interconnected nature of mental health conditions. Seminary institutions could integrate mental health screenings and counseling services into their support frameworks to identify and address co-occurring mental health issues effectively. Additionally, proactive interventions targeting anxiety management could mitigate the risk of depressive symptoms among seminary students.

Furthermore, the non-significant impact of regular prayer on depressive symptoms suggests the need for multifaceted approaches to mental health promotion. While spiritual practices may offer valuable coping mechanisms for some individuals, they should be complemented by evidence-based interventions that address other risk factors and promote holistic well-being. Seminary institutions should invest in comprehensive mental health education and resources encompassing diverse coping strategies and support mechanisms tailored to their student population's unique needs.

Lastly, the temporal changes in depressive symptoms suggest the need for targeted mental health interventions at different stages of the seminary journey. Institutions could implement proactive mental health screenings and counseling services, particularly during the mid-point of the program, where an increase in depressive symptoms is evident.

5. Conclusion

In conclusion, this study has provided a comprehensive exploration into the mental health dynamics among mainline seminary students, shedding light on the interplay between academic, spiritual, and personal factors that influence their well-being. By investigating the prevalence of depressive symptoms, identifying protective factors, and examining risk factors associated with elevated depressive symptoms over a three-year program, this research offers valuable insights into a topic often overlooked in seminary education.

Throughout the investigation, we observed a temporal trend in depressive symptoms, particularly evident during the mid-point of the program. This period marked a potential crisis point characterized by heightened academic and spiritual challenges, which may have been exacerbated by relocation and disrupted social support networks. However, contrary to expectations, these symptoms did not persistently escalate toward graduation. This suggests a potential adaptive response or the development of coping mechanisms among students as they advance through the program, aided by establishing new social support systems and cultivating resilience in response to the evolving academic and spiritual demands.

Moving forward, the study offers insights for seminary institutions, educators, administrators, and mental health professionals to develop targeted interventions, curricular adjustments, and support systems tailored to the unique needs of seminary students. By embracing inclusive practices, implementing proactive mental health screenings, and providing accessible counseling services, seminaries can create environments supporting academic success and overall well-being.

In summary, seminary institutions can play a crucial role in nurturing their students' holistic development and fostering environments that promote resilience, growth, and flourishing throughout their educational journey and into their years of ministry by understanding the trajectory of mental health symptoms and the factors that shape them.

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