A Gender Based Study on the Impact of Depression on Academic Achievement and Psychological Well-Being among Higher Educational Students

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***Abstract*—The study explores the interaction between gender and depression on college student's academic performance and psychological well-being. Employing a survey-based approach, it examines the interplay between gender, depressive symptoms, academic achievement, and mental health outcomes in a diverse sample of college students. Data were collected from a randomly selected sample of 120 college students (60 boys and 60 girls) studying in the second and third years of the undergraduate program. The instruments used in the study included a demographic profile sheet, the Beck Depression Inventory (BDI), Ryff's Psychological Well-Being Scale, and the students' cumulative grade point average (CGPA) from their most recent exams. Data analysis involved an independent sample t-test and a 2×2 ANOVA. The findings revealed significant gender differences in the levels of academic performance. Although certain results were statistically non-significant, suggesting avenues for future research, the study underscores critical gender-specific dynamics in the relationship between depression, academic outcomes, and psychological well-being.**

***Keywords*—academic performance, psychological well-being, college students, gender, depression, mental health.**

Depression marked by a persistent low mood and emotional challenges, profoundly impacts individuals' functioning and overall well-being (APA,2013). When left untreated, these symptoms can severely compromise mental health, disrupt daily activities, and distort self-perception (Yu et al., 2014). Globally more than 350 million individuals are affected by depression, with self-reported prevalence increasing by 34 percent from 2001 to 2020 (WHO, 2021). Among teenagers, the prevalence has risen sharply from 24 percent between 2011 and 2020 with the surge notably higher in regions such as the Middle East, Africa, and Asia, particularly among females (Shorey, Ng & Wong, 2022).

The prevalence of depression among college students, estimated between 12 percent and 50 percent, significantly heightens psychological distress, adversely impacting academic performance and overall well-being (Blanco et al., 2008; Lipson, Lattie, & Eisenberg, 2019). This pinpointed the utmost need for research and targeted interventions to address the issue of depression among college students (Mokdad et al., 2016; Ramon-Arbues et al., 2020).

In the field of psychology and education, academic performance is shaped by the complex interplay of factors outside the intelligence and classroom efforts. Internal factors, like motivation, self-esteem, along with external factors such as background of a family and socio-economic-status play important role in determining the academic success (Wilson & Narayan, 2016). Academic performance is evaluated through various approaches, including standardized testing, grades, GPAs, and both formative and summative assessments (Wiliam, 2010; Ismail et al., 2022).

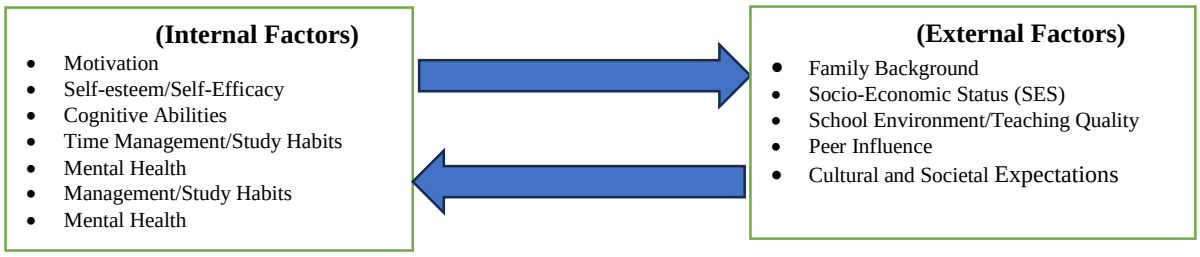

Figure 1. Factors Affecting Academic Outcomes

On the other hand, psychological well-being includes both subjective as well as psychological dimensions, indicating an individual's life satisfaction and overall mental health, defined by the characteristics such as personal growth, self-acceptance, positive emotions, purpose in life, autonomy etc. Together, these components foster a sense of purpose and resilience (Keyes, Shmotkin, & Ryff, 2002). Subjective well-being focuses on an individual's perceived quality of life, including life satisfaction, and the balance between positive and negative emotions (Diener, Lucas & Oshi, 2002).

These elements collectively provide a comprehensive framework for understanding how individuals experience and sustain mental health, emphasizing the importance of fostering both emotional and psychological dimensions to promote overall well-being.

I. OBJECTIVE OF THE STUDY

The primary objective of the study is to examine the impact of depression on academic performance, and the relationship between gender and depression on psychological well-being among college students. However, the specific objectives are:

1. To compare the levels of depression among boys' and girls' college students.
2. To compare the academic performance of girls' and boys' college students.
3. To explore the impact of depression on psychological well-being among boys' and girls' college students.
4. To identify significant differences in the impact of depression on academic performance and psychological well-being between boys' and girls' college students.

II. LITERATURE REVIEW

Extensive literature has examined the intricate relationships between psychological factors and academic achievement, offering valuable insights into the factors affecting students' psychological well-being and performance. Van der Merwe's (2005) study on 324 South African Students demonstrated the critical role that self-efficacy, life satisfaction, optimism, and emotional factors play in academic success.

Khurshid et al. (2007) explored the relationship between mental health and academic success, by conducting a study among second year female students from government colleges in Pakistan, and revealed a strong link between depressive symptoms and diminished academic outcomes, with reduced interest and self-esteem.

Yousefi et al. (2010) found a negative correlation between test-anxiety and academic performance, highlighting the harmful impact of stress on academic outcomes. On the contrary side, Al-Qaisy (2011) identified a positive correlation between test anxiety and academic performance, also noting a negative association between anxiety and depression. This contradiction highlighted the intricate interplay between these variables, emphasizing the need for further inquiry to understand this complex dynamic comprehensively.

Studies conducted on gender differences in anxiety and depression consistently indicate that females are more likely to experience high levels of anxiety, whereas make show greater susceptibility to depression (Gussak, 2009; Hosseini & Khazali, 2013; Slavich & Sacher, 2019; Bangasser & Caurenta, 2021). Furthermore, Khanehkesshi (2011) studied factors academic performance among college students, and revealed that male students tend to report high levels of anxiety and sadness, which further adversely affect their academic performance.

Khumalo, Temane and Wissing (2012) conducted research to examine interconnections among psychological well-being, stress, and demographic factors, which shows that factors such as marital status, employment, residence in urban locality, and level of higher education were positively associated with psychological well-being and improved academic outcomes.

Nadeem et al. (2012) discovered that anxiety had a more pronounced negative impact on academic achievement among female students compared to males, suggesting that female students may be more vulnerable to the detrimental effects of anxiety on their educational performance.

Japaridze (2012) research on Georgian students established a strong link between psychological well-being and academic outcomes, showing that students with higher well-being tend to achieve moderate to high academic success.

On the other hand, Reynolds, Fisher and Cavil (2012) highlighted the influence of gender and socio-economic status on academic achievement among African-Americal student-athletes. Similarly, Alhajraf and Alasfour (2014) found significant correlations between academic achievement and

demographic characteristics in a sample of 700 students.

Moreover, Kumar, Shaheen and Rasool (2016) found a significant association between psychological distress and life satisfaction among university students, with stress, anxiety, and depression rates varying across different educational disciplines.

Larson, Orr, and Warne (2016) emphasized the intricate relationship between mental health and academic success, calling for the implementation of robust support systems to help students navigate these challenges effectively.

Sindhu (2016) investigated stress levels among undergraduate engineering students, revealing elevated stress in both high and low-achieving groups, thereby underscoring the pervasive nature of stress and the necessity for targeted interventions to improve academic outcomes.

Adding to this discourse, Chowdhury (2017) identified high school students as particularly vulnerable to academic depression, which was closely linked to diminished focus and attention during activities.

Expanding on the factors influencing psychological well-being, Oskrochi, Bani-Mustafa, and Oskrochi (2018) examined the relationship between financial status and psychological well-being using a parametric mixed modelling approach applied to panel data from the British Household Panel Survey (BHPS) and the Understanding Society Survey (USS). Psychological well-being was assessed through the GHQ-12 score, with findings indicating that factors such as future financial expectations and household expenditure concerns were significant predictors. Demographic variables- including gender, age, marital status, and job status, also played a role, whereas income size was not found to be significant factor. The findings highlight the influence of financial concerns on psychological well-being.

Likewise, Wahab (2019) investigated high school students in Kerela, India, illustrating the negative impact of depressive symptoms on academic performance, reinforcing the importance of addressing mental health in educational settings. In the same vein, Dapaah and Amoako (2019) found that depression exerts an adverse effect on various aspects of university student's lives beyond academic outcomes. Rapuano (2019) echoed these findings, identifying a positive relationship between psychological well-being and academic outcomes among Lithuanian students, with specific dimensions of well-being predicting academic success.

The study conducted by Malik, Saidin and Nordin (2020) examines the relationship between stress and psychological well-being among TESL foundation students transitioning to tertiary education. A survey of 222 students using the student stress inventory and psychological well-being scales revealed a moderate inverse relationship between stress and well-being. The findings highlighted the need to address stress to improve student's psychological health.

Tabassum and Akhter (2020) examined the influence of demographic factors on academic performance through the lens of Erikson's theory of social development. They conducted a survey on 2986 university students from different colleges in Pakistan. The outcome of the study revealed 14 demographic factors, including gender, age, residence, employment and marital status responsible for affecting academic outcomes among these students.

Likewise, Agarwal (2020) reported a positive correlation between academic performance, psychological well-being, adjustment, and self-esteem among senior-secondary school students in Varanasi, Inidia. Adjustment level was found to be critical factor to foster psychological well-being and academic performance among these students.

Recent findings in this domain claimed the crucial role of psychological well-being in academic outcomes, highlighting the need of integrating well-being targeted strategies to incorporated in educational frameworks. The previous literature had consistently identified anxiety, stress, and depression as important factors that impact both psychological well-being and academic outcomes during formative years. These studies foster the need for ongoing research to dig deeper into the complex relationship between psychological variables and their broader impact on academic performance and psychological well-being among adolescent population (Zinta, Azad & Singh, 2017; Azad, 2020; Azad & Zinta, 2021; Azad & Kumar, 2023; Azad, 2024; Azad & Kaur, 2024).

Hypotheses

H1: There will be a significant difference in the levels of depression between boys' and girls' college students.

H2: There will be a significant difference in academic performance between boys' and girls' college students.

H3: Gender will have a significant impact on academic performance of college students.

H4: Depression will have a significant impact on the academic performance of college students.
H5: There will be a significant impact of gender on the psychological well-being of boys' and girls' college students.
H6: There will be a significant impact of depression on the psychological well-being of boys' and girls' college students.
H7: There will be a significant impact of the interaction effect of Gender and Depression on the academic performance of boys' and girls' college students.
H8: There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students.

Significance and Research Gap

The literature review explores the intricate connections among depression, academic achievement, and psychological well-being. There is a need for an integrative study that simultaneously examines psychological well-being and a broad range of demographic factors to understand their combined effect on academic outcomes. Specifically, research should aim to reconcile conflicting findings regarding anxiety's role, explore under-researched populations, and consider cultural and contextual differences that may influence these relationships. Addressing this gap could lead to the development of targeted interventions and support systems to enhance student's psychological health and academic stress.

III.METHOD

Demographic characteristics of the participants and study design

Table 1. Demographic characteristics of the participants

Variables	Total Population		Selected Sample	
Gender				
	Frequency	Percentage	Frequency	Percentage
Boys	230	55.96	60	50
Girls	180	43.79	60	50
Total	411	100	120	100
Level of Depression				
LD (Low Depression boys)	98	42.60	30	25
LD (Low Depression girls)	70	38.88	30	25
HD (High Depression boys)	132	57.39	30	25
HD (High Depression girls)	110	61.11	30	25
Total	411	100	120	100
Age				
18-19	178	43.30	95	79.16
20-21	233	56.69	25	20.83
Year of the Study				
2nd	287	69.82	69	57.50
3rd	124	30.17	51	42.50
Total	411	100	120	100
Faculty of the study				
Akal College of Arts and Social Science	211	51.33	60	50
Govt. College, Rajgarh	200	48.66	60	50
Total	411	100	120	100

Table 1 displays the demographic characteristics and study design details. Employing a 2 × 2 factorial design, the study investigated the influence of depression levels (high-HD and low-LD) and gender (boys and girls) as independent variables on academic success and psychological well-being on a sample of 120 college students. The participants, with an average age of M=19.7 years, were randomly selected from a larger pool of 411 college students. Within this group, 211 girls (51.33%) represented Akal College of Arts and Social Science, Eternal University, Baru Sahib, while 200 boys (48.66%) were enrolled at Government College Rajgarh in the Sirmaur district of Himachal Pradesh, India. All

participants actively participated in the completion of the study questionnaires.

Sample and Research Design

Table 2. Sample and Research Design

IV		Depression		Total
		HD	LD	
Gender	Boys	30	30	60
	Girls	30	30	60
	Total	60	60	120

*Notation: IV = Independent variable, HD = High Depression, LD = Low Depression

Table 2 provides the sample size and subgroup distribution. The students were equally divided between girls from Akal College of Arts and Social Science and boys from Government College Rajgarh. They were enrolled in bachelor's degree programs, with 69 (57.50%) in the second year and 51 (42.50%) in the third year. Categorically, students were assigned to high depression (HD) and low depression (LD) groups, comprising 25 boys (20.83%) and 35 girls (29.16%) in the HD category, and 35 boys (29.16%) and 25 girls (20.83%) in the LD category.

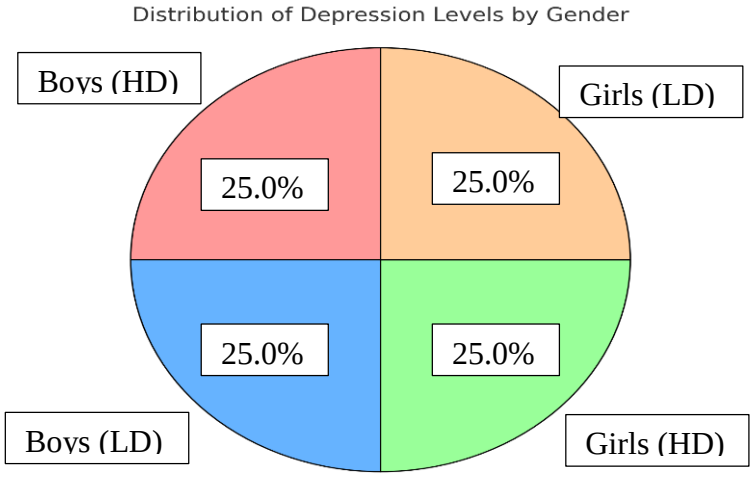

Figure 2. Sample of the Study

Procedure

Participants were provided with clear instructions in a relaxed environment to ensure their comfort. Strict adherence to ethical principles, encompassing informed consent, voluntary participation, anonymity, and confidentiality, was maintained throughout. Eligibility criteria necessitated college enrolment, irrespective of gender, and a minimum age of 19 or second/third-year status. The data collection unfolded in two phases:

Phase I: the data was collected from female students at affiliated colleges under Eternal University, Baru Sahib, Himachal Pradesh, with appropriate permissions.

Phase II: the data was gathered from male students at Government College Rajgarh, Himachal Pradesh.

The questionnaires covered demographics, the Beck Depression Inventory (BDI), Ryff's Psychological Well-Being (PWB) scale, and academic achievement (last semester's percentage, converted to CGPA). This comprehensive process required approximately 50 to 60 minutes. The researcher meticulously reviewed and analyzed completed questionnaires, discarding incomplete ones, and coded the data based on rank percentile order before engaging in statistical analysis.

Tools Used

The Beck's Depression Inventory (BDI):

The Beck Depression Inventory (BDI) is a self-report questionnaire comprising of 21 items, each with four multiple-choice responses scored on a scale of 0 to 3. The total score ranges from 0 to 63, with cutoff scores categorizing depression severity as follows 0-13 (minimal depression), 14-19 (mild depression), 20-28 (moderate depression), and 29-63 (severe depression). Extensive evaluations have validated the tool's content, concurrent, and construct validity. It exhibits strong concurrent validity with a correlation rate (r) of 0.77, substantial, with α values of 0.92 for

outpatients and 0.93 for college students, validating its reliability in assessing depression levels (Beck et al., 1961; Jackson-Koku, 2016).

Ryff's Psychological Well-being Scale:

The study utilized a pre-designed standardized questionnaire developed by Carol D. Ryff in 1989, comprising 42 items to assess participants' psychological well-being across six dimensions: Autonomy, Environmental mastery, Personal Growth, Positive Relations with Others, Purpose in Life, and Self-Acceptance. Participants rated their responses on a Likert scale ranging from 1 (strongly agree) to 6 (strongly disagree). With 20 negatively phrased items, scores were reversed using the formula (Number of scale points + 1) - (Respondent's answer). The scale demonstrated robust internal consistency (Cronbach alpha values: 0.86 to 0.93) and test-retest reliability (0.81 to 0.88). Higher scores indicate greater psychological well-being, emphasizing its utility in assessment.

Academic Achievement Measure:

Academic achievement, assessed using Grade Point Average (GPA), followed the conversion formula: GPA = (Percentage of marks/9.5), aligning with the methodology recommended by Steinmayr et al. (2014).

Data Analysis

The data were meticulously analyzed using SPSS version 28, a statistical software widely applied in social sciences research. The independent sample t-test was employed to compare the mean levels of depression, and academic performance between two independent groups (boys and girls). On the other hand, multivariate analysis of variance (MANOVA) was employed to determine if there are substantial differences between boys and girls when considering the combined impact of depression on both academic performance and psychological well-being.

IV.RESULTS

t-test Analysis

Table 3. t-test analysis showing the level of depression among boys' and girls' college students

	Gender	N	Mean	Std. Deviation	't'	*Df*	Table Value	Level of Significance
Depression	Boys	60	0.42	0.497	1.836	118	0.06	NS
	Girls	60	0.58	0.497				

*Notation: Level of Significance: p<.05 and lower

In Table 3 an independent samples t-test was conducted to compare the level of depression among boys' and girls' college students. The mean depression score for boys (M = 0.42, SD = 0.497) was lower than that of girls (M = 0.58, SD = 0.497). However, the difference was insignificant, t (118) = 1.836, p > 0.05. These results suggest that there was no significant difference in depression levels between boys and girls among college students.

As a result, H1, proposing "There will be a significant difference in the level of depression among boys' and girls' college students," was rejected.

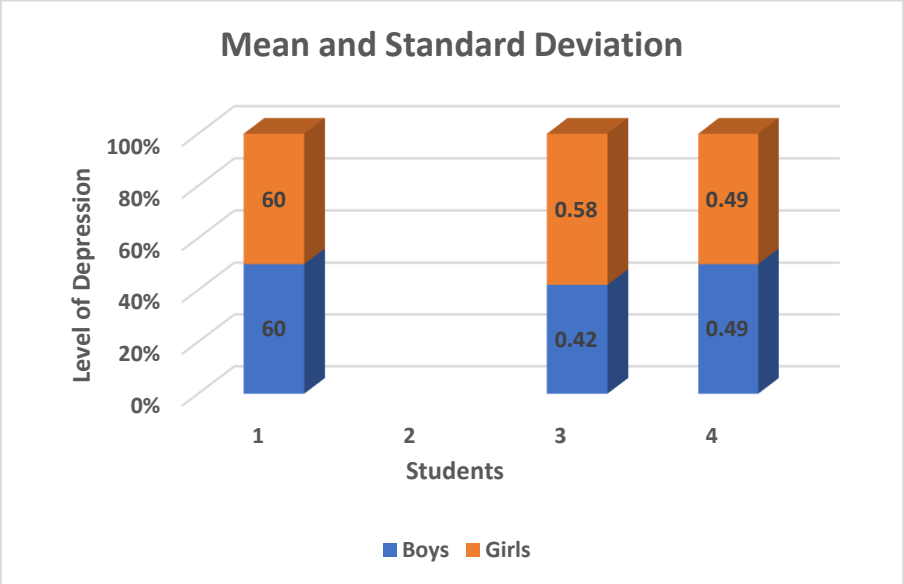

Figure 3. Graphical representation of the level of depression among boys' and girls' college students

Table 4. t-test analysis showing the level of academic performance among boys' and girls' college students

	Gender	N	Mean	Std. Deviation	't'	*Df*	Table Value	Level of Significance
Academic Performance	Boys	60	7.14	0.74	-3.98	118	0.00	0.001
	Girls	60	7.72	0.83				

*Notation: Level of Significance: p<.05 and lower

A t-test was conducted to compare the academic performance of boys and girls, from table 4 it cis evident that there is a significant difference in academic performance between boys (M = 7.14, SD = 0.74) and girls (M = 7.72, SD = 0.83), t(118) = -3.98, p <0.001). This indicates that, on average, girls had higher academic performance than boys. As a result, H2, proposing "There will be a significant difference in the level of academic performance among boys' and girls' college students," was accepted.

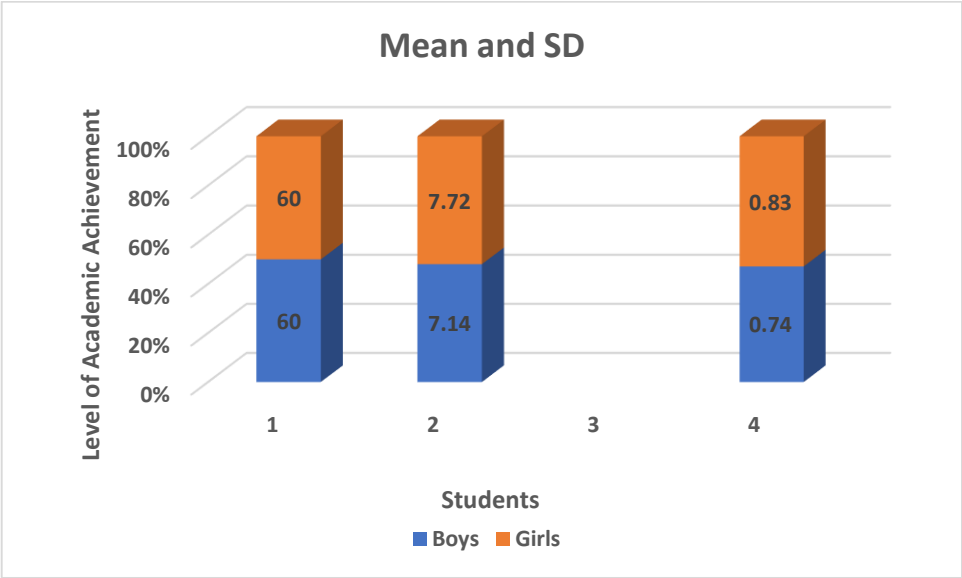

Figure 4. Graphical representation of the level of academic performance among boys' and girls' college students Two-Way ANOVA

Table 5. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on academic performance (AP) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	83.83	119			
Gender	11.85	1	11.85	19.87	<.01
BDI	3.96	1	3.96	6.64	NS
Gender * BDI	0.70	1	0.70	1.18	NS
Error	69.20	116	0.59		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

Table 5 revealed that the main effect of gender on academic performance was statistically significant, F (1,116) = 19.87, p < 0.01, indicating that there was a significant difference in academic performance (AP) between boys and girls. Therefore, Hypothesis No. 3, states that "There will be a significant impact of gender on the academic performance among boys' and girls' college students." is accepted. However, the main effect of depression on AP was not statistically significant, F (1,116) = 6.64, p > 0.05, consequently leading to the rejection of hypothesis No. 4, "There will be a significant impact of depression on the academic performance of boys' and girls' college students." Additionally, the interaction between gender and depression on academic performance was not statistically significant, F (1, 116) = 1.184, p > 0.05. Therefore, hypothesis No. 5, stating "There will be a significant impact of the interaction effect of Gender and Depression on the academic performance of boys' and girls' college students." is rejected.

Table 6. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on PWB (AU) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	2885.99	119			
Gender	6.640	1	6.64	0.29	NS
BDI	145.97	1	145.97	6.43	NS
Gender * BDI	85.42	1	85.42	3.76	NS
Error	2632.91	116	22.69		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

Table 6 depicts the results of a two-way ANOVA conducted to evaluate the interaction effect between gender and depression on the Autonomy (AU) dimension of psychological well-being (PWB). The main effect of gender on PWB was not statistically significant, F (1,116) = 0.29, p> 0.05. Therefore, hypothesis No. 6 "There will be a significant impact of gender on the psychological well-being of boys' and girls' college students." is rejected. Similarly, the main effect of depression PWB was not statistically significant, F (1,116) = 6.43, p>0.05. Consequently, hypothesis No. 7 "There will be a significant impact of depression on the psychological well-being of boys' and girls' college students." is rejected. The interaction between gender and depression on PWB was also statistically non-significant, F (1.116) = 3.76, p > 0.05. Therefore, hypothesis No. 8 "There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students." is rejected.

Table 7. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on PWB (EM) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	1866.99	119			
Gender	8.50	1	8.50	0.55	NS
BDI	46.30	1	46.30	2.99	NS
Gender * BDI	10.60	1	10.60	0.68	NS
Error	1793.21	116	15.45		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

From Table No. 7 it is evident that the main effect of gender on the Environmental Mastery (EM) dimension of PWB was not statistically significant, F (1, 116) = 0.55. p > 0.05. Therefore, hypothesis no-6 "There will be a significant impact of gender on the psychological well-being of boys' and girls' college students." is rejected. Similarly, the main effect of depression on EM was not statistically significant, F (1,116) = 2.99, p > 0.05. As a result, hypothesis No.7 "There will be a significant impact of depression on the psychological well-being of boys' and girls' college students." is rejected. The interaction between gender and depression on EM was also not statistically significant, F (1, 116) = 0.68, p > 0.05. Therefore, hypothesis No. 8 "There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students." is rejected.

Table 8. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on PWB (PG) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	4099.12	119			
Gender	80.37	1	80.37	2.40	NS
BDI	15.97	1	15.97	0.47	NS
Gender * BDI	112.37	1	112.37	3.36	NS
Error	3875.37	116	33.40		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

Table 8 indicated that the main effect of gender on the Personal Growth (PG) dimension of PWB was not statistically significant, F (1,116) = 2.40, p > 0.05. Therefore, hypothesis No. 6 "There will be a

significant impact of gender on the psychological well-being of boys' and girls' college students." is rejected. Similarly, the main effect of depression on PG was not statistically significant, F (1,116) = 0.47, p > 0.05. Therefore, hypothesis No.7 "There will be a significant impact of depression on the psychological well-being of boys' and girls' college students." is rejected. The interaction between gender and depression on PG was also not statistically significant, F (1,116) = 3.36, p > 0.05. Therefore, hypothesis No. 8 "There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students." is rejected.

Table 9. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on PWB (PR) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	3886.32	119			
Gender	19.33	1	19.33	0.60	NS
BDI	1.00	1	1.00	0.03	NS
Gender * BDI	174.05	1	174.0	5.46	<.05
Error	3692.85	116	31.835		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

Table 9 shows that the main effect of gender on the Personal Relations with others (PR) dimension of PWB was not statistically significant, F (1,116) = 0.60, p > 0.05. Therefore, hypothesis No. 6 "There will be a significant impact of gender on the psychological well-being of boys' and girls' college students." is rejected. Similarly, the main effect of depression on PR was not statistically significant F (1,116) = 0.03, p > 0.05. Accordingly, hypothesis No. 7 "There will be a significant impact of depression on the psychological well-being of boys' and girls' college students." is rejected. However, the interaction effect of gender and depression on PR was statistically significant, F (1,116) = 5.46, < 0.05. Therefore, hypothesis No. 8 "There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students." is accepted.

Table10. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on PWB (PL) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	3027.96	119			
Gender	0.115	1	0.11	0.00	NS
BDI	1.44	1	1.44	0.05	NS
Gender * BDI	21.71	1	21.71	0.83	NS
Error	3004.50	116	25.90		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

From Table 10 it can be inferred that the main effect of gender on the Purpose in Life (PL) dimension of PWB was not statistically significant, F (1.116) = 0.00, p > 0.05. Thus, hypothesis No. 6 "There will be a significant impact of gender on the psychological well-being of boys' and girls' college students." is rejected. Similarly, the main effect of depression on PL was not statistically significant, F (1,116) = 0.05, p > 0.05. Subsequently, hypothesis No. 7 "There will be a significant impact of depression on the psychological well-being of boys' and girls' college students." is rejected. The interaction between gender and depression on PL was also not statistically significant, F (1,116) = 0.83, p > 0.05. Therefore, hypothesis No. 8 "There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students." is rejected.

Table 11. A 2×2 ANOVA performed to observe the interaction effect between gender and depression on PWB (SA) among boys' and girls' college students

Source	SS	*Df*	MS	F	P
Total	4472.36	119			
Gender	87.43	1	87.43	2.50	NS
BDI	142.63	1	142.63	4.08	<.05
Gender * BDI	150.10	1	150.10	4.30	<.05

Error	4047.32	116	34.89		

*Notation= BDI= Beck Depression Inventory; SS= Sum of Square; *df*= Degrees of Freedom; MS= Mean Square; p= level of significance i.e., p=<0.05, 0.01.

The results presented in Table 11 depicted that the main effect of gender on the Self-Acceptance dimension of PWB was not statistically significant, F (1.116) = 2.50, p>0.05. Therefore, hypothesis No. 6 "There will be a significant impact of gender on the psychological well-being of boys' and girls' college students." is rejected. However, the main effect of depression on SA was statistically significant, F (1.116) = 4.08, p < 0.05. Accordingly, hypothesis No. 7 "There will be a significant impact of depression on the psychological well-being of boys' and girls' college students." is accepted. Additionally, the interaction effect between gender and depression on SA was also statistically significant, F (1,116) = 4.30, p < 0.05. Therefore, hypothesis No. 8 "There will be a significant impact of the interaction effect of Gender and Depression on the psychological well-being of boys' and girls' college students." is accepted.

V. DISCUSSION

This study explores the relationship between gender, depression, psychological well-being, and academic performance among boys' and girls' college students offering several key insights.

Analysis of mean depression scores and t-test analysis indicated no-significant difference in depression levels between boys' and girls' students, aligning with previous findings (Chio et al., 2019; Khesht-Mesjedi, 2019). This suggests that both boys' and girls' students experience similar levels of depression.

Conversely, the analysis of mean academic performance scores and t-test outcomes revealed a significant difference between boys' and girls' students, with girls' outperforming boys' academically. These results are consistent with earlier studies (Driessen & Van Langen, 2013; Latsch & Hannover, 2014; Sartain et al., 2021; Ullah & Ahmad, 2021).

Regarding Academic performance, the 2×2 Way ANOVA results indicated a significant gender effect on academic achievement, highlighting that boys and girls perform differently academically. However, depression and its interaction with gender did not significantly impact academic performance, aligning with existing research that emphasizes the predominant role of gender over depression in academic outcomes (Gibb, Fergusson & Horwood, 2008; Naderi et al., 2009; Oludipe, 2012; Pirmohamed, Bebowska & Boduszek, 2017).

In terms of psychological well-being (PWB), several patterns emerged. For dimensions such as autonomy (AU), and environmental mastery (EM), neither gender nor depression had significant effects, suggesting that these factors do not notably influence students' independence or ability to manage their environment. Similarly, personal growth (PG) was unaffected by gender and depressive symptoms, reflecting that these variables do not significantly influence student perceptions of their development (Brown et al., 2018; Johnson & Lee, 2019; Taylor, 2021).

Notably, significant interaction effects were observed in the dimensions of positive relations with significant others in the society (PR), and self-acceptance (SA). The interaction between gender and depression significantly influences positive relations with others, suggesting that gender's impact on social relationships varies depending on depression levels (Smith et al., 2020). Additionally, depression significantly affected self-acceptance, with higher levels of depression associated with lower self-acceptance, and the interaction effect between gender and depression on self-acceptance was also significant. This indicates that the relationship between self-acceptance and depression is complex and varies by gender.

VI. CONCLUSION

In conclusion, while gender differences in academic performance were evident, depression did not significantly differ between boys and girls. Most dimensions of psychological well-being were unaffected by gender or depression, except for positive relations (PR), and self-acceptance (SA), where significant interaction effects were observed. These findings indicate that the interaction between gender and depression exerts a nuanced influence on specific dimensions of students' social relationships and self-acceptance. Future research should explore these interaction effects in greater depth, emphasizing gender-sensitive strategies to address depression and enhance psychological well-being, especially for students experiencing depressive symptoms.

Research Implications

Our study produced mixed results regarding the main effects of gender and depression, as well as the interaction between gender and Psychological Well-Being (PWB). However, significant gender effects were observed in academic performance. To address potential gender-related academic disparities and mitigate the impact of depression on academic achievement and PWB, educators should adopt inclusive support programs for all genders (Jhonson & Lee, 2019). Although no significant gender-based differences in depression levels were found, extending proactive mental health support to all students is critical, with an emphasis on counseling services and accessible resources (WHO, 2015; Brown et al., 2018). Policymakers should prioritize the mental health of college students through awareness campaigns and resource allocation (Jongbloed, Enderes & Salerno, 2008; Brown & Carr, 2019). Promoting gender equity in education must remain a central policy goal (Chisamya et al., 2012; Cairney et al'; 2022).

To broaden the applicability of findings, researchers must include diverse student samples (Smith et al., 2020) and employ longitudinal research to identify causal relationships over time (Luppino et al., 2010). A mixed-methods approach combining quantitative and qualitative data can provide a more comprehensive understanding (Ostlund et al., 2011). Variables such as socio-economic status and cultural influences should be further examined (Yusoff et al., 2013). Regular evaluation of intervention outcomes is vital to maintaining student well-being (Simbolon & Purba, 2022). Additionally, comparative studies across educational levels and non-academic contexts are necessary to generalize findings (Mirza et al., 2021). Leveraging innovative tools, including wearable technology, can enhance the accuracy and depth of research (Davies, Morriss & Glazebrook, 2014).

To minimize response bias and include non-responders, strategies need to be employed (Atkinson, Williamson & Batterham, 2019). Exploring additional aspects of mental health and well-being is recommended (Green & Elliot, 2010). Cultural insights are essential, requiring research in diverse contexts (Diener & Suh, 2003). Constant improvement of measurement tools is vital (Joseph & Wood, 2010). Implementing these actions can advance our understanding of complex relationships among college students, contributing to the design of more effective support programs.

Limitations

The current research has notable limitations that warrant consideration when interpreting findings and shaping future research:

- The study's findings may not be universally applicable to all college students due to regional sampling bias. The cross-sectional design hinders establishing causality, underscoring the importance of longitudinal studies to explore evolving relationships over time.
- Self-report measures introduce vulnerability to response bias, potentially impacting result accuracy. Context-specific findings may not be generalized universally. Characteristics of non-responders, if different, could introduce bias.
- The study lacks specific guidance on effective interventions for enhancing college students' well-being and may not extend its findings to other educational levels or non-academic settings.
- Future studies should address these limitations by employing larger, more diverse samples and comprehensive methodologies to advance our understanding of these complex relationships.

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