FACTORS ASSOCIATED WITH DEPRESSION AMONG UNDERGRADUATES: A REVIEW OF EXISTING LITERATURE

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Abstract

Depression among undergraduate students is a considerable mental health issue. Understanding the factors associated with depression is important to prevent it effectively and to design intervention strategies to mitigate the repercussions of depression. This systematic literature review mainly aims to identify and review the existing academic body of knowledge on the factors associated with depression among undergraduate students in relation to ScienceDirect and Scopus databases. A comprehensive search of ScienceDirect and Scopus databases derived 44 relevant articles published between 2003 and 2023. The review focuses on academic stress, social isolation, financial stress, relationship issues, pre-existing mental health conditions, substance abuse, lack of sleep and fatigue, coping mechanisms, family history and genetics to be factors associated with depression among undergraduates. The implications of these findings highlight the importance of universities and counselling services to focus on and implementing stress management programs, providing social support mechanisms, establishing financial support systems during higher studies, promoting healthy relationships, addressing substance abuse and sleep-related issues, and also providing resources and required support for individuals with pre-existing mental health conditions and family history and genetics on depression to better cope up with depression. Future researchers are encouraged to conduct more longitudinal studies, examine underlying mechanisms, explore mediating and moderating factors while considering cultural and contextual factors, and conduct intervention studies that examine the impact of technology to enhance the understanding of the factors associated with depression among undergraduate students.

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Introduction

Depression is a serious mental health concern that has now become a prominent mental health disorder affecting at least 280 million people worldwide (World Mental Health Day: An Opportunity to Kick-Start a Massive Scale-up in Investment in Mental Health, 2020). Depression is becoming a key component in the overall cost of diseases across the globe, adding more pressure and burden on the world healthcare budgets (World Health Organization, 2023). Depressive disorders are recorded to be the most alarming psychiatric disorder among young adults who commit suicide, ranging from 49% to 64% (Bhattarai et al., 2020). The prevalence of various mental health-based problems, such as higher levels of depression, increased levels of anxiety, and frequent amounts of higher stress loads, are symptoms that are more common among university students (Amal K Suleiman et al., 2017). With the COVID-19 pandemic, the statistics on global mental health disorders have surged drastically from 2019 to 2020, where around 76.2 million new cases of depression have been reported all over the world (IHME, 2021). It is found that younger people between the ages of 20 to 24 recorded a total of an additional 1,118 cases of depression per 100,000 (Santomauro et al., 2021).

Mental health among students has been a controversial topic of discussion over the past, which is not yet fully detailed or analysed (Schwartz et al., 2021). Historical literature suggests that many factors during one's undergraduate life can lead towards depression, yet most factors are unexplored (Mofatteh, 2020). Depression among undergraduates can lead towards degraded academic performance, engagement in risky sexual behaviours, substance abuse, unhealthy relationships, changes in moods and finally suicide (Pedrelli et al., 2014). Students with depression usually showcase various symptoms, such as higher levels of absenteeism and missing most lectures, that will make them achieve a low cumulative grade point average (GPA) when compared to the students who are not depressed (Abu Ruz et al., 2018). Depression leads towards increased levels of dropout rates among college students (Boyraz et al., 2016). It also can result in a reduction in attention, verbal memory, and planning (Tesera & Wohabie, 2021). When there is an increased level of depression, it can also increase the negative emotions and behavioural disorders that can thereby lead to less satisfaction in social interactions (Zou et al., 2022). Students with depression are more likely to miss most lectures, fail to complete and submit due assignments, face competitive examinations and are even prone to leave their studies at an early point (Goodwin, 2020). As a result, these symptoms of the issue of depression during undergraduate time can create a more comprehensive array of reciprocating problems. In this way, depression can badly disturb the future of a student, both professionally and personally (Dawood et al., 2017). Past studies reveal that students who experienced mental difficulties had gained lower grade point averages (GPA), resulting in more frequent dropouts when compared to other students (Bruffaerts et al., 2018). When an individual is depressed in an achievement-driven environment such as in higher education, low grades may lead towards considering themselves as failures with relatively poor levels of self-esteem that can negatively impact their present and future (Freire et al., 2020).

The development in education is usually assessed through a better state of academic performance; therefore, poor or degraded academic achievement in a higher educational environment can thereby add more stress on students, leading towards a continuous and severe state of depression, resulting in a more adverse state of degraded academic performance (Mofatteh, 2020). Depression can cause lifelong impacts on one's personal and professional success by deteriorating the level of academic achievement, which in turn will lead towards substance abuse and frequent suicidal intentions (Olum et al., 2020). In this regard, an individual with frequent suicidal thoughts is more likely to find worthlessness in one's self, which can again lead towards dishonesty, lack of compassion and even morality while reciprocating and trigger again on substance abuse, self-harm and suicide, causing a vicious cycle of lifelong trauma and desperation that occurs in a broader level to this problem (Olum et al., 2020).

Though depression has been leading towards such adverse outcomes, there is a dearth of systematic empirical literature assessing the context and the repercussions of mental health issues that are faced by university students. Thereby, the outcomes of such mental health issues associated with factors associated with such are currently left unexplored. As a result of this, there is an empirical gap pertaining to the domain of depression at present, where only a limited number of studies have been conducted examining depression in the higher education setting. Moreover, there are few studies conducted examining the factors associated with depression among undergraduates and assessing these past studies across multiple sources, as stated by Chulasiri et al. (2016), Ahmed et al. (2020), Dawood et al. (2017) and Amarasuriya et al. (2015) family-related factors can lead towards causing depression among undergraduates. Also, Chulasiri et al. (2016), Worku et al. (2020) state that factors related to financial difficulties can cause depression among undergraduates. Factors related to sleep quality can also lead to depression. Internet usage also has an impact on the cause of depression among students.

The publications made by Chulasiri et al. (2016), Worku et al. (2020), Amarasuriya et al. (2015) suggest that the living conditions of undergraduates can lead towards depression. Bhattarai et al. (2020), (Demir, 2016), Ahmed et al. (2020), Dawood et al. (2017) and Amarasuriya et al. (2015) also have stated that personal factors can cause depression among undergraduate students whereas, Chulasiri et al. (2016), Olum et al. (2020), Worku et al. (2020) and Amarasuriya, et al. (2015) found that pressure resulting from academic, family and social factors do result in causing depression. Factors related to personal and romantic relationships can also lead towards depression, and it has been identified from the studies of Chulasiri et al. (2016), Ahmed et al. (2020) and Amarasuriya et al. (2015). As stated by Bhattarai et al. (2020) social factors also have the potential to cause depression, and all these studies suggest the need for more elaborative studies to be conducted exploring the factors associated with depression among undergraduates.

This has been constantly highlighted by scholars, including Amarasuriya et al. (2015), while there is a considerable absence of previous empirical studies examining the factors affecting depression among university undergraduates. This has aided towards widening the empirical gap in this area, and there is a need for a more updated and detailed understanding to be established of this domain of depression among undergraduates. It is noted that the empirical gap in this area of focus has also led towards the widening of the knowledge gap in the domains of depression, especially in relation to the factors that affect depression among undergraduates. Therefore, as there is not enough solid understanding that addresses the factors affecting depression among undergraduate students, the causes for poor academic achievement and the related socio-catastrophic vicious cycle of associated events of undergraduate depression also remained underexplored, which has led towards the absence of timely tools and interventions on providing solutions to this burning global problem.

Due to this considerable knowledge gap in this area, it demands more immediate and serious attention has been invested in this concern. More knowledge in the field of depression is needed to be discovered and developed to understand better the reasons behind the global epidemic of depression that adds up to the global burden of diseases as highlighted by the World Health Organization (2021), and this is needed to be better explored in an undergraduate level. In assessing the currently available theory that can be aided in understanding and exploring depression among undergraduates, there is again a considerable absence of related direct theory that has also resulted in a theoretical gap in this area. Only a very few theories, such as the Psychodynamic Theory of Depression, Beck's Cognitive Theory of Depression, The Stress-Vulnerability Model and the Rank Theory of Depression, are available on depression yet overlook depression in a more therapeutic term over-explaining or exploring depression

with relation to an academic setting or conduct (Brouwer et al., 2019). This absence of a theoretical basis leads to the need to conduct further research to explain and facilitate the understanding of this phenomenon, especially in relation to the factors associated with depression. The absence of a robust theoretical foundation has also added to both the existing knowledge gap and the literature gap, and this has been one of the main reasons behind the prevailing dearth of literature in this area of study.

So far, there is limited literature that investigates factors that affect depression at an undergraduate level, and it creates the need to summarise and analyse past literature in this field to facilitate and encourage future research in this domain. At present, the available limited literature is scattered across multiple sources, and there is a lack of unified systematic reviews conducted over the past assessing the past studies on the area of factors associated with depression among undergraduates. There are a few sets of published records available across different literature sources, yet so far, a proper screening of them and systematic classification and analysis of them has not been performed satisfactorily. Due to this, conducting further research in this area becomes challenging as future researchers need to analyse these multiple sources and re-do their literature screening to understand the direction of studies and related information in this regard. Also, most of the past publications in this area do not arise from academically acceptable and reputed sources of research, and there is an absence of a systematically reviewed pool of past studies in this area of factors associated with depression among undergraduates. Therefore, it is necessary to identify the related studies in this area and systematically analyse them to facilitate future research more effectively. The scattered literature across multiple sources needs to be analysed, and the most related literature must be extracted and analysed in a systematic literature review.

In considering these concerns, this current study is focused on analysing various research that are published in the field of undergraduate depression, primarily focused on the factors associated with depression among undergraduates. Through this, it mainly aims to explore and understand the various factors associated with depression among undergraduates worldwide so that the prevailing studies can be evaluated and synthesised to summarise published studies in this field. For this, the existing literature derived from the empirical databases has thereby systematically been reviewed to understand the state of the prevailing literature in this field of study so that a collective presentation and an accumulation of literature can be made to facilitate further research in this area to understand on factors associated with depression among undergraduates under multiple perspectives of analysis.

Methodology
This review had been conducted and reported adhering to the PRISMA guidelines (Page et al., 2021).

2.1 Search Strategy
This systematic literature search has been conducted to facilitate the identification of related literature. This search strategy was conducted mainly in relation to ScienceDirect and Scopus databases. The following terms were used as the search terms in these databases.
"factors associated with depression" AND "undergraduates"
"factors associated with depression" AND "university students"
The search results covered from inception until 2023, including all review articles, research articles, conference abstracts, and book chapters published in English.

2.2 Selection Criteria
The PRISMA Statement [29] was based on proceeding with the selection criteria for this systematic literature review. The search was aimed to examine the existing literature related to factors associated

with depression among undergraduates in multiple fields. They include Social Sciences Business, Management and Accounting, Environmental Science, Genetics and Molecular Biology, Arts and Humanities, Psychology, Toxicology and Pharmaceutical Science, Biochemistry, Immunology and Microbiology, Agricultural and Biological Sciences, Dentistry, Computer Science, Medicine and Dentistry, Nursing and Health Professions, Pharmacology from 2003 to the year 2023. All items before the year 2003 have been excluded from the search. The search considered all countries and no item was excluded based on the country of origin. A total of 13 items were excluded out of 124 total items at this stage. One hundred eleven items were extracted at this stage, 85 from ScienceDirect and 26 from Scopus databases.

2.3 Quality Assessment

This systematic literature review was based on review articles, conference abstracts, research articles and book chapters. To ensure the quality of the review, a deep check was done to see for duplicates. As a result, 20 duplications were identified, and all 20 duplicates were excluded from the study. Furthermore, each article was examined in relation to the abstracts to screen them further for quality and relevance. Each item was then evaluated to one, and as a result, once the duplicates were removed, another 46 more items were also excluded from the study due to not being directly related to the examined area of focus. Out of these, 46 and 40 have been removed as they did not directly correspond to the area focused on this systematic literature review.

In contrast, the remaining seven have been removed due to insufficient information in the record. Forty-four items were selected after evaluating each item per the inclusion and exclusion criteria applied in this case. The literature inclusion and exclusion at each stage as per PRISMA is shown in Figure 1.

2.4 Data Extraction

In the stage of extracting data, a total of 44 items were selected. As a result of this, the data extraction criteria included the following:

1. Items must be in review articles, research articles, conference abstracts, or book chapters; anything else was excluded.
2. The item must be published in English language and from the fields of Social Sciences Business, Management and Accounting, Environmental Science, Genetics and Molecular Biology, Arts and Humanities, Psychology, Toxicology and Pharmaceutical Science, Biochemistry, Immunology and Microbiology, Agricultural and Biological Sciences, Dentistry, Computer Science, Medicine & Dentistry, Nursing and Health Professions, Pharmacology.
3. Extracted items must be published between 2003 and 2023.
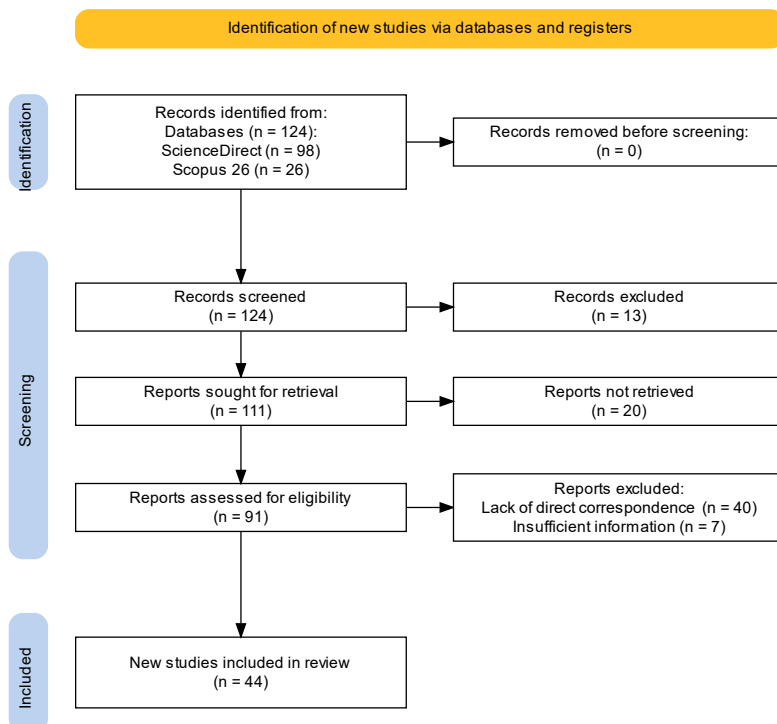
Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Study Selection Flowchart

Results

This underwent a systematic review while adhering to the PRISMA guidelines [29]. The data were analysed using both descriptive analysis and bibliometric analysis. Under the Descriptive Analysis Method, all screened and included records as per the earlier stated PRISMA framework were deeply reviewed to determine their year of publication, country of origin, the journal where the record was published, the research method used for the study, statistical tests that have been used in the study, data collection instruments used for the study and also under the study design used for each study. Similarly, under the Bibliometric Analysis Method, all screened records extracted per the earlier stated PRISMA framework were inputted into the *VOS viewer* software package and analysed to create a map based on bibliographic data and text data. Accordingly, under this Bibliometric Analysis conducted, Co-authorship, Co-occurrence and Term co-occurrence based on titles and abstracts were analysed, and the results that were derived from both this Descriptive Analysis and the Bibliometric Analysis are hereby presented and interpreted in the proceeding sections.

3.1 Descriptive Analysis

According to the PRISMA framework, all included reports were initially analysed using descriptive terms in relation to year, country, journal, research method, statistical tests, data collection instruments, and study design. The related descriptive analysis is as follows.

Figure 2 shows the count of publications by year. As seen in Figure 2, over the period considered in screening from 2003 to 2023, the initial publication was available in 2009. During the last 14 years, the highest number of publications have been done in 2022, which amounts to 11.
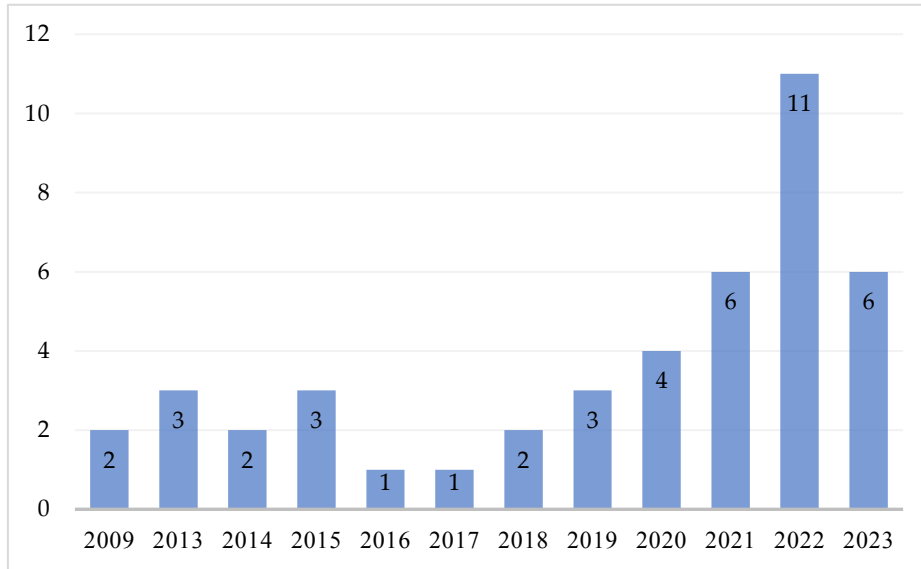
Figure 2: Publications by Year From 2009 - 2023

Figure 3 depicts the analysis done in relation to the country of origin of the publications. As is seen in Table 1, the most significant number of publications was conducted in China, and the second highest publication count is from the United States.
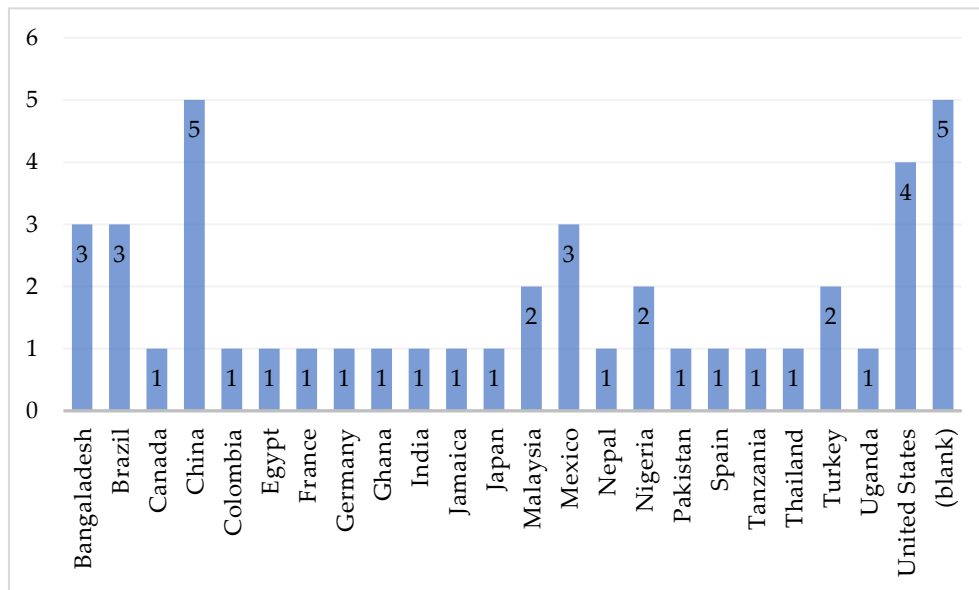
**Figure 3: Publications by Country From 2009 - 2023**

Table 1 analyses the number of publications made in terms of the journals. As shown in Table 1, most publications have been done in the Journal of Affective Disorders.

Table 1: Publications by Journals from 2009 – 2023

Journal Name	No of Publications
African Health Sciences	1
American Journal of Preventive Medicine	1
Annals of Medicine and Surgery	1
Arab Gulf Journal of Scientific Research	1
BMC Psychiatry	1
Child and Adolescent Psychiatric Clinics of North America	1
Egyptian Journal of Hospital Medicine	1
Frontiers in Psychiatry	1
Gazi Medical Journal	1
Global Health Journal	1
Heliyon	1
Indian Journal of Public Health Research and Development	1
International Journal of Clinical and Health Psychology	1
International Journal of Mental Health and Addiction	1
International Journal of Nursing Sciences	1
Journal of Adolescence	1
Journal of Affective Disorders	9
Journal of Affective Disorders Reports	1
Journal of Contemporary Dental Practice	1
Journal of International Students	1
Journal of Mental Health	1
Journal of Mental Health Training, Education and Practice	1
Journal of Nepal Health Research Council	1
Journal of Professional Nursing	2
Journal of Psychiatric Research	1
Journal of Public Mental Health	1
PLoS ONE	2
Procedia - Social and Behavioral Sciences	1
Psychiatry Research	1
Revista da Associacao Medica Brasileira	1
Revista da Associação Médica Brasileira (English Edition)	1
Scientific Reports	1
West Indian Medical Journal	1
Zdravniski Vestnik	1
Grand Total	**44**

Figure 4 showcases the analysis made using the research method, and as can be seen in Figure 4 itself, most of the past publications have been conducted using quantitative methods.
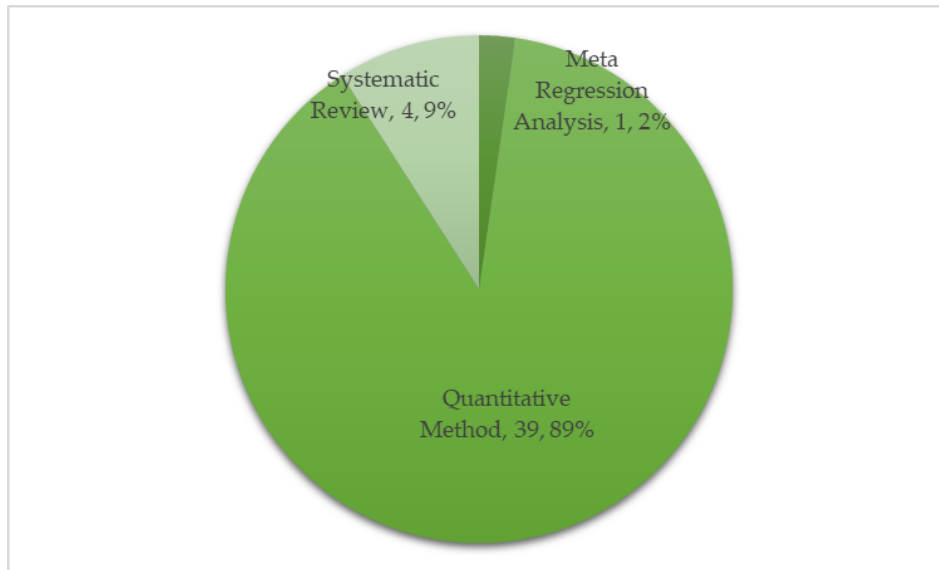
Figure 4: Publications as per Research Methods from 2009 - 2023

Table 2 summarises the analysis of the statistical tests used in each study over the assessed period. As seen in Table 2, most past studies have used Logistic Regression as the statistical analysis test to analyse the data.

**Table 2: Statistical Test Used in Studies From 2009 - 2023**

Statistical Tests	No of Publications
Kolmogorov–Smirnov test & Multiple Chi Square tests with Bonferroni Correction	1
T-test & Mann–Whitney U test & Multiple Logistic Regression Model	1
Path Analysis & Regression Analyses	1
Logistic Regression	12
Bivariate and multivariate analyses	4
Chi-square test	2
Chi-square test and binary Logistic Regression	1
Chi-square & Mann Whitney-U & Kruskal-Wallis tests	1
Confirmatory Factor Analysis (CFA)	1
Frequencies, Percentages &Means & Chi-Square test	1
Independent t-tests & ANOVA & Regression Analysis	1
Kruskal-Wallis test & Chi-Square test	1
Linear Regression Analysis	1
Logistic Regression, Random Forest Regression, Extra Gradient Boosting Regression, Cochran's Armitage test	1
Mixed Effects Modeling	1
Multiple Linear Regression	1
t-tests and chi-square tests	1
Shapiro–Wilk test & Chi-Square test & Mann–Whitney U-test	1
Spearman's Correlation & ANOVA	1
t test & ANOVA	2
t-test & Mann–Whitney U-test & the Kruskal–Wallis Chi-Square t-test & Shapiro–Wilk test	1
t-tests & ANOVA's & Multiple Regression Analyses	1
Univariate & Multivariate Normality	1

Table 3 shows the analysis results of the screening and data collection instruments used in past studies. Most of the past studies have used the Standard Patient Health Questionnaire (PHQ-9) as the screening and data collection instrument. Some studies have also used the Beck Depression Inventory as their screening and data collection tool. In comparison, the most widely used screening and data collection instrument has been the Standard Patient Health Questionnaire (PHQ-9).

Table 3: Screening & Data Collection Instruments Used in Studies From 2009 - 2023

Screening & Data Collection Instruments	No of Publications
Beck Depression Inventory	10
Beck Depression Inventory (BDI) and Migraine Disability Assessment (MIDAS)	1
Centre for Epidemiological Studies Short Depression Scale (CES-D 10)	1
Childhood Anxiety Sensitivity Index (CASI) Child Anxiety and Depression Scale (RCADS)	1
Composite International Diagnostic Interview Screening Scales (CIDI-SC)	1
Depression Anxiety Stress Scale (DASS21)	1
Engine of Well-being Model	1
Mexican Self-Report Scales	1
Patient Health Questionnaire (PHQ-9)	14
Risk Factors for Teen Depression Questionnaire (KRFD-Q)	1
The Brief Screen for Depression (BSD: 16)	1
The Depression, Anxiety, and Stress Scale (DASS-21)	4
The German COVID-19 Student Well-being Study (C19 GSWS) & PHQ-9	1

This study underwent descriptive analysis of this systematic literature review and analysed past studies based on the type of study design it used. This is shown in the analysis in Figure 5. As depicted in Figure 5, most past studies in this area have followed the cross-sectional study design to conduct the studies.
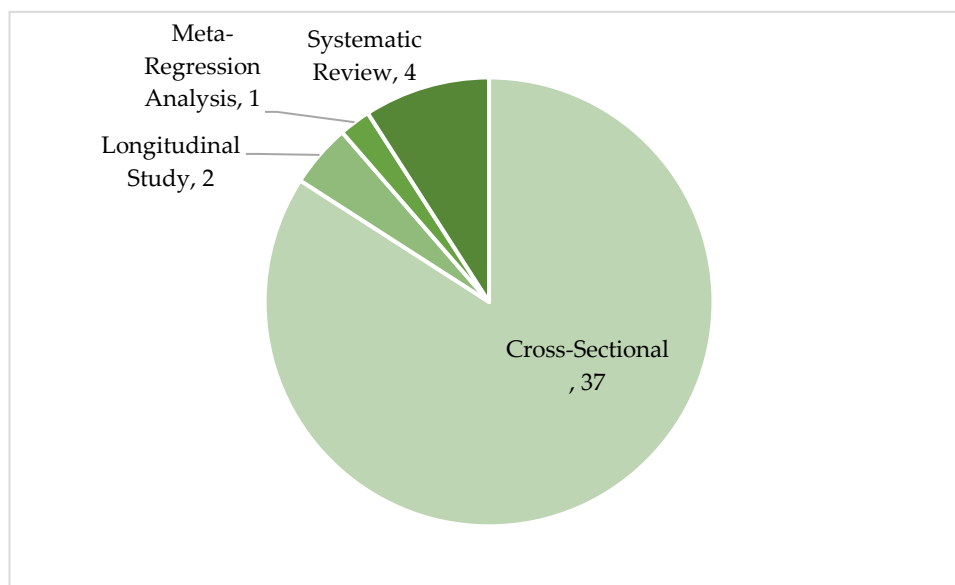
Figure 5: Study Design Used in Studies From 2009 – 2023

Finally, under this descriptive analysis, the screened and included studies have been summarised according to their study year, related authors involved, study location, and their findings in terms of what factors are associated with depression, and this is detailed and presented in Table 4.

Table 4: Summary of Key Findings from Studies From 2009 - 2023

Year	Authors	Study Location	Key Findings
2009	Lowe G A et al.	Jamaica	Financial Stress & Relationship Issues are associated with depression
2013	Chen L et al.	China	Financial Stress & Relationship Issues are associated with depression
2013	Falavigna A et al.	Brazil	Pre-existing Mental Health Conditions are associated with depression
2014	Marcotte D et al.	Canada	Social isolation is associated with depression
2014	Fatiregun AA et al.	Nigeria	Social isolation is associated with depression
2015	Beiter R et al.	United States	Academic stress is associated with depression
2015	Oppong Asante K et al	Ghana	Social Isolation, Relationship Issues, & Substance Abuse are associated with depression
2015	Wimsatt LA et al.	United States	Social isolation is associated with depression
2017	Sun XJ et al.	China	Coping Mechanisms are associated with depression
2018	Ho SM et al.	China	Pre-existing Mental Health Conditions are associated with depression
2018	Muralidhar et al.	India	Academic Stress, Social Isolation, & Substance Abuse are associated with depression
2019	Romo-Nava F et al.	Mexico	Academic Stress, Relationship Issues, Family History and Genetics are associated with depression
2020	Paudel, S et al.	Nepal	Academic Stress, Family History and Genetics are associated with depression
2020	Lugata S et al.	Tanzania	Academic Stress, Relationship Issues, and Pre-existing Mental Health Conditions are associated with depression
2020	Li L et al.	China	Academic Stress, Lack of Sleep and Fatigue are associated with depression
2020	Castaños-Cervantes S et al	Mexico	Substance Abuse is associated with depression
2021	Mehareen et al.	Bangladesh	Social isolation is associated with depression
2021	Gao C et al.	China	Financial stress is associated with depression
2021	Koly KN et al.	Bangladesh	Academic Stress & Coping Mechanisms are associated with depression
2021	Sheldon E et al.	A Systematic Review Study	Relationship Issues and pre-existing Mental Health Conditions are associated with depression
2021	Melnyk BM et al.	United States	Lack of Sleep and Fatigue are associated with depression
2022	Abed H A et al.	Egypt	Academic stress is associated with depression
2022	Cheong W S et al.	Malaysia	Financial Stress is associated with depression
2022	Benavides Morales J A et al	Colombia	Social isolation is associated with depression
2022	Islam S et al.	Bangladesh	Lack of Sleep and Fatigue are associated with depression
2022	George R P et al.	Malaysia	Academic stress is associated with depression

2022	Kaggwa M M et al.	Uganda	Relationship Issues are associated with depression
2022	Zeng F et al.	United States	Financial Stress is associated with depression
2022	Tashiro T et al.	Japan	Coping Mechanisms are associated with depression
2022	Anosike C et al.	Nigeria	Academic Stress and pre-existing Mental Health Conditions are associated with depression
2022	Ballester L et al.	Spain	Relationship Issues are associated with depression
2023	Juanico-Morales L et al	Mexico	Academic Stress & Financial Stress are associated with depression
2023	Ali N A et al.	Pakistan	Social Isolation, Financial Stress, and Pre-existing Mental Health Conditions are associated with depression
2023	Alaşık O et al.	Turkey	Relationship Issues are associated with depression
2023	Pillai R et al.	A Systematic Review Study	Academic Stress, Lack of Sleep and Fatigue Coping Mechanisms are associated with depression
2023	Frajerman A et al.	France	Academic Stress & Financial Stress are associated with depression
2023	Heumann E et al.	Germany	Financial Stress & Relationship Issues are associated with depression

Based on the overall analysis conducted on the screened and included records, in summarising the findings from each study, it is identified that factors associated with depression among undergraduates can vary and are influenced by a combination of factors. As past research has identified, several factors lead towards depressive symptoms collectively and similarly. These detailed factors can be summarised under the main key findings that depict the factors associated with depression among undergraduates. Table 5 details the factors associated with depression among undergraduates under each key factor per the systematic literature review.

Table 5: Detailed Factors Associated with the Key Findings from Studies From 2009 - 2023

Key Findings	Detailed Factors Associated
Academic Stress	High levels of academic pressure, such as heavy workloads, demanding coursework, academic competition, and fear of failure, can contribute to increased stress levels and the development of depressive symptoms.
Social Isolation	Feelings of loneliness, social isolation, a lack of social support networks, difficulties in forming meaningful relationships and a sense of disconnectedness from peers can also generate feelings of depression.
Financial Stress	Financial pressures, including the cost of education, living expenses, student loans, and the need to work part-time jobs, can contribute to increased stress levels and depressive symptoms among undergraduates.
Relationship Issues	Troubles in romantic relationships, conflicts with friends or roommates, or difficulties in establishing and maintaining healthy interpersonal relationships or trauma or abusive nature of relationships can contribute to depressive symptoms.
Pre-existing Mental Health Conditions	Individuals with a history of mental health conditions, such as anxiety or depression, may be more susceptible to experiencing depressive symptoms during their undergraduate years.
Substance Abuse	Engaging in substance abuse, such as excessive alcohol consumption or drug use, is associated with higher rates of depression among undergraduate students.

| Lack of Sleep and Fatigue	Irregular sleep patterns, chronic sleep deprivation, and fatigue can contribute to the development or worsening of depressive symptoms among undergraduates.
Coping Mechanisms	Ineffective or maladaptive coping mechanisms, such as avoidance, self-isolation, increased screen time addiction or even substance use, can contribute to the maintenance of depressive symptoms among undergraduates.
Family History and Genetics	A family history of depression or a genetic predisposition to mental health disorders can increase the likelihood of experiencing depressive symptoms during undergraduate years.

3.2 Bibliometric Analysis

The reports included were also analysed using the Bibliometric Analysis; in doing this, the *VOS viewer* was used as the leading software package to conduct the Bibliometric Analysis. In relation to the Bibliometric Analysis, Co-authorship, Co-occurrence, and Term co-occurrence based on titles and abstracts have been performed as analysis methods, and the result of the Bibliometric Analysis is as follows. Figure 6 shows the results of the Co-authorship analysis under the Bibliometric Analysis, and it shows that 21 authors have been working together in the past research conducted in this area of study.
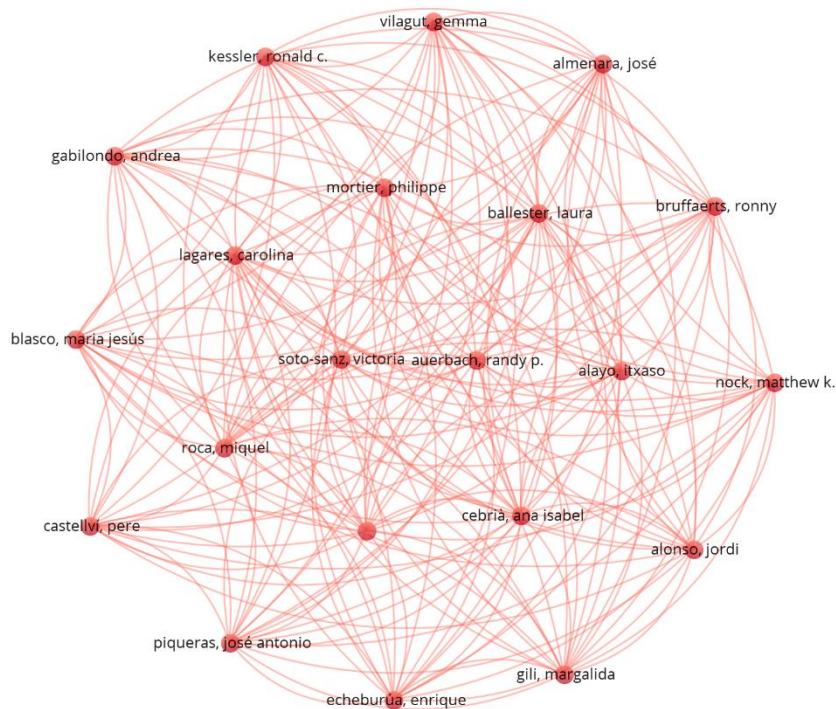

Figure 6: Co-authorship in Studies From 2009 – 2023

The results derived from the Co-occurrence analysis under the Bibliometric Analysis are shown in Figure 7. As per the Co-occurrence analysis, it is identified that 27 keywords mainly included depression, university student, young adult, female, male, students, prevalence, humans, anxiety, and mental health that have been occurring in multiple studies over the past period.
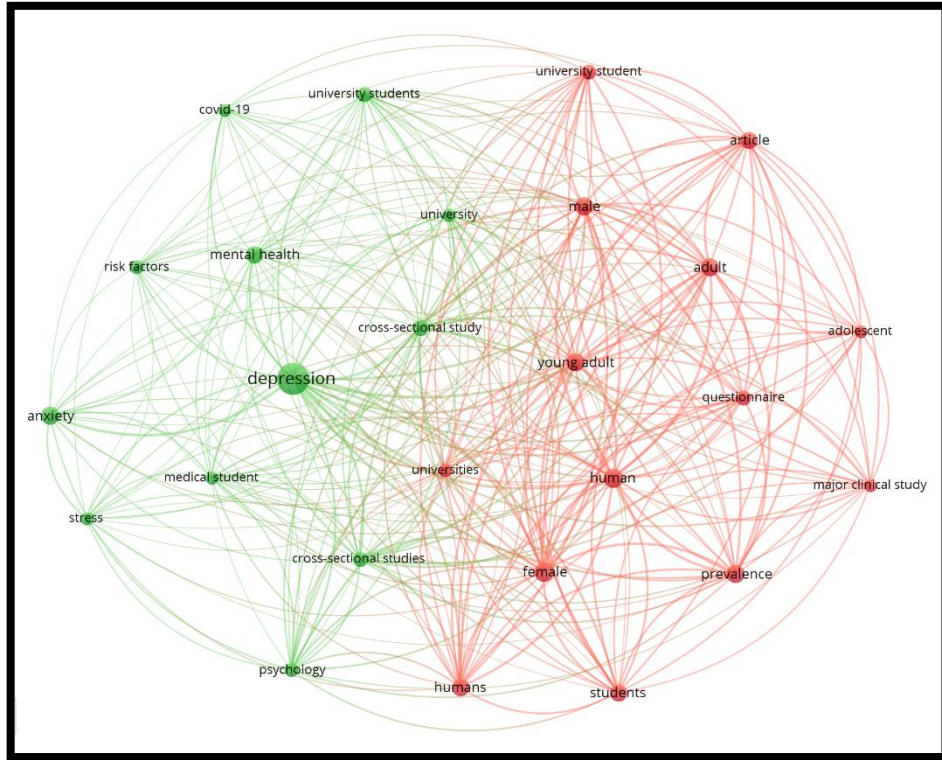
Figure 7: Co-occurrence of keywords in Studies From 2009 – 2023

Figure 8 shows the results of the term co-occurrence analysis performed under the bibliometric analysis. As per the results derived from this term co-occurrence based on the titles and abstracts, seven different terms have been studied together, including depression, student, factor, prevalence, study, cross-sectional study, and anxiety.
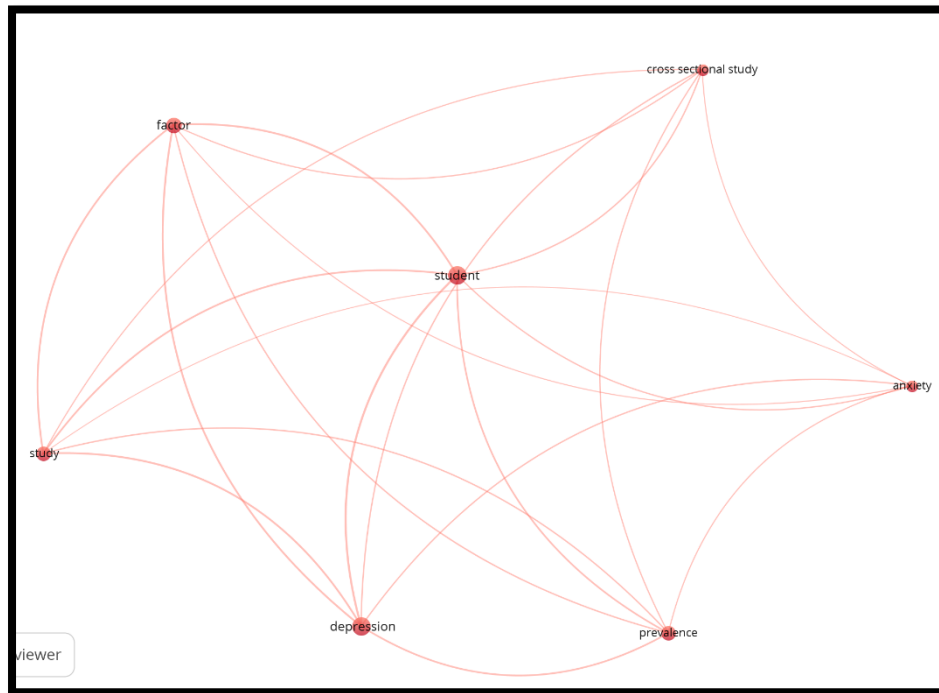
Figure 8: Term co-occurrence based on titles and abstracts in Studies From 2009 – 2023

Discussion

This research paper aimed to systematically analyse the past literature on the factors associated with depression among undergraduate students. In doing this, the screened and included studies from 2003 to 2023 have been reviewed, and the directly related publications in the field of factors associated with depression among undergraduates were found only from 2009 onwards. This systematic review conducted under the PRISMA framework has analysed the past studies in this field using both Descriptive and Bibliometric analysis, and their findings have been presented in the earlier sections. Therefore, this discussion section will focus more on the key findings derived from the systematic literature analysis and their implications.

As per the systematic analysis**, academic stress** was found to be a leading factor that is associated with depression among undergraduate students. The high expectations, demanding coursework, and fear of failure prevalent in academic environments can lead to increased stress levels and subsequent depressive symptoms. These findings suggest the need for timely addressing academic stress and the deployment of supportive measures within educational institutions to encourage mental wellness among undergraduates. Future research could explore deeper into the specific aspects of academic stress that have the most significant impact on depression and explore interventions tailored to mitigate its effects.

As per past studies, another prominent factor that was identified to be associated with depression among undergraduates was **social isolation** or **lack of social support.** Loneliness and a sense of disconnection from peers can contribute to increased vulnerability to depressive symptoms. Universities and colleges should recognise the significance of creating a supportive and inclusive social environment for students. Implementing interventions that enhance social connections, foster a sense of belonging, and provide adequate social support can potentially reduce the risk of depression. Further research could explore the effectiveness of specific interventions addressing social isolation among undergraduates.

Financial stress emerged as another significant factor that was associated with depression among undergraduate students. The rising costs of education, coupled with the pressure to manage living expenses and student loan debt, contribute to increased stress levels and depressive symptoms. Universities and policymakers should consider strategies to reduce the financial burden and provide financial education and support services to help undergraduate students manage their finances more effectively. Future research could examine the long-term impact of financial stress on the mental health of undergraduate students and explore interventions aimed at reducing financial stressors.

Relationship issues were also identified as another factor associated with depression among undergraduate students. Difficulties in romantic relationships, conflicts with friends or roommates, challenges in establishing and maintaining healthy interpersonal relationships and especially the trauma or abusive nature of relationships were identified as factors associated with depression. These relationship issues can significantly impact the emotional well-being and mental health of undergraduate students. Addressing relationship issues among undergraduate students is crucial in preventing or reducing depressive symptoms. Universities and counselling services can provide relationship counselling, workshops on communication and conflict resolution skills, and resources for improving relationship quality. These interventions can help students develop healthier relationship patterns, enhance communication skills, and foster greater emotional well-being. Future research should consider further exploring the complex relationships between relationship issues and depression among undergraduate students.

Pre-existing mental health conditions, such as anxiety, increase the risk of developing depressive symptoms among undergraduate students. It is crucial for universities and colleges to provide accessible and comprehensive mental health support services to identify and assist students with pre-existing mental health conditions. Future research could explore the interactions between pre-existing mental health conditions and depressive symptoms among undergraduate students, as well as the effectiveness of early interventions in reducing the negative impact on mental well-being.

Substance abuse, including alcohol and drug misuse, was also identified to be strongly associated with depression among undergraduate students. Substance use can increase depressive symptoms and lead towards the risk of developing depression. Interventions targeting substance abuse prevention and treatment should be integrated into comprehensive mental health programs on college campuses. Further research is encouraged to examine the mechanisms underlying the relationship between substance abuse and depression.

Lack of sleep and fatigue is another factor associated with depression among undergraduate students. Insufficient sleep duration, poor sleep quality, and chronic fatigue were identified as factors associated with an increased risk of depressive symptoms. Higher demand from academic involvement, pressure arising from social interactions and certain lifestyle-based factors can also contribute to a lack of sleep and fatigue among undergraduate students. Regular sleeping patterns help to maintain a healthy mood and emotional stability. When a person is not getting enough sleep, this can lead to the instability of a person in relation to his or her day-to-day activity, including mood and emotions. This can lead towards depression, and therefore, it is necessary to reduce this by facilitating the encouragement of healthy sleeping patterns among undergraduates. In doing this, universities can conduct various programs that address this concern, and stress management programs can promote better sleep quality. Further research can be conducted in relation to identifying the relationship between stress, sleep quality and depression.

Effective **coping strategies** and resilience were found to have a protective role against depression among undergraduate students. Students who possess adaptive coping mechanisms and resilience tend to have lower levels of depressive symptoms. Identifying and promoting effective coping strategies and resilience-building programs within university settings can enhance students' ability to navigate challenges and promote mental well-being. Future research could focus on developing and evaluating interventions that enhance coping skills and resilience among undergraduate students.

Finally, **family history and genetics** were identified to be another factor that is associated with depression among undergraduate students. Having a family history of depression or a genetic predisposition to the disorder was identified as a significant risk factor for developing depressive symptoms. Genetic influences can create vulnerability to depression, and individuals with a family history of the disorder may be at higher risk. It is important to note that family history and genetics do not solely determine the risk of depression but interact with environmental factors. Adverse childhood experiences, chronic stress, and other psychosocial factors can influence the generation of depressive symptoms, even in individuals with a genetic predisposition.

Conclusions

This research paper has reviewed the past literature related to factors associated with depression among undergraduate students. As per the systematic literature review, it is identified that academic stress, social isolation, financial stress, relationship issues, pre-existing mental health conditions, substance abuse, lack of sleep and fatigue, coping mechanisms and family history and genetics are factors

associated with depression among undergraduates. Better understanding and further exploration of these factors are important to mitigate the repercussions of depression in relation to undergraduates and to promote sound mental well-being during undergraduate studies. In doing this, universities must focus on a balanced set of interventions that can address these factors affecting depression and are capable of providing sustainable solutions to this burning global problem. As suggestions, it is encouraged to develop a support network for students facing depression and to provide financial support services for the students faced with financial struggles during their studies. Related and enough resources must also be provided to all students to act towards mitigating these risk factors, and stress management and counselling services are encouraged. Substance abuse and poor sleep quality must also be addressed, and the repercussions of each must be communicated to discourage them in future.

Future Agenda

This systematic literature review provides insights into the factors associated with depression among undergraduate students; as the findings reveal, several areas need to be assessed through further investigation. Therefore, future research should address the gaps in knowledge and expand the understanding of the relationship between these factors and depressive symptoms. The following research directions are suggested for future studies:

1. Longitudinal studies: Conducting longitudinal studies can facilitate researchers to explore the changes in the relationship between the explored depressive symptoms over time. This would help in establishing causal relationships and understanding the domain of depression among undergraduate students over time.

2. Mechanisms and pathways: Further research can explore the underlying mechanisms and pathways through which different factors lead towards the development and maintenance of depression. For example, investigating the role of cognitive processes, neurobiological factors, and psychosocial mechanisms can provide a more comprehensive understanding of the causal pathways involved.

3. Mediating and moderating factors: Examining potential mediators and moderators can enhance understanding of the factors that influence the relationship between various factors and depressive symptoms. Factors such as coping strategies, social support, resilience, personality traits, and cultural factors can mediate or moderate the impact of other factors on depression and should be explored further.

4. Cultural and contextual factors: The influence of cultural and contextual factors on depression among undergraduate students deserves attention. Different cultural norms, social support systems, educational systems, and institutional practices may influence the manifestation and impact of depressive symptoms.

6. Technology and mental health: Though technology was not highlighted directly towards the factors associated with depression, with the current change in society with the technological advancement, it is worth examining the impact of technology towards depression among undergraduate students. Hereby, the impact of screen time, social media usage and related factors can be further examined through longitudinal studies to strengthen the existing body of knowledge on this area.

Availability of data and materials

The originally extracted datasets used and analysed during the current study are available from the corresponding author upon reasonable request. The datasets generated during the current study can also

be extracted from the ScienceDirect and Scopus databases under the search terms of "factors associated with depression" AND "undergraduates" and "factors associated with depression" AND "university students"(https://www.sciencedirect.com & https://www.scopus.com).

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