Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 6 No. 3 (2025): March 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i3.1513
Original Article

PREVALENCE AND DETERMINANTS OF DEPRESSION AMONG ADOLESCENT STUDENTS IN RURAL AREAS SURROUNDING BHUBANESWAR, ODISHA: A CROSS-SECTIONAL STUDY.

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ABSTRACT

Introduction
Depression, a persistent low mood and aversion to activity, significantly affects thoughts, behavior, and well-being, often emerging during adolescence—a phase of rapid physical, emotional, and social changes. Globally, around 20% of adolescents experience psychological disorders, with depression being the most common.
Aim and objectives: To assess the prevalence and associated factors of depression among adolescent students in rural areas surrounding Bhubaneswar, Odisha.

Material and methods
This community-based cross-sectional study was conducted at Ekamra College, Sundarpada, a rural area near Bhubaneswar, Odisha, targeting 11th and 12th-grade students. Exclusions included those with major physical illnesses or diagnosed psychiatric conditions. The study included 220 participants (110 males and 110 females) selected based on roll numbers. Depressive symptoms were assessed using the Beck Depression Inventory (BDI), with students completing the questionnaire based on their feelings over two weeks.

Results
with a mean age of 17 years; the majority (44.54%) were 18 years old. Most participants (84.10%) were Hindus, with 77.29% belonging to the general caste and 22.71% to OBC, SC, or ST categories. The study revealed that 70% of male and 76% of female students experienced depression, ranging from borderline clinical depression to extreme depression.

Conclusions
This study explores depression among rural adolescents in Odisha, identifying sleep duration, outdoor activities, socioeconomic status, parental conflicts, and education as key contributors. Addressing these stressors through improved habits, socioeconomic support, and healthier family dynamics could reduce depression, highlighting the need for targeted interventions in rural youth mental health.

Recommendations
Regular mental health screening programs should be implemented in schools to identify adolescents at risk of depression. Teachers and school staff should be trained to recognize early signs of depression and refer students for further evaluation.

Keywords: *Depression, Beck Depression Inventory, Behavior, Stress*
Submitted: 2025-01-03 **Accepted:** 2025-02-25 **Published:** 2025-03-03

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INTRODUCTION

Depression, a state of persistent low mood and aversion to activity, significantly impacts thoughts, behavior, feelings, and well-being. It often first manifests during adolescence, a critical developmental phase marked by rapid physical, emotional, and social changes.1 Globally, approximately 20% of adolescents experience psychological disorders, with depression being the most prevalent.2,3 One in five adolescents is likely to encounter a depressive episode by age 18, and nearly 7% of those with depression attempt suicide. Females, particularly after puberty, face a twofold higher risk than males.4,5
Adolescent depression presents with emotional symptoms such as sadness, anxiety, hopelessness, and irritability, alongside somatic complaints like fatigue, insomnia, and digestive issues. Key risk factors include genetic predisposition, environmental influences, stressful life events, and individual characteristics.3 Adolescents with a family history of depression are at a 3-4 times higher risk, while exposure to family conflict, abuse, or parental

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mental health issues significantly increases vulnerability. Negative life events, such as loss or peer rejection, further compound this risk.4,5

Socio-demographic factors such as age, gender, education, and socioeconomic status (SES) are critical in understanding depression's variability. Low SES correlates with higher psychiatric morbidity and limited healthcare access.6 Adolescents in rural areas, often marginalized and isolated, face unique challenges, including limited resources and support systems, which exacerbate mental health disparities.7 Addressing adolescent depression necessitates integrating comprehensive mental health programs in schools, leveraging frameworks like Response to Intervention (RTI) and Positive Behavior Intervention Supports (PBIS).8 These programs can provide prevention, early detection, and intervention services, fostering resilience among vulnerable adolescents.9

Aim

To assess the prevalence and associated factors of depression among adolescent students in rural areas surrounding Bhubaneswar, Odisha.

OBJECTIVES

- To study the prevalence, socio-demographic, and etiology profile of adolescent students suffering from Depression in the rural area of Bhubaneswar.
- To determine the Clinical features, patterns, and factors of Depression in adolescent students in the rural area of Bhubaneswar.

MATERIAL AND METHODS

Study design

Community-based cross-sectional study

Study setting

Ekamra College, Sundarpada, a rural area near Bhubaneswar, Odisha, in the Khordha district of Eastern India.
Study duration: Dec 2023 to Dec 2024

Study Participants

The study included 11th and 12th-grade students of selected schools, excluding those with major physical illnesses or diagnosed psychiatric conditions, based on information from teachers and students.

Sample size

A total of 220 participants were included, comprising 110 male and 110 female students, selected according to their roll numbers in class.

Data Measurement

The study utilized the Beck Depression Inventory (BDI) to assess depressive symptoms among students, alongside a detailed history focused on depression-related aspects. Students were instructed to complete the questionnaire by selecting the statement that best reflected their feelings over the past two weeks. The highest applicable score was chosen when multiple statements seemed relevant, ensuring only one response per group, including Item 16. The study population was divided into two groups based on sex, with separate lectures delivered to each group on adolescence and depression. Following this, a comprehensive history was taken from each participant, emphasizing depression-related factors, and appropriate treatment options were offered to students in need.

The study involved clinical examinations to exclude any major physical illnesses, followed by the administration of the Beck Depression Inventory (BDI), a mood-assessment tool developed by Dr. Aaron T. Beck. The questionnaire, including the original 1961 version revised in 1971, was distributed to the students after difficult terms were explained in the local language. Detailed instructions for completing the questionnaire were provided, and a separate history sheet was attached. Students were given an hour to complete the questionnaire in a friendly environment, after which the responses were collected. Evaluations were performed as per the scoring instructions in the BDI, and the study population was classified based on the scores.

Inclusion Criteria

- Students from 11th and 12th classes who provided informed consent.

Exclusion Criteria

- Students with major physical illnesses or diagnosed psychiatric conditions (as confirmed by teachers and the students).
- Students absent on the study date.

Bias

The study focuses on adolescent students in rural areas surrounding Bhubaneswar, Odisha, which may not represent the broader adolescent population in urban or other rural areas. The choice of specific geographic areas may lead to an underrepresentation of adolescents from different regions with varying socio-economic backgrounds.

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Statistical methods

Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were used to summarize the socio-demographic characteristics of the participants and the prevalence of depression. To assess the association between depression and various factors, such as academic stress, family environment, social relationships, and lifestyle factors, inferential statistical methods will be applied. Chi-square tests were used to determine the relationships between categorical variables, such as gender, family structure, and depression status. Continuous variables, such as age, academic performance, and sleep duration, were compared using independent t-tests or analysis of variance (ANOVA), depending on the number of groups. Data were analyzed using statistical software like SPSS, ensuring a robust and comprehensive evaluation of the study objectives.

Ethical consideration

Ethical approval was taken and followed the ethical standard

Informed consent

Informed consent was taken from study subjects/parents

RESULT

Out of an initial pool of 300 potentially eligible adolescent students aged 16 to 18 years, 250 were examined for eligibility based on the inclusion criteria. Of these, 220 participants were confirmed to meet the eligibility requirements and were included in the study. All 220 participants completed the baseline survey, and no participants were lost to follow-up. Data from all 220 participants were analyzed for the study. With a mean age of 17 years, the majority (44.54%) were 18 years old. Most participants (84.10%) were Hindus, with 77.29% belonging to the general caste and 22.71% to OBC, SC, or ST categories. Joint families were predominant (82.72%). Parental education varied, with 46.81% of fathers and 43.18% of mothers educated up to middle school. Among fathers, 27.72% were contractual laborers, and 18.63% were self-employed. Most mothers (72.27%) were homemakers. Income data were unreliable as respondents were unable to provide accurate details. The prevalence of depressive disorders was 70% in male students and 76% in female students.

TABLE I: Classification of Depressive Disorder

Mood Disorder	*Male*	*Female*
Mild mood disturbances	**20 (18%)**	**22 (20%)**
Depression in general	**77 (70%)**	**84 (76%)**

The study revealed that 70% of male and 76% of female students experienced depression, ranging from borderline clinical depression to extreme depression. These rates are notably higher compared to other studies. This disparity could be attributed to factors such as the small sample size, the rural setting of the college, and the inclusion of students from Arts, Commerce, and Science streams.

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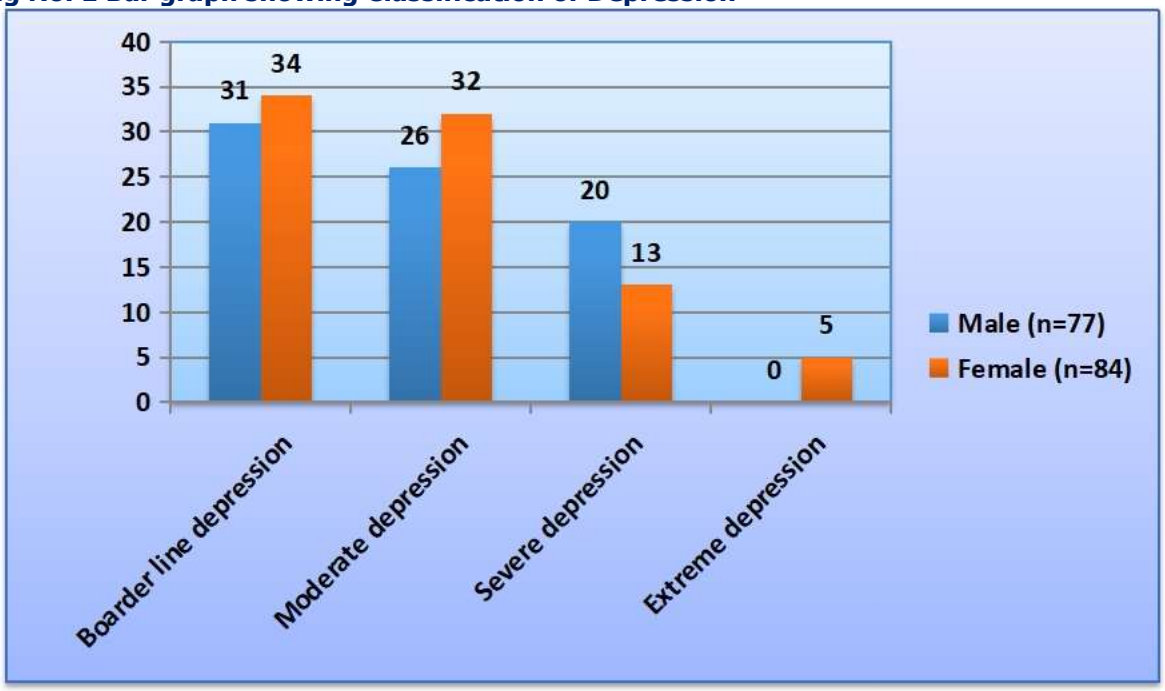
Fig No. 1 Bar graph showing Classification of Depression



This graph highlights that females are more prone to depression, with a higher prevalence of extreme depression compared to males. This gender-related observation aligns with findings from other studies. However, the overall prevalence of depression types in this study is significantly higher and not comparable to other studies, likely due to factors such as the small sample size, the rural setting of the college, and the inclusion of students from diverse academic streams, as discussed.

TABLE 2: Distribution of study subjects as per problem faced by different individuals in their lives

	Male n=77	*Female n=84*
Parents	**12**	**14**
Friends	**32**	**35**
Relative	**6**	**4**
Teacher	**25**	**30**
Siblings	2	1

Table 2 presents the distribution of problems faced by male and female students with different individuals in their lives. Among the male participants (n=77), the highest number of problems were reported with friends (32), followed by teachers (25), parents (12), relatives (6), and siblings (2). In contrast, female participants (n=84) reported the most problems with friends (35), followed by teachers (30), parents (14), relatives (4), and siblings (1). The findings suggest that both male and female students primarily face issues with their friends, which could indicate that peer relationships are a significant source of stress for this age group. The slightly higher number of problems reported by females with teachers and parents may reflect different gender dynamics or expectations within family and educational settings. The lower number of problems with siblings and relatives for both genders could imply that familial relationships are less of a stressor compared to peer and authority figures. This pattern highlights the importance of peer interactions and the influence of teachers and parents on adolescent mental health.

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TABLE 3: Distribution of study subjects as per their Problems at home

	Male n=77	*Female n=84*
Quarrels	**12**	**25**
Alcohol	**28**	**0**
Financial	**9**	**37**
Broken home	**0**	**0**
Substance abuse	**20**	**0**
Chronic illness in family	**08**	**22**

This table shows quarrels in family, financial condition in family, broken families; chronic illnesses in families are few precipitating factors or cause for depression in females. Whereas quarrels, alcohol, financial condition, and substance abuse are the main factors for depression in males. These factors for depression are comparable with the factors discussed in the table.

TABLE 4: Predominant Symptoms and Signs

Score more than zero	*Male n=77*	*Female n=84*
Loss of pleasure	**9**	**8**
Guilty feeling	**13**	**12**
Loss of interest	**37**	**41**
Loss of energy	**6**	**5**
Irritability	**6**	**11**
Change in sleeping pattern	**5**	**4**
Fatigue	**1**	**3**

The data presents the prevalence of various depressive symptoms in males (n=77) and females (n=84) with scores greater than zero. Both genders show a higher frequency of "loss of interest," with 37 males and 41 females reporting this symptom. "Guilty feeling" is also common, with 13 males and 12 females affected. Other symptoms, such as "irritability," are more prevalent in females (11) compared to males (6), while "fatigue" is less common overall, with only 1 male and 3 females affected. The overall distribution suggests a slightly higher presence of depressive symptoms among females, particularly "loss of interest" and "irritability."

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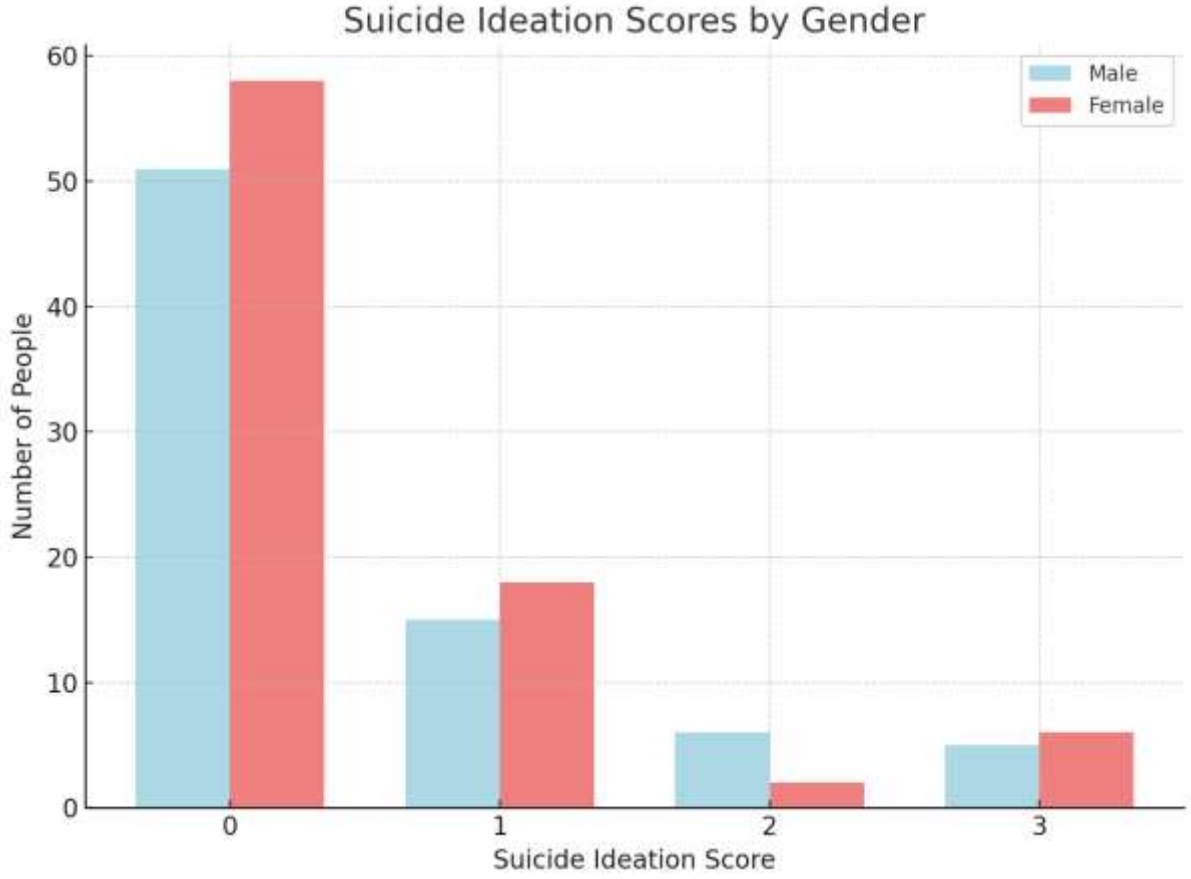
Fig no. 2 - Bar chart showing Suicidal thoughts or wishes in depressed students



DISCUSSION

However, the results may not be fully applicable to urban areas or regions with vastly different cultural, economic, or healthcare contexts. Furthermore, as the study focuses on adolescent students, its applicability to other age groups or non-student populations is also restricted.

The study found that 70% of male and 76% of female students experienced depression, ranging from borderline clinical depression to extreme depression. These rates are significantly higher than those reported in other studies. For example, a study in North India reported a 39% prevalence of depression, which is notably lower than the findings in this study.10 The variation in depression rates could be attributed to several factors, including differences in the methods used for depression assessment. Different diagnostic tools or criteria may yield varying results, and the study populations in each case may have differing baseline characteristics, such as socio-economic status, cultural influences, and exposure to risk factors.11 The higher rates in this study may reflect regional or contextual factors that influence the mental health of students, such as social pressures, academic stress, and gender-specific challenges. These factors underscore the importance of considering local contexts and assessment methods when comparing depression prevalence across studies.12

This study presents the socio-demographic profile of 220 participants aged 16 to 18 years, with a mean age of 17 years, and the majority (44.54%) being 18 years old. This finding aligns with the study by Jayashree et al.13, who also observed a similar age distribution. However, in contrast, studies by Jha et al.14 and Shukla et al.15 found a significant association between a higher proportion of depression and increasing age. They suggested that the rising prevalence of depression among older adolescents could be attributed to factors such as increased academic pressures, heightened parental expectations, and the greater responsibilities and challenges that come with older age. These pressures may contribute to higher stress levels, which in turn may make older adolescents more vulnerable to depression compared to their younger counterparts. Thus, while this study found a consistent age distribution, other studies suggest that the relationship between age and depression may be more complex, influenced by additional contextual and environmental factors.

The distribution of problems faced by male and female students in their lives reveals that both genders report the most issues with friends, followed by teachers and

parents. Male participants (n=77) reported 32 problems with friends, 25 with teachers, and fewer with other individuals like parents, relatives, and siblings. Similarly, female participants (n=84) reported 35 problems with friends, 30 with teachers, and slightly more problems with parents. These findings suggest that peer relationships and authority figures (teachers and parents) are significant sources of stress for both genders, with males and females equally affected by issues related to friends.

The higher rates of depression among females in this study align with previous research, which indicates that females are more prone to depression due to factors such as fear of early marriage, incomplete education, hormonal changes, and additional household responsibilities, especially in rural areas. However, Umesh et al.16 and Chauhan et al.17 did not find any similar associations, suggesting that gender-specific factors influencing depression may vary across different studies and regions.

Additionally, the type of family structure did not appear to play a significant role in depression in this study, consistent with the findings of Jayashree et al 13. and Jha et al.14 However, Umesh et al.16 found a statistically significant association between family type and depression, highlighting the possibility that family dynamics may influence depression differently depending on cultural and regional contexts. This contrast suggests that while family structure may not universally impact depression in all settings, it could be a contributing factor in certain populations.

The table highlights various factors contributing to depression in both male and female students. For females, issues such as family quarrels, financial instability, broken families, and chronic illnesses in the family are identified as significant precipitating factors for depression. These factors suggest that domestic and familial stressors may have a more pronounced impact on the mental health of females in the study. In contrast, males appear to be more affected by issues such as family quarrels, alcohol consumption, financial difficulties, and substance abuse, which are identified as the primary contributors to depression in this group.

These findings align with previous studies, such as those by Nair et al. 18 and Chauhan et al.17, which also identified similar risk factors for depression among male and female adolescents. The study also found a noteworthy association between sleep deprivation (defined as sleeping less than 6 hours) and depression, further corroborating results from other studies that have demonstrated the negative impact of poor sleep on mental health. Sleep deprivation has long been recognized as a significant factor contributing to the onset and exacerbation of depression, particularly among adolescents. Therefore, the interplay between familial stressors, substance use, and sleep patterns underscores the complexity of factors contributing to depression in both male and female students in this study.

The table reveals that a significant majority of both male (66%) and female (69%) depressed students do not have suicidal thoughts, which suggests that the majority of those experiencing depression are not contemplating self-harm. However, it is concerning that 6% of male and 7% of female depressed students reported having thoughts of suicide. These percentages, though seemingly small, are notable and indicate a higher level of suicidal ideation than might be expected in a general population of depressed individuals. This finding warrants further investigation to understand the underlying causes and contributing factors that might be driving this elevated risk. It is essential to explore whether these individuals are experiencing specific stressors or mental health challenges that increase their risk of suicidal thoughts, and further research could help identify effective interventions to reduce this risk among vulnerable adolescents.

GENERALIZABILITY

The generalizability of this study's findings may be limited to similar rural settings in India, particularly in regions with socio-economic conditions and educational systems comparable to those surrounding Bhubaneswar and Odisha.

CONCLUSIONS

The study highlights a high prevalence of depression among adolescent students in rural areas surrounding Bhubaneswar, Odisha, with 70% of male students and 76% of female students experiencing varying degrees of depressive symptoms. Female students reported higher levels of extreme depression and exhibited more symptoms like irritability. Peer relationships, teacher interactions, and family dynamics were key stressors, with male students facing issues related to alcohol, substance abuse, and family quarrels, while females were more affected by financial problems and chronic illness in the family.

LIMITATIONS OF THE STUDY

The study's rural setting and focus on a specific age group of adolescent students from Arts, Commerce, and Science streams restrict its applicability to urban or more diverse populations. Self-reported data on income and depressive symptoms may be subject to bias and inaccuracies. Lastly, the absence of clinical diagnosis or standardized mental health assessments may affect the accuracy of the reported prevalence of depressive disorders.

ACKNOWLEDGMENT

We sincerely thank the participating students and their families for their cooperation and support. We extend our gratitude to the school authorities and faculty for facilitating the study. Lastly, we acknowledge the guidance and support of our colleagues and staff in conducting this research.

LIST OF ABBREVIATIONS

BDI: Beck Depression Inventory
SES: Socioeconomic Status
NPDR: Non-Proliferative Diabetic Retinopathy
PDR: Proliferative Diabetic Retinopathy
RTI: Response to Intervention
PBIS: Positive Behavior Intervention Supports
ANOVA: Analysis of Variance
SPSS: Statistical Package for the Social Sciences

SOURCE OF FUNDING

The study had no funding.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

AUTHOR CONTRIBUTION

Dr. (Maj) Mohanty Rajesh Priyadarsan
Role: Conceptualization, Study Design, and Supervision

Dr. Aparna Aradhana
Role: Data Collection and Analysis

Dr. Nitish Jena
Role: Literature Review and Manuscript Writing

Dr. Suchismita Panda
Role: Conceptualization, Technical Support, and Literature Review

DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. Due to privacy and ethical considerations, some data may be restricted to protect the confidentiality of the study participants.

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PUBLISHER DETAILS

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa