# DEPRESSIVE SYMPTOMS AND CORRELATES AMONG IN-SCHOOL ADOLESCENTS IN EGBEDA LOCAL GOVERNMENT AREA OF OYO STATE


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# CERTIFICATION

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## DEDICATION

This project is dedicated to God, the Source of Life and all that is good.

## ACKNOWLEDGEMENT

My appreciations go to my Supervisor, Dr A. A.Fatiregun, for his support and tutelage; to Dr. B.Adedokun, Dr. J.O. Abdul-malik and Dr. O. Kolade for their expert advice. To Ojonugwa for being there from start to finish; to my friends (Ronke, Joseph, Fiyin, Yemi, Emem, Dami, Lola, Deji, Koye, Franklin, Simi and Kenny) for rendering help when I needed it.

Lastly, to my family for urging me to go on and giving all the support I needed. I appreciate you all so much.

## ABSTRACT

Depression is a psychiatric disorder characterized by symptoms of persistent feelings of hopelessness, dejection, poor concentration, lack of energy, inability to sleep and sometimes, suicidal tendencies. Depression has been pegged down as the leading cause of disability and the fourth leading cause of total disease burden worldwide.Limited information is available on adolescent depression and correlates in Nigeria. This study was conducted to assess the prevalence and correlates of depressive symptoms among in-school adolescents in Egbeda Local Government area of Oyo State.

This is a cross-sectional survey involving 1713 in-school adolescents. All schools (68) in the Local Government were first stratified by School ownership into private and public schools.Seven schools (4private, 3 public) out of 68 were randomly selected and all eligible students in each school were included in the study. Asocio-demographic questionnairewas administered to the respondents to obtain information on age, family structure, maltreatment status, participation in sporting activity, health conditions and concomitant drug use. Patient Health Questionnaire (PHQ 9), with a maximum score of 27, was used to assess the presence (≥10) and severity (≥15) of the symptoms of depressionand academic performance was indirectly evaluated using the Sudoku-6 grid game. Descriptive statistics were used to describe the characteristics of the study population including the prevalence of depressive symptoms. Cross-tabulations and logistic regression wereemployed to identify predictors of depressive symptoms.

Mean age of respondents' was14.0 ± 2.1 years. A little less than half (44.7%) were males, 9.8% do not live with their parents and 11.3% have more than 5 siblings. About a third (32.3%) had changed their location in the last 6 months, 43% reported the presence of a persistent health condition and 23.4% reported not partaking in any form of sporting activity. The prevalence of depression was 21.2% of which 5.1% was severe depression. Significant predictors of depressive symptoms include "not living with parents" (OR 1.69, 95% C.I= 1.14 -2.38), Presence of persistent health condition (OR 2.30, 95% C.I= 1.80 -2.94), Not Participating in Sports (OR 1.45, 95% C.I= 1.11 -1.92), Large number of siblings (OR 1.69, 95% C.I= 1.11 -2.63) and Changed living location (OR 1.46, 95% C.I= 1.13 -1.88).

This study has shown that the occurrence of depressive symptoms among in-school adolescents is of Public Health concern in Egbeda Local Government. Thus, efforts should be

made by all stakeholders to implement preventive programs to address some of the predictors such as reinforcement of family planning, encouragement of sporting activities in and out of school settings and early treatment of diseases.

Key Words: Patient Health Questionnaire, Receiver Operating Characteristics Curve, Depressive symptoms and Correlates.

**426 words**

# TABLE OF CONTENTS


| CONTENT | PAGE |
|---|---|
| Title Page | i |
| Certification | ii |
| Dedication | iii |
| Acknowledgement | iv |
| Abstract | v-vi |
| Table of Contents | vii-ix |
| List of Tables | x |
| List of Figures | xi |
| List of Appendices | xii |
| List of Abbreviations | xiii |
| **CHAPTER ONE: INTRODUCTION** | |
| 1.1 General Background | 1 |
| 1.2 Problem Statement | 2 |
| 1.3 Justification for the study | 3 |
| 1.4 Objectives | 3 |
| 1.5 Hypotheses | 3 |
| **CHAPTER TWO: LITERATURE REVIEW** | |
| 2.1 Adolescent Depression | 4 |

| | | |
|---|---|---|
| 2.2 | History of Adolescent Depression | 4 |
| 2.3 | Correlates of Depression | 5 |
| 2.4 | Screening Tools | 6 |
| 2.5 | Treatment and Relapse of Adolescent Depression | 8 |

**CHAPTER THREE: METHODOLOGY**

| | | |
|---|---|---|
| 3.1 | Study Location | 9 |
| 3.2 | Study Population | 9 |
| 3.3 | Study Design | 9 |
| 3.4 | Sample Size Determination | 9 |
| 3.5 | Subjects (Inclusion and Exclusion Criteria) | 10 |
| 3.6 | Sampling Technique | 11 |
| 3.7 | Ethical Approval | 11 |
| 3.8 | Study Instruments | 11 |
| 3.9 | Pre-test | 13 |
| 3.10 | Data Collection | 13 |
| 3.11 | Data Management and Analysis | 14 |

**CHAPTER FOUR: RESULTS**

| | | |
|---|---|---|
| 4.1 | Socio-demographic characteristics of Respondents | 15 |
| 4.2 | Other Socio-demographic Characteristics | 18 |
| 4.3 | Assessment of Performance andPerception of Participants | 20 |

4.4 Maltreatment Status of Respondents 22

4.5 Health conditions and Drug use among Participants 26

4.6 Assessment of Depressive Symptoms 28

4.7 Associations of Depressed Status and Respondent Characteristics 34

4.8 Associations between Depressed Status and Assessmentof Performance andPerception of Participants 37

4.9 Regression of Depression Status on Statistically Significant Variables 40

4.10 Assessment of Depression Screening Instruments, PHQs 42

**CHAPTER 5: DISCUSSION**

5.1 Prevalence of depression 46

5.2 Socio-demographic correlates of depression 47

5.3 Maltreatment Status, Health Condition and Drug use 48

5.4 Screening for depression with PHQs 49

5.5 Limitations of the study 50

5.6 Conclusions and Recommendations 51

**REFERENCES** 53

**APPENDIX** 59

4.4 Maltreatment Status of Respondents 22

4.5 Health conditions and Drug use among Participants 26

4.6 Assessment of Depressive Symptoms 28

4.7 Associations of Depressed Status and Respondent Characteristics 34

4.8 Associations between Depressed Status and Assessmentof Performance andPerception of Participants 37

4.9 Regression of Depression Status on Statistically Significant Variables 40

4.10 Assessment of Depression Screening Instruments, PHQs 42

**CHAPTER 5: DISCUSSION**

5.1 Prevalence of depression 46

5.2 Socio-demographic correlates of depression 47

5.3 Maltreatment Status, Health Condition and Drug use 48

5.4 Screening for depression with PHQs 49

5.5 Limitations of the study 50

5.6 Conclusions and Recommendations 51

**REFERENCES** 53

**APPENDIX** 59

## LIST OF TABLES


| TABLE | DESCRIPTION | PAGE |
|---|---|---|
| 4.1 | General Socio-demographic characteristics of Respondents | 16 |
| 4.2 | Other Socio-demographic Characteristicsof Respondents | 19 |
| 4.3 | Assessment of Performance and Perception of Participants | 21 |
| 4.4 | Perception of Participants on Maltreatment status | 23 |
| 4.5 | Health conditions and Drug use | 27 |
| 4.6 | Correlation matrix of the items of the PHQ 9 | 29 |
| 4.7 | Assessment of Depression based on the PHQs | 30 |
| 4.8 | Associations of Depressed Status and Respondent Characteristics | 35 |
| 4.9 | Associations between Depressed Status and Assessment of Perception and Performance of Participants | 38 |
| 4.10 | Regression of Depression Status on Significant Correlates | 41 |
| 4.11 | Validity testing for PHQs '1+2', '7+4' and '8+7' | 43 |
| 4.12 | Sensitivity- Specificity values of PHQs '1+2', '7+4' and '8+7' | 44 |
| 4.13 | Area under the Receiver Operating Characteristic (ROC) Curve | 45 |

## LIST OF FIGURES


| TABLE | DESCRIPTION | PAGE |
|---|---|---|
| 4.1 | Graph showing the types of Sporting activities engaged in by Respondents | 17 |
| 4.2 | Graph showing forms of maltreatment reported by Respondents | 24 |
| 4.3 | Graph showing Perpetrators of maltreatment reported | 25 |
| 4.4 | Graph of Percentage Distribution of Depressive symptoms amongStudents in Public and Private Schools | 31 |
| 4.5 | Graph showing Percentage depressed against Age of Respondent | 32 |
| 4.6 | Graph showing Percentage depressed against Assessment of Educational Performance | 33 |
| 4.7 | Receiver Operating Curve for PHQs '1&2', '8&7' and '8&7' | 45 |

## LIST OF APPENDICES

| APPENDIX | DESCRIPTION | PAGE |
|---|---|---|
| 1. | List of Schools in Egbeda Local Government area of Oyo State | |
| 2. | Ethical Approval from the Ministry of Health, State Secretariat, Oyo State | |
| 3. | Informed consent and Questionnaire | |

## LIST OF ABBREVIATIONS

ADHD: Attention Deficit Hyperactivity Disorder

DSM-IV: Diagnostic and Statistical Manual of Mental Disorder-IV

PHQ: Patient Health Questionnaire

MDE: Major Depression Episodes

NSDUH: National Survey on Drug Use and Health

ROC: Receiver Operating Characteristic

OR: Odds Ratio

PPV: Positive Predictive Value

NPV: Negative Predictive Value

LRP: Likelihood Ratio Positive

CDI: Children's Depression Inventory

AUC: Area under the ROC Curve

CBT: Cognitive Behavioral Therapy

PRIME-MD: Primary Care Evaluation ofMental Disorders (PRIME-MD)

# CHAPTER ONE
# INTRODUCTION

## 1.1 General Background

Depression is more than just a feeling of sadness or a transient state of unhappiness and hopelessness, which is something all experience at one point in time or another. It is a psychiatric disorder characterized by symptoms of *'persistent'* feelings of hopelessness, dejection, poor concentration, lack of energy, inability to sleep and sometimes, suicidal tendencies (Peterson et.al, 1993). This may also be termed 'clinical depression' but more often than not, it is referred to simply as depression.

Until recently, depression was thought to be a condition experienced by adults alone; children and adolescents were not at all considered as candidates for depression. The increasing prevalences of substance abuse, suicide and other misnomers among adolescents have however led to the discovery that depression is a cause for concern among them as well (Tyrrell and Elliot, 2011). One school of thought on why depression had been unexplored in adolescents until recently is because of the propensity of adolescents to have mood swings and other common behavioural anomalies which are associated with hormonal changes that they experience during this period. There is also the tendency for depression to be masked by other conditions such as attention deficit disorder, aggressiveness, physical illness, sleep disorders, eating disorders and hyperactivity (Lamarine, 1995). Burford (1995), however states that attention deficit hyperactivity disorder (ADHD) can easily be distinguished from depression as ADHD normally begins before 7 years of age.

Since the advent of research on depression in adolescents, numerous discoveries have been made on symptoms, consequences, diagnostic techniques and treatment of depression in this class of individuals. *The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* specifies a period of 2 weeks or longer during which there is either depressed mood or loss of interest or pleasure and at least four other symptoms that reflect a change in functioning, such as problems with sleep, eating, energy, concentration, and self-image (Hallfors et.al, 2005). Although there is a high degree of variation among people with depression in terms of symptoms, course of illness, and response to treatment (indicating that depression may have a number of complex and interacting causes), standardized questionnaires have evolved which agree on a set of symptoms as a base line screening for depression. These include the Patient

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Health Questionnaire-9 (PHQ-9), the Patient Health Questionnaire-2 (PHQ-2), Hamilton Depression Rating Scale, the Beck Depression Inventory, the Zung Self-Rating Depression Scale, the Center for Epidemiologic Studies Depression Scale e.t.c. Any of these, when followed up with careful review of all results from a full diagnostic work-up by a mental health professional gives basis for accurately diagnosing depression.

Depression has been pegged down as the leading cause of disability and the fourth leading cause of total disease burden worldwide (World Health Report 2002). In the United States, a lifetime depression prevalence of 16.2% and a 12-month prevalence of 6.6% was observed (Kessler et.al, 2003) while a French study has shown that 30% of teenagers have at least one depressive symptom in the course of their teenage years. In a study to estimate the prevalence and examine the socio-demographic correlates of depressive disorder among university students in Western Nigeria, Adewuya (2006) discovered that 8.3% students met the criteria for depressive disorder (Adewuya et.al, 2006) and a prevalence of 9% was also reported among secondary school students in Ilesha, Osun state, Southwestern Nigeria (Adewuya and Ologun, 2006).

Depression is a condition that can only be recognized by the representative symptoms. Oftentimes, the causes and the consequences are not easily distinguishable. For instance, poor academic performance may precipitate depression in an adolescent and low academic performance may also be as a result of depression. Some causes are however clear cut, for example, loss of loved ones and abuse; some consequences are also clearly as a result of on-going depression, for example, aggression and suicide.

This has led to the use of the word "correlates" in addition to causes and consequences.

## 1.2. Problem Statement

As the world leading cause of disability, depression is indeed of Public health concern, excluding no class of the population in its assault (WHO, 2002). It has been observed that adolescents who develop depression often have recurrences in adulthood and undergo a more severe course. Depression in this class of individuals is particularly delicate as it often results in lower academic performance, behavior problems, poor socialization (Lamarine, 1995) and even suicide. Ninety percent of suicides are reported to occur among teenagers with a diagnosable mental illness, depression being the most common (Tyrell and Elliot, 2011). Potency is further

granted to this disease condition in adolescents by the tendency of parents, teachers and caretakers to overlook the symptoms, excusing them as teenage mood swings.

## 1.3 Justification

There is a deficit of information on adolescent depression in Nigeria. This is because historically, depression had been viewed as a condition which only affected adults. (Whitley, 1996; Lamarine, 1995). Also the PHQ-2 which is an ultra-brief screening tool is yet to be explored among Nigerian adolescents and this may prove needful to make it easier to recommend screening of adolescents in school settings due to its ease of administration. This, if well implemented, will empower those in daily contact with adolescents to enhance detection, prompt intervention and thus prevent or assuage the progress of the condition.

## 1.4 Objectives

Main:

- To assess the prevalence and correlates of depressive symptoms among in-school adolescents.

Specific:

- To determine the prevalence of depressive symptoms among in-school adolescents.
- To identify some correlates of depressive symptoms among in-school adolescents.
- To evaluate the agreement of PHQs 2 and 9 in screening for depression.

## 1.5 Hypotheses

- A significant difference exists in the prevalence of depressive symptoms between male and female adolescent students
- Family structure is an important predictor of depressive symptoms in adolescents.
- A significant relationship exists between the presence of depressive symptoms and deductive reasoning ability among in-school adolescents.
- PHQ-2 shows a high level of agreement with PHQ-9 in screening for depressive symptoms among in-school adolescents.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Adolescent Depression

Depression, which is the most common form of emotional problems experienced during adolescence, can be characterized by feelings of sadness, anxiety, fear, guilt, anger, contempt and confused thinking (Peterson et.al, 1993). Depression in adolescents may be difficult to spot because sulkiness, irritability, antisocial behaviour, negativity and withdrawal often go hand in hand with growing up which often arises as a result of hormonal changes (Lamarine, 1995).

Adolescent depression often has features and symptoms that differ from that of adults. Common presentations include anxiety, guilt, despair, poor school performance, complaints of boredom, insomnia/ hypersomnia, antisocial behavior decreased or increased eating, irritability, sadness, helplessness and even defiance. Adolescents also tend to idealize suicide as a solution to depression (Tidy, 2009).

Depression in children and adolescents can be precipitated by family discord, abuse, bullying, homelessness, bereavement, history or present parental depression, socioeconomic decline, instability and the likes.

## 2.2 History of Adolescent Depression

The number of adolescents suffering from depressive disorders seems to be on the increase and despite the information available, lots of questions remain unanswered. This is particularly so in a developing country like Nigeria (Fisher, 2011) .

As debilitating as depression has been discovered to be, research on it among adolescents was limited by the general opinion that depression is foreign to them. In recent years however, this opinion has been eroded by discoveries made on adolescent depression. The increasing prevalence of substance abuse, suicide and other misnomers among adolescents has made depression a cause for concern among them (Tyrrell and Elliot, 2011). These and other discoveries have therefore eroded the view that adolescents do not experience depression.

In 2004, an estimated 14.0 percent of adolescents aged 12 to 17 (approximately 3.5 million adolescents) had experienced at least one Major Depression Episodes (MDE) in their lifetime,

and an estimated 9.0 percent (2.2 million adolescents) experienced at least one MDE in the past year (NSDUH,2005.)

Also, the suicide rate in teenagers has quadrupled in the last 25 years making it the 3rd leading cause of adolescent death in the United States (Arialdi, 2010). Depression has been reported to be the most important predictor of suicide, and failure to address depression in adolescents can lead to an increase in cases of suicides (Robles-Piña, 2008).

## 2.3 Correlates of Depression

Correlates of depression have been found to vary with age, socioeconomic status, gender, family structure, low performance especially academic in adolescents, presence of co-morbidities. These may predispose adolescents to depression or enhance its severity.

In a multinational cross sectional study carried out by the World Health Organization in 2007, the prevalence of depression alone was found to be as low as 3.2% but in the presence of other morbidities, its prevalence increased notably. Prevalence for depressed people who also have a medical condition ranged from 9.3% in those with diabetes to 23% in those with two or more of asthma, angina, arthritis or diabetes (World Health Survey, 2007), as opposed to those without existing co-morbidities. Jiang and Hesser in a comparison of depression and mental distress indicators (Rhode Island Behavioral Risk Factor Surveillance System), 2006 also reported an increase in the prevalence of depressive symptoms among those with obesity and physical disability (Jiang et.al, 2006).

Adolescents are individuals aged between 10-19 years of age (WHO, 2009) and even within this narrow range, there are still variations in the prevalence of depression. For instance, in the 2005 National Survey on Drug Use and Health (NSDUH), it was reported that adolescents aged 16 or 17 years were more than twice as likely to have experienced Major Depressive Episodes in the year 2004 as those aged 12 or 13 years (12.3 vs. 5.4%), (NSDUH, 2005).

Gender has also been noted to play a role in the prevalence of depression in some studies while others observed no notable difference between the genders. A school based survey carried out in the United States discovered that 25% of females as opposed to 10% of males reported depressive symptoms. (Gitanjali et al, 2004). Seul Ki Choi, 2010, however opined that no significant difference was observed in the prevalence of depression between males and females

as depression prevalence was almost the same between males (37.0% scored≥8; 14.8% scored≥11) and females (35.2% scored≥8; 14.8% scored≥11) (Seul et.al,2010).

Not only do factors affect the prevalence of depression individually but interaction has also been observed in the presence of more than one factor which modifies the resultant effects. For instance, Gitanjali et al, 2004 observed an increase in prevalence with grade levels, such that prevalence in males almost doubled between the $6^{th}$ and $10^{th}$ grades and nearly tripled for females in those same grades. (Gitanjali et al, 2004). Similarly, the NSDUH 2005 noted that females, aged between 12-17 years were more likely than males in the same age-range to have had MDE in the year 2004 (13.1 vs. 5.0%) (NSDUH, 2005).

Depressed adolescents with a history of sexual abuse have a higher incidence of posttraumatic stress disorder, but no increase in the severity of neither depressive symptoms nor tendency for suicide (Brand, et. al., 1996).

Family stressors such as separation, divorce and even socioeconomic decline have also been found to precipitate the manifestation of depressive symptoms among adolescents.

## 2.4. Screening Tools

Many screening tools have been developed in other to facilitate easy and early detection in adolescents. The strength and weaknesses of each however lie in the validity, length and ease of administration.

The PHQ-9 is a self-rating instrument for depression that was developed in 1999 by Spitzer *et al*, from the PRIME-MD. It screens for the occurrence and severity of depression and has the advantage of being strictly based upon the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Nine symptoms are described and the patient responds by indicating how much he/she has been bothered by these symptoms over the last 2 weeks. Also, there is a tenth question regarding the patient's functioning. This final question on the PHQ is a single patient-rated difficulty item and is not used in calculating any PHQ score or diagnosis but rather represents the patient's global impression of symptom-related impairment. It may be useful in decisions regarding initiation of or adjustments to treatment since it is strongly associated with both psychiatric symptom severity as well as multiple measures of impairment and health-related quality of life (PHQ-manual). The response to each item is rated 0–3, which enables the clinician to assess the severity of the disorder. The maximum possible score is 27. Scores of 5–9

indicate mild depression, 10–14 moderate depression, 15–19 moderately severe depression, and ≥20 severe depression. The PHQ-9 takes only a few minutes to complete (Spitzer et.al, 1999). Earlier studies in primary care show that PHQ-9 detects depression with sensitivity around 90% and a specificity ranging from 77% to 88% when using the cut-off ≥10. The PHQ-9 has been validated in both primary care settings and hospitals. (Spitzer et.al, 1999)

The Patient Health Questionnaire-9 has been widely used and found to be extremely useful in the diagnoses of depression, particularly in Primary Health Care and in population. At 9 items, the PHQ depression scale (which we call the PHQ-9) is half the length of many other depression measures, has comparable sensitivity and specificity, and consists of the actual nine criteria on which the diagnosis of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) DSM-IV* depressive disorders is based. Its usefulness is not only strengthened by its relatively brief nature but also in its ability to not only detect depression but also to measure its severity. Using the same instrument, PHQ-9 among university students, Adewuya detected an internal consistency of 0.85 (Adewuya 2006). A meta-analysis carried out using 18 validation studies (n=7180) by Manea et al.(2011) identified a sensitivity of 88% and specificity of 88% at a cut-off point of 10, with strong diagnostic ability in different populations within the range 8-11.

On the other hand, the PHQ-2, though able to detect depression in settings does not have the ability to measure severity. This study will employ both the PHQ-9 and the ultra-brief PHQ-2 as validation of the PHQ-2 as an accurate screening tool among in-school adolescents in Nigeria will make it easier to recommend screening of adolescents in school settings due to its ease of administration. This in turn, if well implemented, will enhance detection and thus reduction in the severity and burden of depression among this class of individuals.

Correlates were studied in relation to the state of depression and these include gender, maltreatment status, presence of co-morbidities, deductive reasoning ability e.t.c.

Academic performance was indirectly assessed with the use of the game, Sudoku. Sudoku is made up of a grid of cells, rows and columns which are to be filled with the numbers, 1-4 and 1-6. The aim is to enter digits from 1-4 and 1-6 respectively in each cell of a 4×4 and 6×6 cell made up of a 2×2 and 2×3 sub-grid respectively. Starting with some pre-given digits in some cells, each row, column and sub-grid must contain only one instance of each digit.

## 2.5 Treatment and Relapse of Adolescent Depression

According to Dunn and Weintraub (Dunn et.al, 2008), successful treatment of teen depression is important not only in reducing the suffering, morbidity and mortality resulting from the disorder but also in preventing the development of other adverse long-term psychosocial and health outcomes.

Various therapies have been used with adolescent depression. Psychoanalytical therapies target the unconscious conflicts resulting in the depression. Behavior therapies design reinforcement programs to change behavior patterns. Cognitive therapies look to improve and examine meta-cognition and increase more positive thought patterns (Lamarine, 1995).

Unfortunately it is harder to medically treat adolescent depression than adult depression because adolescents are less likely to respond to the medication (Fritz, 1995). Therefore, alternative treatments such as counseling have proven more successful. Physicians will prescribe anti-depressant medication to a depressed adolescent, but if that child appears suicidal, a psychological counselor will also become involved (Burford, 1995).

For the treatment to be fully effective, it is critical that the treatment should continue for several months, or longer. However, relapses are common and almost one half of the children diagnosed with depression are likely to suffer a relapse over a five-year follow-up period. Young people who suffer from depression are also likely to suffer from depression during their adult lives. Therefore, continuity of illness between childhood and adult forms of depression is noteworthy (Burford, 1995).

Comprehensive treatment of a depressive episode is likely to prevent short-term sequelae (self-harm, academic failure) and prevent long-term negative outcomes (disruption of key relationships, impairment of problem-solving skills, a heightened vulnerability to loss). However, patients and their families should be aware that re lapses are common and require prompt professional attention (Burford, 1995).

# CHAPTER THREE

# METHODOLOGY

## 3.1 Study Location

Egbeda is one of 33 local government areas in Oyo State, Nigeria. It has an area of 191km$^2$ and a population of 281,573 based on the 2006 census. It is subdivided into 11 wards (NPC, 2006). There are 68 registered secondary schools in the local government, of which 28 are public and 40 are private (appendix 1). Secondary schools (private and public) in Egbeda Local Government of Oyo State, Nigeria were randomly selected for the study.

## 3.2 Study Population

Participants in the study were students aged between 10 and 19 years in the selected schools in Egbeda Local Government area of Oyo State. According to the records provided by the Local Government, there are 19,896 in school-adolescents in the local government of which 1713 were involved in the study. All the schools were comprised of both sexes and in one of the private schools, there were boarders who come from other parts of the city. This is not however considered to pose a bias to the study as they made up only 0.3% of the study population and were not significantly different from those who were not boarders.

## 3.3 Study Design

The study design for the study was a descriptive cross-sectional survey among in-school adolescents. It employed a two-stage sampling system of which the last stage was a cluster sampling. Questionnaires were employed to obtain information on socio-demographic characteristics and the symptoms and severity of depressive symptoms from the participants. The questionnaires were interviewer-guided to ensure completeness and proper understanding of the questions.

## 3.4 Sample Size Determination

The Leslie and Kish formula for calculating sample size with consideration for power and design effect was used. Design effect was introduced to cater for the loss of effectiveness that

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The Leslie and Kish formula for calculating sample size with consideration for power and design effect was used. Design effect was introduced to cater for the loss of effectiveness that

could have been introduced with the use of clusters as opposed to random sampling of students (Levy 1999).

$$N = \frac{D \times (Z_\alpha + Z_\beta)^2 pq}{d^2}$$

Where N = desired sample size

D = design effect =2

$Z_\alpha$ = standard normal deviate set at 1.96 at 95% confidence interval

$Z_\beta$ = stan dard normal deviate of power,1-β ( 95% power) set at 1.65

P = estimated prevalence of target population,6.9% (Adewuya, 2007)

Q = 100 – P, which is 93.1%

D = level of precision required, set at 3.5%

∴ N = 1367

To make up for probable non-response,

$$N_{adj} = N \div 1\text{-}f$$

Where $N_{adj}$ = adjusted sample size

F = non-response rate, set at 0.

∴ $N_{adj}$ = 1708 ≅ 1710

## 3.5 Subjects (Inclusion and Exclusion Criteria)

Inclusion Criteria

- Students from selected schools aged between 10- 19 years

Exclusion Criteria

- Students not willing to participate.

## 3.6 Sampling Technique

A list of all schools in the Local Government and their population were obtained and all schools in the list were stratified based on school type into public and private schools. The cumulative population was calculated per stratum recorded. The cumulative population per stratum was divided by the total population and multiplied with the sample size to know how many students would be required per stratum. Based on this, 4 private and 3 public schools were randomly selected from all the schools.

All eligible and consenting students in the selected schools were recruited for the study. In all, a total of 1713 students participated in the study.

## 3.7 Ethical Approval

The proposal for this study was submitted for approval to the Ministry of Health Ethical Review Board and permission to conduct research at the schools was obtained from the Commissioner, Ministry of Education. Assent was then obtained from the school authorities of the selected schools and consent from each of the students willing to participate. Adequate information was provided to all participants before consent was obtained individually from each of them.

Confidentiality was assured and ensured with the use of code numbers instead of the names of participants. Also, individual results were not reported, and all results were based on sub groups of the total population, such as gender and age-group.

Intervention will be by recommending the reinforcement or institution of counseling centers in the schools to the Local Government.

## 3.8 Study Instruments

The study instruments utilized for the study included a socio-demographic questionnaire, PHQ-9 and a sudoku grid game.

Socio-demographic Questionnaire:

The socio-demographic questionnaire was used to obtain information on the age, sex, religion, family structure, change of location within the last 6 months, maltreatment status,

participation in sporting activities, presence of persistent health condition and attendant drug use and other relevant correlates of depression.

Patient Health Questionnaires: PHQ-9 and PHQ-2.

The PHQ-9 is a self-rating instrument for depression that was developed in 1999 by Spitzer *et al*, from the PRIME-MD. It screens for the occurrence and severity of depression and is strictly based upon the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Nine symptoms are described and the patient responds by indicating how much he/she has been bothered by these symptoms over the last 2 weeks. The response to each item is rated 0–3, which enables the clinician to assess the severity of the disorder. The maximum possible score is 27. Scores of 5–9 indicate mild depression, 10–14 moderate depression, 15–19 moderately severe depression, and ≥20 severe depression. The PHQ-9 takes only a few minutes to complete.

Earlier studies in primary care show that PHQ-9 detects depression with sensitivity around 90% and a specificity ranging from 77% to 88% when using the cut-off ≥10. The PHQ-9 has been validated in both primary care settings and hospitals.

At 9 items, the PHQ depression scale (popularly called the PHQ-9) is half the length of most other depression measures, has comparable sensitivity and specificity, and consists of the actual nine criteria on which the diagnosis of *DSM-IV* depressive disorders is based. The latter feature distinguishes the PHQ-9 from the other two-step depression measures for which, when scores are high, additional questions must be asked to establish *DSM-IV* depressive diagnoses. The PHQ-9 is thus a dual-purpose instrument that, with the same nine items, can establish provisional depressive disorder diagnoses as well as grade depressive symptom severity (Kroenke et. Al, 2002).Over time, the severity scores have been a particularly popular use of the PHQ-9, and are now used much more commonly than the provisional diagnoses. Cut points of 5, 10, and 15 represent mild, moderate, and severe levels of depressive symptoms, respectively on the PHQ -9. Also, a cut point of 10 or greater is considered a —yellow flag (i.e., drawing attention to a possible clinically significant condition), while a cut point of 15 is a —red flag (i.e., targeting individuals in whom active treatment is probably warranted).

The PHQ-2 is an ultra-brief screening measure containing the first two items on the PHQ-9. The purpose for its use is simply to screen for depression and cannot be used to assess depression severity. It is a very useful tool in large population settings, busy general medical settings and other settings where volume of people is high and contact is brief. The first 2

questions of the PHQ-9, together called the PHQ-2 is also used to provide a simple measure of *current depression*. The PHQ-2 score can range from 0 to 6. A PHQ-2 score of 3 or greater has sensitivity for major depression of 83%, a specificity of 90%, and a positive likelihood ratio of 2.9. Hence, a score of 3 or greater should prompt administration of the full PHQ-9 as well as a clinical interview to determine whether a mental disorder is present (Kroenke et.al, 2002).

Also a sudoku-6 grid game was used to obtain inference scores which was used as an indirect assessment for academic performance. Sudoku is a game that utilizes the art of deductive reasoning to be able to solve the grids. Due to the complexities involved in obtaining the academic assessment for the students in their respective schools, the grid game was used as an assessment for academic performance. This is because the main essence of most academic assessments are based on deductive reasoning.

Two forms of the game was used, Sudoku-4 and Sudoku-6. The game is made up of a grid of cells, rows and columns which are to be filled with the numbers, 1-4 and 1-6. The aim is to enter digits from 1-4 and 1-6 respectively in each cell of a 4×4 and 6×6 cell made up of a 2×2 and 2×3 sub-grid respectively. Starting with some pre-given digits in some cells, each row, column and sub-grid must contain only one instance of each digit. All the students were taught the same game with a 4 × 4 grid and asked to solve the Sudoku-6 grid. All right answers, divided by all possible answers were rated over 6. Scores equal to or greater to or greater than 4 were considered "high" and those below 4 were considered as "low" for the assessment of academic performance.

### 3.9 Pre test

The pre-test was conducted at Sow the Seed Model College, Ibadan, Oyo state, Nigeria. Prevalence of depressive symptoms was 19.0%. After the pretest, questions on maltreatment was included in the research. Also, the question on persistent health conditions was changed to an open-ended question.

### 3.10 Data Collection

Seven schools were selected and all eligible students in each of the schools were recruited to participate in the study. Questionnaires were used to obtain information on socio-demographic

characteristics, other correlates of depression and academic performance. The questionnaires were interviewer-guided to ensure completeness and proper understanding of the questions.

### 3.11 Data Management and Analysis

Statistical analyses were carried out with the SPSS Version 15. Frequencies and percentages were used to obtain prevalence and general characteristics of the study population. Bi-variate analysis was used to detect the presence of a relationship between the outcome (depression) and the covariates. Cross-tabulations that were significant association at the 20% level were put in for multivariate analysis which served to quantify the relationship between the various covariates and the occurrence of depression.

Receiver operating Characteristic Curve (ROC) served to determine the accuracy of the screening tests while Cohen's k measured the level of agreement between them. The ROC shows the accuracy of the prediction given by the screening tests. It is graded within a range of 0.5- 1.0 where 1 is the maximum achievable and shows a perfect screening test (Heagerty & Zheng, 2005). Kappa values indicate both the strength and significance of the relationship between the row and column variables of a cross-tabulation (Sim Wright, 2005). On correlating the items of the PHQ-9, two other combinations, "8&7" and "7&4" were included in the analysis of agreement and were validated against PHQ 9 alongside PHQ 2.

# CHAPTER FOUR

# RESULTS

## 4.1: Socio-demographic Characteristics of Respondents.

In all, 1713 students were approached and all of them responded, giving a response rate of 100%, out of which 473 (27.6%) were from private secondary schools and 1037 (60.5%) were in the junior secondary arm (J.S.S 1-3) of their schools. A little less than half of the respondents were males 766 (44.7%) and 952 (55.6%) were Christians. The mean age of respondents was 13.96 ± 2.08) years with 738 (42.9%) of them in the early adolescent group (10-13 years) and 200(11.7%) in the late adolescent group (17-19 years). Of the respondents, 1230 (71.8%) were from monogamous families; 578 (33.7%) were of the first born position while 467 (27.3%) were of the last born position. In addition, 193 (11.3%) of the respondents had more than 5 siblings (Median =3, Range = 12) while nearly 77% (1313) reported partaking in one form of sporting activity or the other (Table 4.1), of which the most predominant were football (50.0%) and running (33.3% ) (Fig 4.1). As displayed in Table 4.1, late adolescents were approximately 14% in public schools as opposed to 6% in private schools. Those from polygamous homes made up about 34.5% and 12%, in public and private schools, respectively. Also, females made up 57.8% of respondent in Public schools and 48.6% of those in Private Schools.

**TABLE 4.1: General Socio-demographic characteristics of Respondents**

| Variable | Public N=1240 (%) | Private N=473 (%) | Total N=1713 (%) |
|---|---|---|---|
| **Gender** | | | |
| Male | 523 (42.2) | 243 (51.4) | 766 (44.7) |
| Female | 717 (57.8) | 230 (48.6) | 947 (55.3) |
| **Religion** | | | |
| Christianity | 670 (54.0) | 282 (59.6) | 952 (55.6) |
| Islam | 570 (46.0) | 191 (40.4) | 761 (44.4) |
| **Age (Years)** | | | |
| Early Adolescents (10-13) | 470 (37.9) | 268 (56.7) | 738 (43.1) |
| Mid Adolescents (14-16) | 598 (48.2) | 177 (37.4) | 775 (45.2) |
| Late Adolescents (17-19) | 172 (13.9) | 28 (5.9) | 200 (11.7) |
| | **Mean = 14.24± 2.05** | **Mean = 13.21± 2.00** | **Mean = 13.96 ± 2.08** |
| **Position** | | | |
| First | 408 (32.9) | 171 (36.2) | 578 (33.7) |
| Last | 374 (30.2) | 99 (20.9) | 467 (27.3) |
| Others | 458 (36.9) | 203 (42.9) | 668 (39.0) |
| **Family Structure** | | | |
| Monogamy | 814 (65.6) | 416 (87.9) | 1230 (71.8) |
| Polygamy | 426 (34.4) | 57 (12.1) | 473 (28.2) |
| **Number of Siblings** | | | |
| 0-2 | 276 (22.3) | 150(31.7) | 426 (24.9) |
| 3-5 | 802 (64.7) | 292(61.7) | 1094 (63.9) |
| 6+ | 162 (13.1) | 31(6.6) | 193 (11.3) |
| | **Median= 3, Range=11** | **Median= 3, Range=11** | **Median = 3, Range = 12** |
| **Participation in Sports** | | | |
| Yes | 918(74.0) | 395 (83.5) | 1313 (76.6) |
| No | 322(26.0) | 78 (16.5) | 400 (23.4) |
| **Class Group** | | | |
| Junior | 759(61.2) | 278 (58.8) | 1037 (60.5) |
| Senior | 481(38.8) | 195 (41.2) | 676 (39.5) |

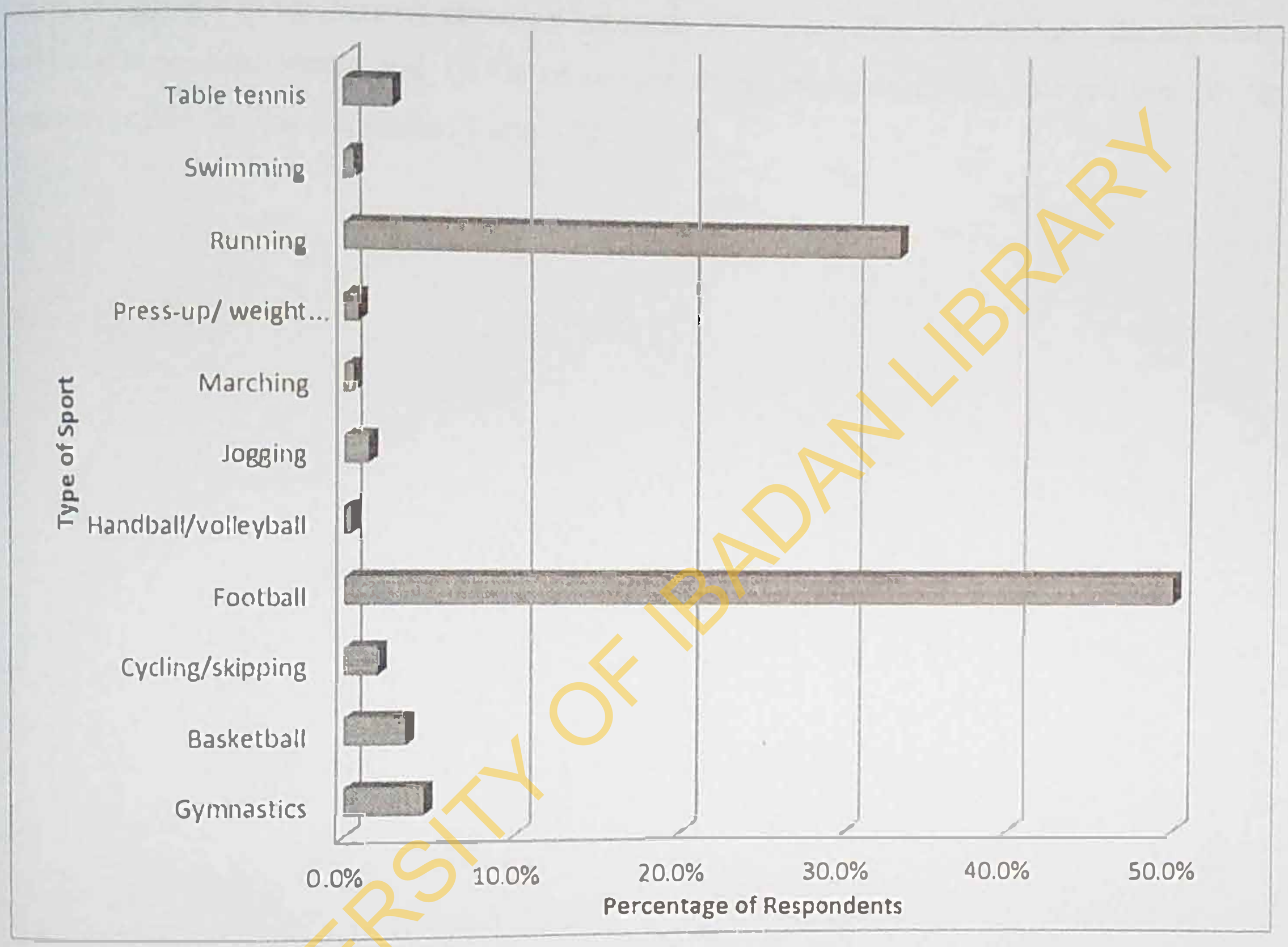


FIGURE 4.1: **Graph showing the types of Sporting activities engaged in by Respondents**

## 4.2: Other Socio-demographic Characteristics

About 90% (1545) live with their parents while 32.3% (553) had changed their locations of residence within the past 6 months. Furthermore, about a third (518) reported that they work after school hours. In the Public schools, approximately 38% of the students work after school hours as opposed to the Private schools where only 9.7% work after school. Also, about 37% of public school respondents and 19.7% of private school respondents had changed their living location within the last 6 months (Table 4.2).

TABLE 4.2. Other Socio-demographic characteristics of Respondents

| Variable | Public N=1240 (%) | Private N=473 (%) | Total N=1713 (%) |
|---|---|---|---|
| **Changed Living Location** | | | |
| Yes | 460 (37.1) | 93 (19.7) | 553 (32.3) |
| No | 780 (62.9) | 380 (80.3) | 1160 (67.7) |
| **Work after School** | | | |
| Yes | 472 (38.1) | 46 (9.7) | 518 (30.2) |
| No | 768 (61.9) | 427 (90..3) | 1195 (69.8) |
| **Living condition** | | | |
| With Parents | 1100 (88.7) | 445 (94.1) | 1545 (90.2) |
| Not with Parents | 140 (11.3) | 28 (5.9) | 168 (9.8) |
| **Living with Parents** | **(N=1100)** | **(N=445)** | **(N=1545)** |
| Both | 873 (70.4) | 409 (86.5) | 1282 (83.0) |
| Mother alone | 149 (12.0) | 27 (5.7) | 176 (11.4) |
| Father alone | 78 (6.3) | 9 (1.9) | 87 (5.6) |
| **Not Living with Parents** | **(N=140)** | **(N=28)** | **(N=168)** |
| Relative | 100 (71.4) | 19 (67.9) | 119 (70.8) |
| Family Friend | 33 (23.6) | 3 (10.7) | 36 (21.4) |
| Others | 7 (5.0) | 6 (21.4) | 13 (7.7) |

TABLE 4.2. Other Socio-demographic characteristics of Respondents

| Variable | Public N=1240 (%) | Private N=473 (%) | Total N=1713 (%) |
|---|---|---|---|
| **Changed Living Location** | | | |
| Yes | 460 (37.1) | 93 (19.7) | 553 (32.3) |
| No | 780 (62.9) | 380 (80.3) | 1160 (67.7) |
| **Work after School** | | | |
| Yes | 472 (38.1) | 46 (9.7) | 518 (30.2) |
| No | 768 (61.9) | 427 (90..3) | 1195 (69.8) |
| **Living condition** | | | |
| With Parents | 1100 (88.7) | 445 (94.1) | 1545 (90.2) |
| Not with Parents | 140 (11.3) | 28 (5.9) | 168 (9.8) |
| **Living with Parents** | **(N=1100)** | **(N=445)** | **(N=1545)** |
| Both | 873 (70.4) | 409 (86.5) | 1282 (83.0) |
| Mother alone | 149 (12.0) | 27 (5.7) | 176 (11.4) |
| Father alone | 78 (6.3) | 9 (1.9) | 87 (5.6) |
| **Not Living with Parents** | **(N=140)** | **(N=28)** | **(N=168)** |
| Relative | 100 (71.4) | 19 (67.9) | 119 (70.8) |
| Family Friend | 33 (23.6) | 3 (10.7) | 36 (21.4) |
| Others | 7 (5.0) | 6 (21.4) | 13 (7.7) |

## 4.5: Assessment of Performance and Perception of Participants

Proportion of respondents who were embarrassed by the financial status of their family was 26.3% (450) and 43% (736) had a persistent health condition. Among the respondents, 537 (31.3%) perceived themselves maltreated at one time or the other (Table 4.3). Thirty two percent (32%) of those in Public Secondary schools admitted to being embarrassed by the financial status of their family as opposed to 11.2% in Private Schools; 36% and 19% in Public and Private Secondary Schools respectively perceived they had been maltreated. Also about half (49.5%) of Private school respondents reported the presence of a persistent health condition in comparison with those from Public Schools (40.5%). In the assessment of educational performance, those who scored high (≥4) were 16.2% (278); respondents from private school that schools that scored high were 23.7% (112) as opposed to those from public schools were 13.4% (162).

TABLE 4.3. Assessment of Performance and Perception of Participants

| Variable | Public N=1240 (%) | Private N=473 (%) | Total N=1713 (%) |
|---|---|---|---|
| **Embarrassed by family financial status** | | | |
| Yes | 397 (32.0) | 53 (11.2) | 450 (26.3) |
| No | 843 (68.0) | 420 (88.8) | 1263 (73.7) |
| **Maltreatment status** | | | |
| Yes | 447 (36.0) | 90 (19.0) | 537 (31.3) |
| No | 793 (64.0) | 383 (81.0) | 1176(68.7) |
| **Presence of persistent health condition** | | | |
| Yes | 502 (40.5) | 234 (49.5) | 736 (43.0) |
| No | 738 (59.5) | 239 (50.5) | 977 (57.0) |
| **Assessment of educational performance** | | | |
| High | 166 (13.4) | 112 (23.7) | 278 (16.2) |
| Low | 1074 (86.6) | 361 (76.3) | 1435 (83.8) |

## 4.4 Maltreatment Status of Respondents

From Table 4.3 above, it is indicated that 537 of the 1713 adolescents perceived they had been maltreated. Of these, 367 (68.3%) had been maltreated physically, 127 (23.6%) psychological and 43 (8.0%) sexually (Table 4.4). More than half (54.4%) of these adolescents reported that they had been abused by their parents, 15.6% (84) had been abused by a relative, and 6.5% (35) by teachers or strangers (Table 4.4). Almost the same proportions are observed for each form of maltreatment and persons responsible for maltreatment perceived or experienced by respondents in both Public and Private Secondary schools. However in Public schools, maltreatment by friends had a proportion of 7.6% as opposed to 25.6% observed in Private Schools while maltreatment by parents had a proportion of 36.7% in private schoools as opposed to 57.9% in Public Schools.

**TABLE 4.4. Perception of Participants on Maltreatment status**

| Variable | Public N=447 (%) | Private N=90 (%) | Total N=537 (%) |
|---|---|---|---|
| **Form of maltreatment experienced** | | | |
| Physical | 303 (67.8) | 64 (71.1) | 367 (68.3) |
| Psychological | 108 (24.2) | 19 (21.1) | 127 (23.6) |
| Sexual | 36 (8.1) | 7 (7.8) | 43 (8.0) |
| **Perpetrators of maltreatment** | | | |
| Parent | 259 (57.9) | 33 (36.7) | 292 (54.4) |
| Relative | 70 (15.7) | 14 (15.6) | 84 (15.6) |
| Neighbour | 60 (13.4) | 9 (10.0) | 69 (12.8) |
| Friend | 34 (7.6) | 23 (25.6) | 57 (10.6) |
| Others | 24 (5.4) | 11 (12.2) | 35 (6.5) |

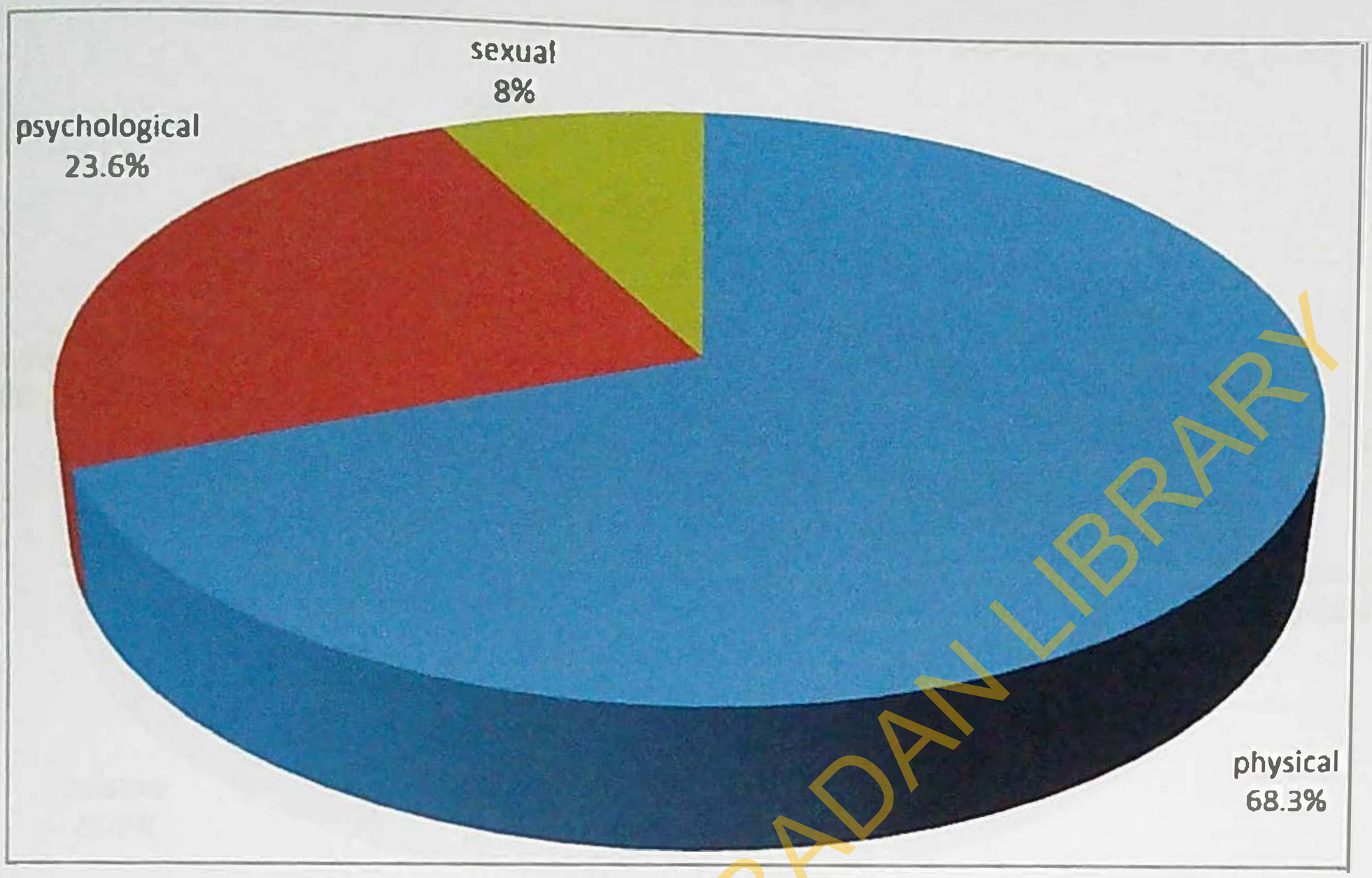


**FIGURE 4.2. Chart showing forms of maltreatment reported by Respondents**

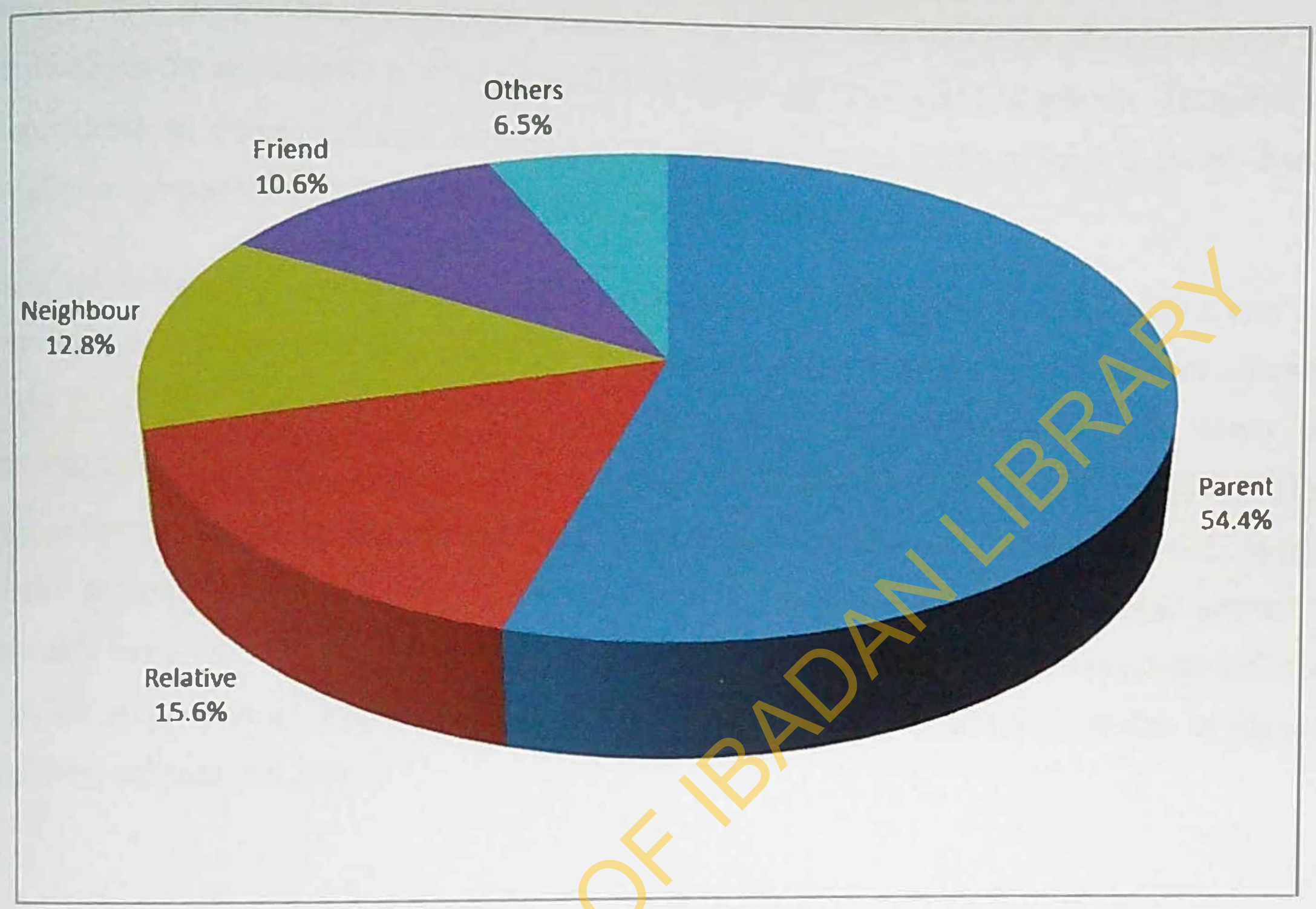


**FIGURE 4.3. Chart showing the Perpetrators of maltreatment reported by Respondents**

## 4.5: Health conditions and Drug use among Participants

On the whole, 28% (479) of all the students take medications on a regular basis with or without consideration of specific disease conditions. Among Public schools, 27% of the respondents take medications for any reason at all, as opposed to 30.4% reported in public schools. Thus, 8.7% of respondents in Public schools take medications on a regular basis without a stated disease condition as opposed to 2.7% of those from Private Schools.

With reference to the information displayed in Table 4.3, 736 respondents stated that they had one form of persistent health condition or the other. Among these, 9.8% (168) had allergies; 6.1% (104) had persistent headache and 5.8% (100) experienced sleeplessness. About half (51.4%) of these, however, do not use any form of medication (Table 4.5). Respondents from both school types reported similar disease conditions with the exception of 'dizziness', 'genital discharge' and 'painful sex organ' reported in Public but not in private schools and 'protruding stomach' reported in Private but not in Public schools. Also Private school respondents reflected a higher proportion of drug use among those with stated disease conditions (56.0%) as opposed to Public schools (45.2%).

## TABLE 4.5. Health conditions and Drug use

| Variable | Public N=1240 (%) | Private N=473 (%) | Total N=1713 (%) |
|---|---|---|---|
| **Use of drug for all reasons** | | | |
| Yes | 335 (27.0) | 144 (30.4) | 479 (28.0) |
| No | 905 (73.0) | 329 (69.6) | 1234 (72.0) |
| **Health condition/drug use** | | | |
| Health condition, uses drugs | 227 (18.3) | 131 (27.7) | 358 (20.9) |
| Health condition, no drugs | 275 (22.2) | 103 (21.8) | 378 (22.1) |
| No health condition, uses drugs | 108 (8.7) | 13 (2.7) | 121 (7.1) |
| No health condition, no drugs | 630 (50.8) | 226 (47.8) | 856 (50.0) |
| **Persistent/recurrent health condition** | **(N=502)** | **(N=234)** | **(N=736)** |
| Allergies | 114 (9.2) | 54 (23.1) | 168 (9.8) |
| Bleeding Nose | 1(0.2) | 1 (0.4) | 2 (0.1) |
| Body pain | 5 (1.0) | 4 (1.7) | 9 (0.5) |
| Bone Pain | 5 (1.0) | 8 (3.4) | 13 (0.8) |
| Cold | 6 (1.2) | 4 (1.7) | 10 (0.6) |
| Genital Discharge | 1 (0.2) | 0 (0.0) | 1 (0.1) |
| Dizziness | 6 (1.2) | 0 (0.0) | 6 (0.4) |
| Eye pain & defects | 24 (4.8) | 25 (10.7) | 49 (2.9) |
| Headache | 60 (12.0) | 44 (18.8) | 104 (6.1) |
| Heart Disease | 29 (5.8) | 2 (0.9) | 31 (1.8) |
| Itching | 2 (0.4) | 0 (0.0) | 2 (0.1) |
| Kidney disease | 3 (0.6) | 0 (0.0) | 3 (0.2) |
| Menstrual pain | 4 (0.8) | 1 (0.4) | 5 (0.3) |
| Painful Sex organ | 1 (0.2) | 0 (0.0) | 1(0.1) |
| Physical Disability | 33 (6.6) | 12 (0.0) | 45 (2.6) |
| Protruding stomach | 0 (0.0) | 1 (0.4) | 1 (0.1) |
| Sleeplessness | 83 (16.5) | 17 (7.3) | 100 (5.8) |
| Stomach ache | 63 (12.5) | 39 (16.7) | 102 (6.0) |
| Ulcer | 60 (12.0) | 20 (8.5) | 80 (4.7) |
| Weakness | 2 (0.4) | 2 (0.9) | 4 (0.2) |
| **Use of drugs for stated health condition** | | | |
| Yes | 227 (45.2) | 131 (56.0) | 358 (48.6) |
| No | 275 (54.8) | 103 (44.0) | 378 (51.4) |

## 4.6 Assessment of Depressive Symptoms

Correlations of the items of the questionnaire (PHQ 9) yielded values that were mostly lower than that observed between the 1st and 2nd items (PHQ 2). However a higher correlation was observed between the 4th and 7th items and an equal correlation between the 7th and 8th items (Table 4.6).

The median PHQ-9 score was 5.00 (range = 27) and the prevalence of depressive symptoms was 21.2% with 5.1% classified as major (moderatey severe and severe) and 16.1% as moderate depression (Table 4.7). Going by the data displayed in Fig 4.5, there doesn't appear to be much difference in the trend of the occurrence of depressive symptoms among respondents from the public (20.7%) and private (22.6%) schools. The range however differed as that of respondents from private schools was 23 as opposed to the range of depressive symptoms score in public schools which was 27.

As shown in Fig 4.5, prevalence of depressive symptoms increases with age with a steady slope from the lowest, 10 year olds (10.6%), to the highest, 19 year olds (33.3%). There is however a lull at ages 14 (17.9%) and 15 (18.3%), after which the incline resumes. Depressed adolescents had a significantly higher mean age ($t = 0.350$, $p = 0.004$) than those that were not depressed.

Also, a distinct difference exists in the occurrence of depressive symptoms among those with high educational performance (16.5%) when compared to those with low educational performance (22.2%).

**Table 4.6. Correlation matrix of the items of the Patient Health Questionnaire 9**

| ITEMS | PHQ 1 | PHQ 2 | PHQ 3 | PHQ 4 | PHQ 5 | PHQ 6 | PHQ 7 | PHQ 8 | PHQ 9 |
|---|---|---|---|---|---|---|---|---|---|
| PHQ 1 | 1 | | | | | | | | |
| PHQ2 | **0.316[a]*** | 1 | | | | | | | |
| PHQ3 | 0.246* | 0.231* | 1 | | | | | | |
| PHQ 4 | 0.285* | 0.275* | 0.265* | 1 | | | | | |
| PHQ 5 | 0.149* | 0.176* | 0.242* | 0.215* | 1 | | | | |
| PHQ 6 | 0.235* | 0.305* | 0.202* | 0.244* | 0.225* | 1 | | | |
| PHQ 7 | 0.229* | 0.288* | 0.254* | **0.323[a]*** | 0.157* | 0.266* | 1 | | |
| PHQ 8 | 0.256* | 0.256* | 0.240* | 0.285* | 0.207* | 0.283* | **0.316[a]*** | 1 | |
| PHQ 9 | 0.190* | 0.276* | 0.172* | 0.225* | 0.185* | 0.247* | 0.248* | 0.310* | 1 |

*Correlation is significant at 0.01 level, N = 1713 cases

[a]These are included in further analysis to assess agreement with PHQ 9

**TABLE 4.7: Assessment of Depression based on Patient Health Questionnaires (PHQs)**

| Variable | Frequency | Percentage (%) |
|---|---|---|
| **Categories of Clinical depression based on PHQ 9 ( /27)** | | |
| Depressed ( >=10) | 364 | 21.2 |
| Not depressed (<10) | 1349 | 78.8 |
| **Median PHQ Score = 5.00, Range= 0 - 27** | | |
| **Severity of depression based on PHQ 9 ( /27)** | | |
| No depression ( <5) | 754 | 44.0 |
| Mild depression (5-9) | 595 | 34.7 |
| Moderate depression (10-14) | 276 | 16.1 |
| Moderately severe depression (15-19) | 79 | 4.6 |
| Severe depression (>=20) | 9 | 0.5 |
| **Categories of depression based on PHQ 2 ( /6)** | | |
| Depressed (>=3) | 292 | 17.0 |
| Not depressed ( <3) | 1421 | 83.0 |
| **Median PHQ Score = 1.00, Range= 0 - 6** | | |
| **Categories of depression based on PHQ (7+4) ( /6)** | | |
| Depressed (>=3) | 432 | 25.2 |
| Not depressed ( <3) | 1281 | 74.8 |
| **Median PHQ Score = 1.00, Range= 0 - 6** | | |
| **Categories of depression based on PHQ (8+7) ( /6)** | | |
| Depressed (>=3) | 401 | 23.4 |
| Not depressed ( <3) | 1312 | 76.6 |
| **Median PHQ Score = 1.00, Range= 0 - 6** | | |

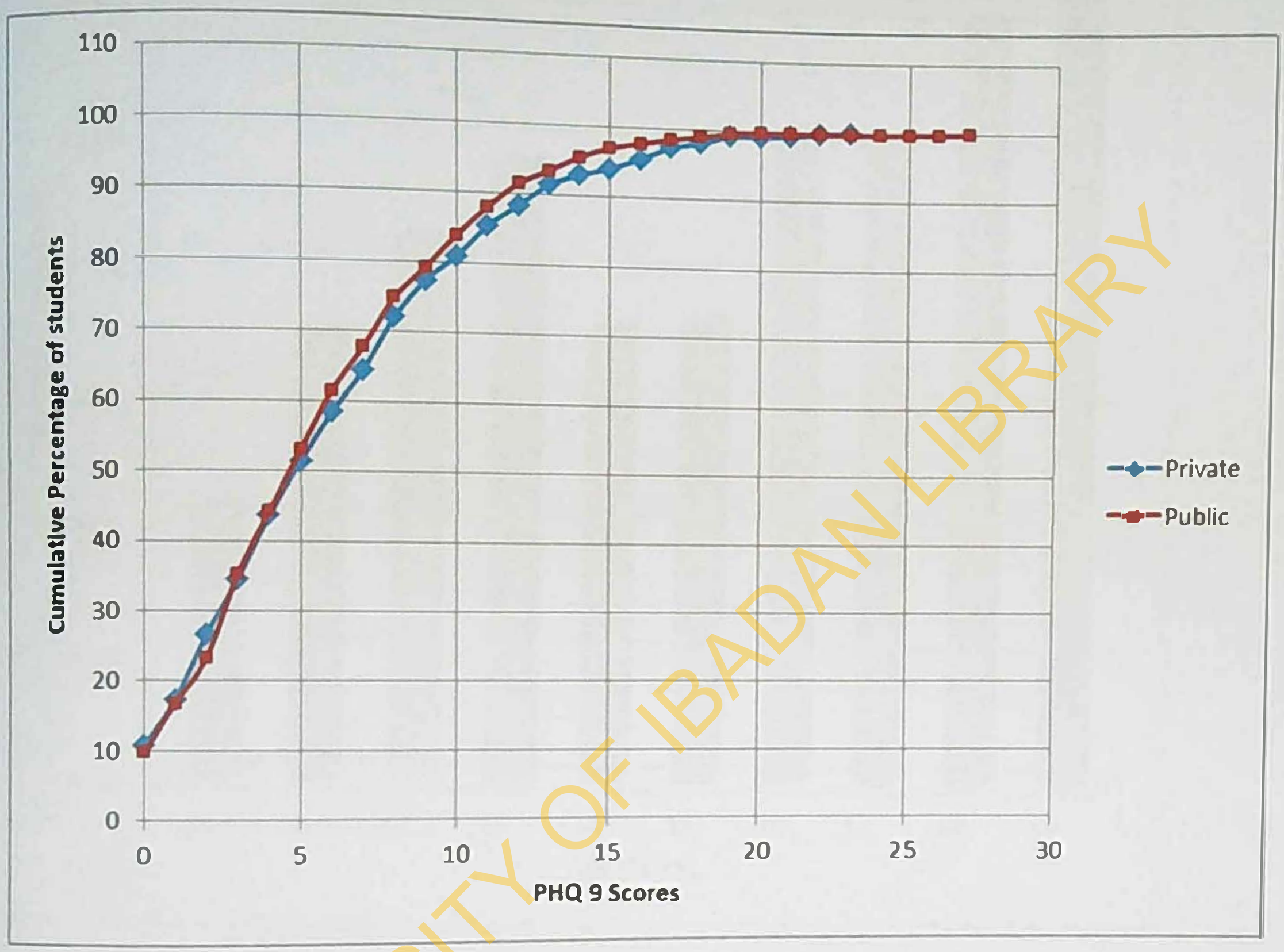


**Figure 4.4. Graph of Percentage Distribution of Depressive symptoms among Students in Public and Private Schools.**

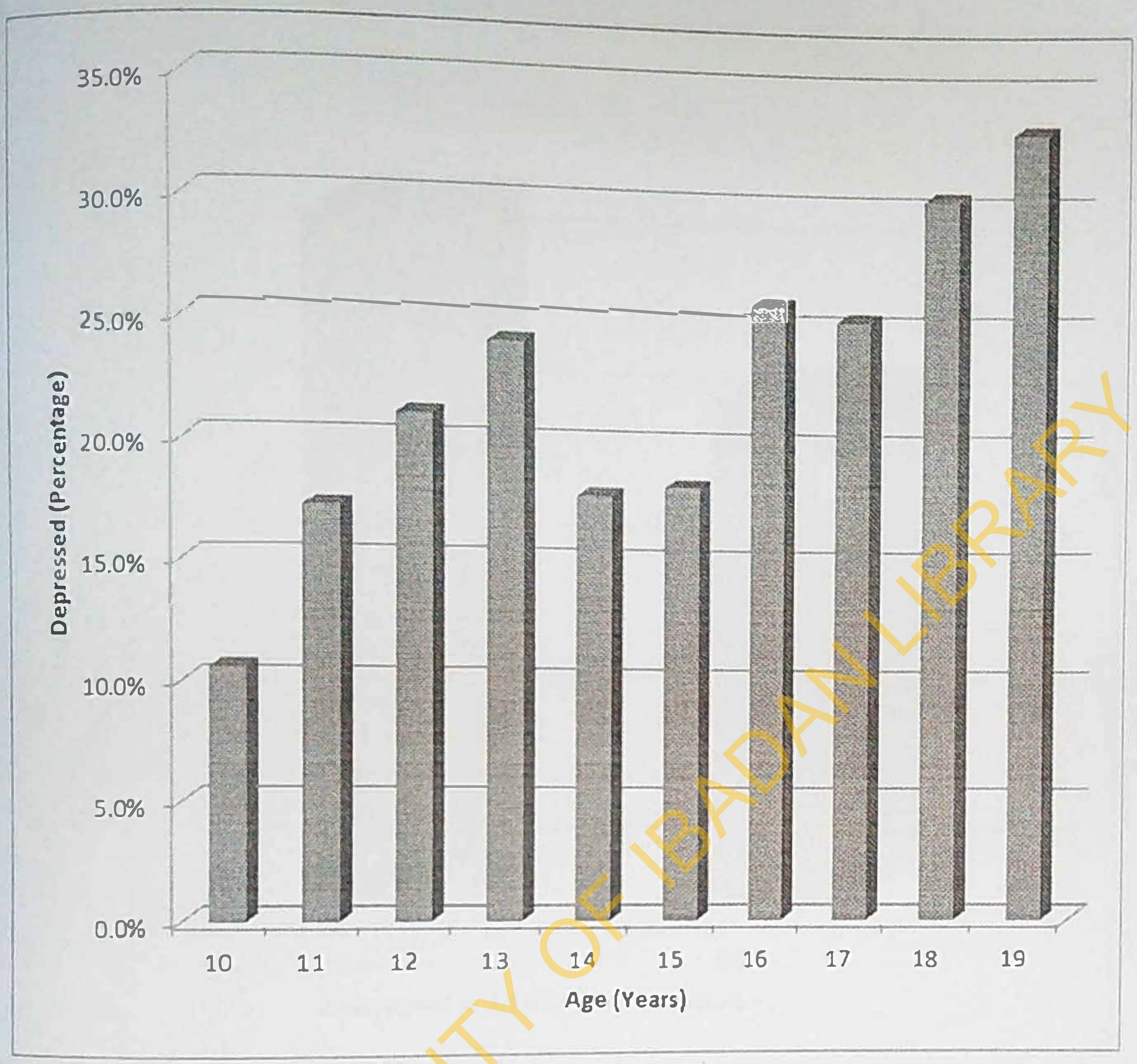


Figure 4.5: Graph showing Percentage depressed against the Age of Respondent.

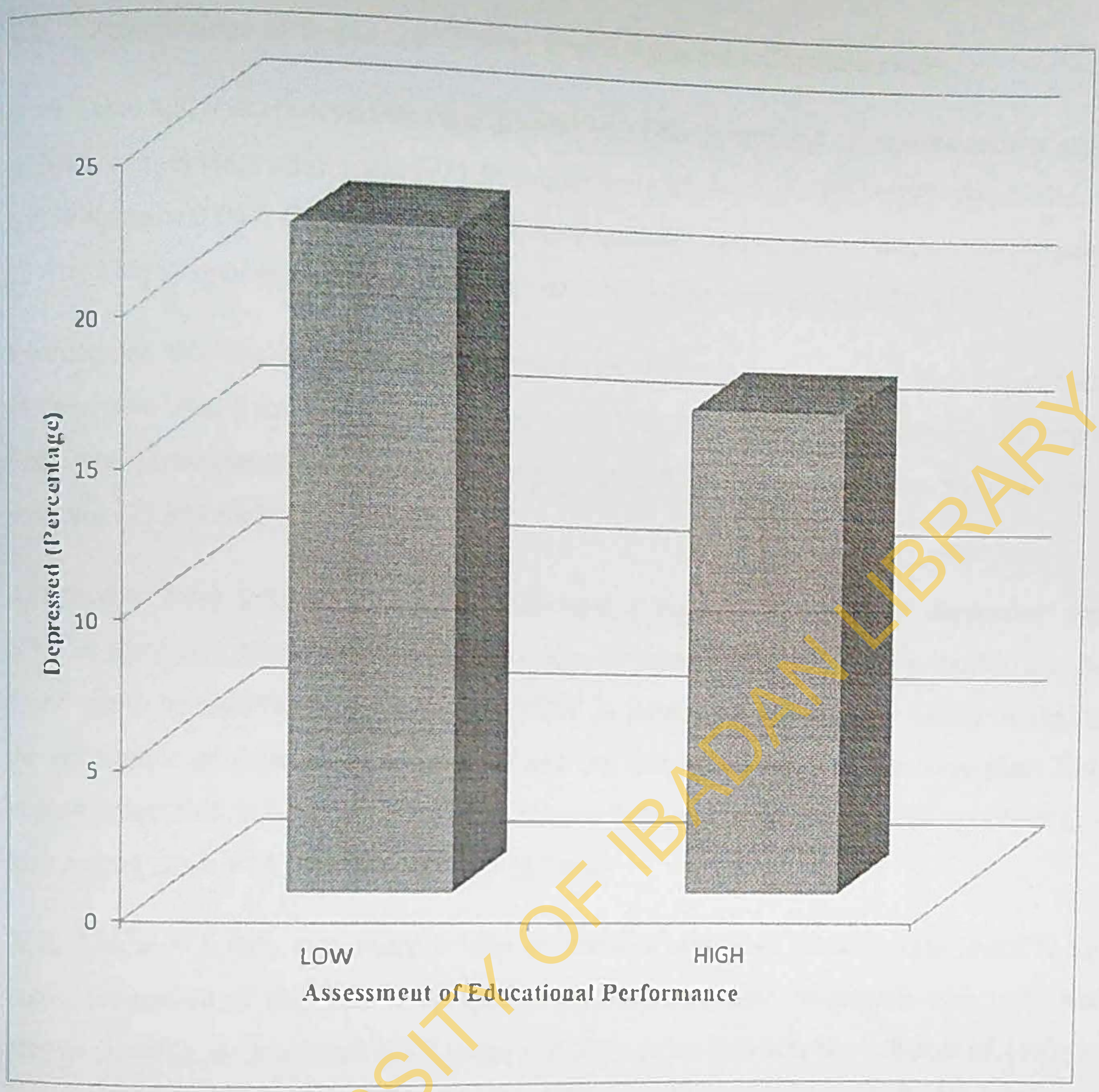


Figure 4.6: Graph showing Percentage depressed against Assessment of Educational Performance.

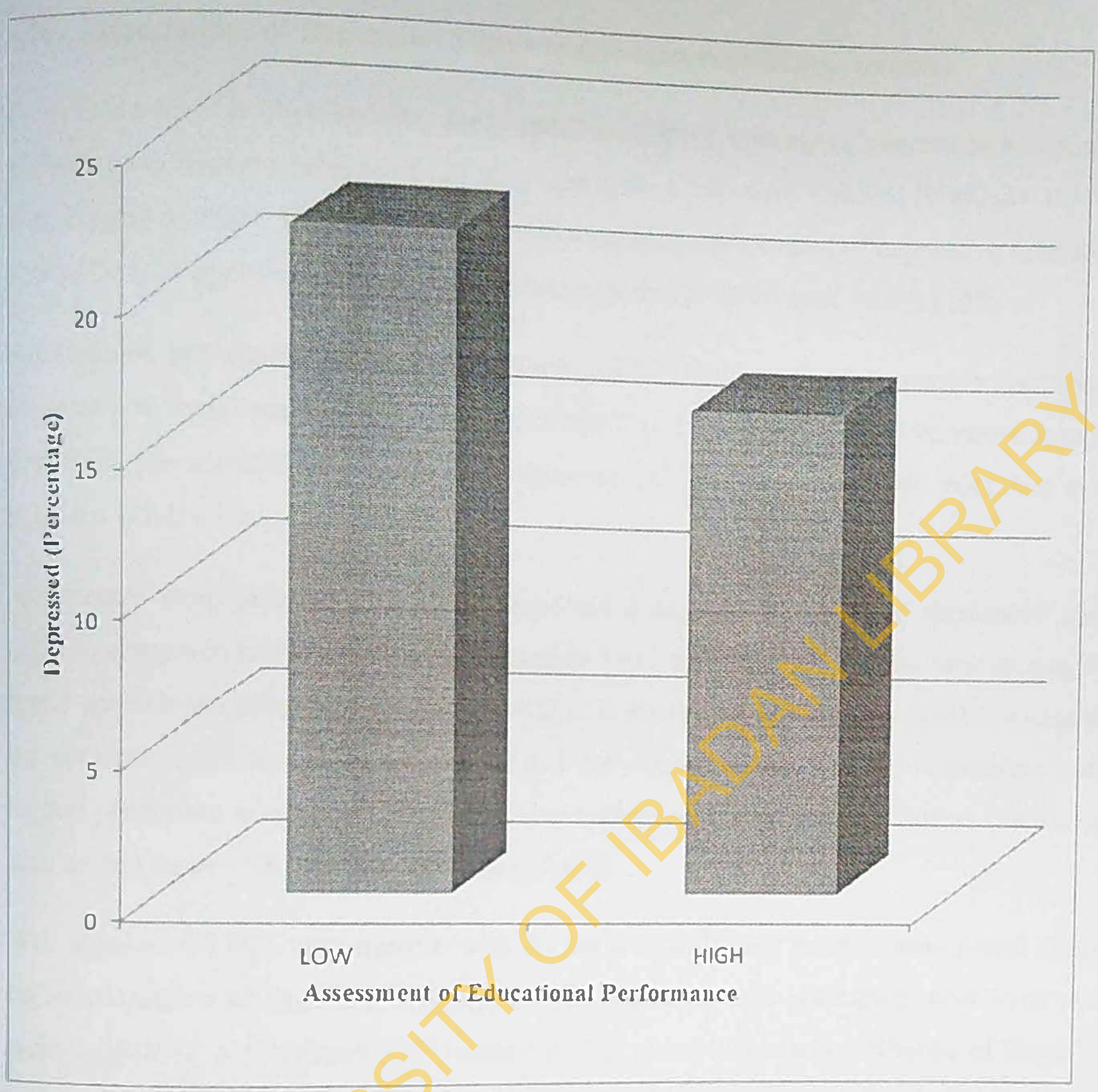


Figure 4.6: Graph showing Percentage depressed against Assessment of Educational Performance.

## 4.7: Associations of Depressed Status and Respondent Characteristics

From Table 4.8, it is observed that the proportion of the symptoms of depression was slightly higher among female adolescents (21.9%) than male adolescents (20.5%) (P value = 0.514). Also with P value of 0.007, Christian respondents displayed a proportion of depressive symptoms 23.6% (225) as opposed to Muslim participants with a proportion of 18.3% (139).

Furthermore, late adolescents had the highest (28.0%) occurrence of depressive symptoms while the least was found among mid adolescents (20.1%), (P value= 0.045). Depressive symptoms in first-child participants had a lower proportion (20.2%) in comparison with last and other positions (21.8% each) (P value=0.753).

Adolescents from polygamous homes reported a higher occurrence of depressive symptoms (23.2%) compared to those from monogamous families (20.5%). This relationship was however found not to be significant, as P value= 0.237. A relationship (P value = 0.021) existed between the occurrence of depressive symptoms and the number of siblings the respondent had as the highest proportion was observed among respondents with more than 5 siblings (26.9%) and the least among those with 2 or less siblings (17.4%).

With P value < 0.001, respondents who do not live with their parents were found to display a higher proportion of depressive symptoms (34.5%) than their colleagues who lived with their parents (19.8%). A relationship (P value < 0.001) exists between the "change of living location in the past 6 months" as the occurrence of depressive symptoms as those who answered 'yes' showed a higher proportion of depressive symptoms (26.6%) than those who had not changed their living location (18.7%).

Also respondents who do not partake in any sporting activities had a higher proportion of depressive symptoms (27.3%) when compared with those who do (19.4%), P value = 0.001.

**TABLE 4.8: Associations of Depressed Status and Respondent Characteristics**

| Variable | Depressed (%) | Not Depressed (%) | Total (%) | $\chi^2$ value | P value ($\alpha$=0.05) |
|---|---|---|---|---|---|
| **Gender** | | | | | |
| Male | 157 (20.5) | 609 (79.5) | 766 (100) | 0.470 | **0.514** |
| Female | 207 (21.9) | 740 (78.1) | 947 (100) | | |
| **Religion** | | | | | |
| Christianity | 225 (23.6) | 727 (76.4) | 952 (100) | 7.285 | **0.007*** |
| Islam | 139 (18.3) | 622 (81.7) | 761 (100) | | |
| **Age in 3 groups** | | | | | |
| Early (10-13) | 152 (20.6) | 586 (79.4) | 738 (100) | 6.216 | **0.045*** |
| Mid (14-16) | 156 (20.1) | 619 79.9) | 775 (100) | | |
| Late (17-19) | 56 (28.0) | 144 (72.0) | 200 (100) | | |
| **Position** | | | | | |
| First | 117 (20.2) | 462 (79.8) | 579 (100) | 0.568 | **0.753** |
| Last | 103 (21.8) | 370 (78.2) | 473 (100) | | |
| Others | 144 (21.8) | 517 (78.2) | 661 (100) | | |
| **Family structure** | | | | | |
| Monogamy | 252 (20.5) | 978 (79.5) | 1230 (100) | 1.512 | **0.237** |
| Polygamy | 112 (23.2) | 371 (76.8) | 483 (100) | | |
| **Number of siblings** | | | | | |
| 0-2 | 74 (17.4) | 352 (82.6) | 426 (100) | 7.735 | **0.021*** |
| 3-5 | 238 (21.8) | 856 (78.2) | 1094 (100) | | |
| 6+ | 52 (26.9) | 141 (73.1) | 193 (100) | | |
| **Living Condition** | | | | | |
| With Parents | 306 (19.8) | 1239 (80.2) | 1545 (100) | 19.615 | **0.000*** |
| Not living with Parents | 58 (34.5) | 110 (65.5) | 168 (100) | | |
| **Living with parents (N=1545)** | | | | | |
| Both | 245 (19.1) | 1037 (80.9) | 1282 (100) | 2.804 | **0.246** |
| Father alone | 18 (20.7) | 69 (79.3) | 87 (100) | | |
| Mother alone | 43 (24.4) | 133 (75.6) | 176 (100) | | |

| Variable | Depressed (%) | Not Depressed (%) | Total (%) | $\chi^2$ value | P value ($\alpha$=0.05) |
|---|---|---|---|---|---|
| **Not Living with parents (N= 168)** | | | | | |
| Relative | 35 (29.4) | 84 (70.6) | 119 (100) | 10.713[a] | **0.001*** |
| Family Friend | 12 (33.3) | 24 (66.7) | 36 (100) | | |
| Others | 11 (84.6) | 2 (15.4) | 13 (100) | | |
| **Changed living locations** | | | | | |
| Yes | 147 (26.6) | 406 (73.4) | 553 (100) | 13.879 | **0.000*** |
| No | 217 (18.7) | 943 (81.3) | 1160 (100) | | |
| **Work after school** | | | | | |
| Yes | 107 (20.7) | 411 (79.3) | 518 (100) | 0.156 | **0.748** |
| No | 257 (21.5) | 938 (78.5) | 1195 (100) | | |
| **Partake in sports** | | | | | |
| Yes | 255 (19.4) | 1058 (80.6) | 1313 (100) | 11.230 | **0.001*** |
| No | 109 (27.3) | 291 (72.8) | 400 (100) | | |
| **School type** | | | | | |
| Private | 107 (22.6) | 366 (77.4) | 473 (100) | 0.735 | **0.391** |
| Public | 257 (20.7) | 983 (79.3) | 1240 (100) | | |

[a] *Linear-by-Linear Association was used as an exact test of significance in place of Pearson's Chi Square which was used for the others.*

**Significant at 5% level of significance/ 95% Confidence Interval.*

## 4.8: Associations between Depression Status and Assessment of Performance and Perception.

Going by information displayed on Table 4.9, adolescents who reported embarrassment by the financial status of their families were identified as more depressed (27.8%) than those that were not embarrassed by the financial status of their families (18.9%) with P value < 0.001.

A relationship was also observed between maltreatment status and the presence of depressive symptoms as a higher proportion of those who perceived themselves as maltreated were identified as depressed (27.2%) as opposed to those who did not have this perception (18.5%) and this displayed P value < 0.001. Furthermore, the type of maltreatment was also associated with the occurrence of depressive symptoms (P value < 0.001) as those who perceive themselves to have been sexually assaulted had the highest occurrence (53.5%), physically maltreated (25.9%) and those psychologically maltreated (22.0%).

Adolescents who reported a persistent health condition had a higher proportion of depressive symptoms (29.8%) in comparison with those who do not (14.8%) and P value < 0.001.At P value < 0.001, a significant relationship is observed between the existence of depression among in-school adolescents and their use and non-use of drugs for stated disease conditions. The highest proportion was found among those who reported specific disease conditions but do not use drugs (31.5%); second to this is the proportion found among those who are diseased and use drugs (27.9%); those who use drugs despite the fact that they have no corresponding illness reported a higher proportion for depressive symptoms (19.0%) than counterparts that do not have diseases and so do not use drugs (14.3%).

A significant difference exists in the occurrence of depressive symptoms among those with high educational performance (16.5%) when compared to those with low educational performance (22.2%), Pvalue = 0.037, Kappa value = 0.50 with significance of 0.036.

**Table 4.9: Associations between Depressed Status and Assessment of Performance and Perception of Participants.**

| Variable | Depressed (%) | Not Depressed (%) | Total (%) | $\chi^2$ value | P value ($\alpha$=0.05) |
|---|---|---|---|---|---|
| **Embarrassed by family financial status** | | | | | |
| Yes | 125 (27.8) | 325 (72.2) | 450 (100) | 15.545 | 0.000* |
| No | 239 (18.9) | 1024 (81.1) | 1263 (100) | | |
| **Maltreatment status** | | | | | |
| Yes | 146 (27.2) | 391 (72.8) | 537 (100) | 16.486 | 0.000* |
| No | 218 (18.5) | 958 (81.5) | 1176 (100) | | |
| **Form of maltreatment (N= 537)** | | | | | |
| Physical | 95 (25.9) | 272 (74.1) | 367 (100) | 17.035 | 0.000* |
| Psychological | 28 (22.0) | 99 (78.0) | 127 (100) | | |
| Sexual | 23 (53.5) | 20 (46.5) | 43 (100) | | |
| **Perpetrators of maltreatment (N= 537)** | | | | | |
| Parent | 54 (18.5) | 238 (81.5) | 292 (100) | 26.670 | 0.000* |
| Relative | 35(41.7) | 49 (58.3) | 84 (100) | | |
| Neighbour | 23 (33.3) | 46 (66.7) | 69 (100) | | |
| Friend | 23 (40.4) | 34 (59.6) | 57 (100) | | |
| Others | 11 (31.4) | 24 (68.6) | 35 (100) | | |
| **Presence of persistent health condition** | | | | | |
| Yes | 219 (29.8) | 517 (70.2) | 736 (100) | 11.295 | 0.000* |
| No | 145 (14.8) | 832 (85.2) | 977 (100) | | |

Table 4.9: Associations between Depressed Status and Assessment of Performance and Perception of Participants.

| Variable | Depressed (%) | Not Depressed (%) | Total (%) | $\chi^2$ value | P value ($\alpha$=0.05) |
|---|---|---|---|---|---|
| **Embarrassed by family financial status** | | | | | |
| Yes | 125 (27.8) | 325 (72.2) | 450 (100) | 15.545 | 0.000* |
| No | 239 (18.9) | 1024 (81.1) | 1263 (100) | | |
| **Maltreatment status** | | | | | |
| Yes | 146 (27.2) | 391 (72.8) | 537 (100) | 16.486 | 0.000* |
| No | 218 (18.5) | 958 (81.5) | 1176 (100) | | |
| **Form of maltreatment (N= 537)** | | | | | |
| Physical | 95 (25.9) | 272 (74.1) | 367 (100) | 17.035 | 0.000* |
| Psychological | 28 (22.0) | 99 (78.0) | 127 (100) | | |
| Sexual | 23 (53.5) | 20 (46.5) | 43 (100) | | |
| **Perpetrators of maltreatment (N= 537)** | | | | | |
| Parent | 54 (18.5) | 238 (81.8) | 292 (100) | 26.670 | 0.000* |
| Relative | 35(41.7) | 49 (58.3) | 84 (100) | | |
| Neighbour | 23 (33.3) | 46 (66.7) | 69 (100) | | |
| Friend | 23 (40.4) | 34 (59.6) | 57 (100) | | |
| Others | 11 (31.4) | 24 (68.6) | 35 (100) | | |
| **Presence of persistent health condition** | | | | | |
| Yes | 219 (29.8) | 517 (70.2) | 736 (100) | 55.295 | 0.000* |
| No | 145 (14.8) | 832 (85.2) | 977 (100) | | |

| Variable | Depressed (%) | Not Depressed (%) | Total (%) | $\chi^2$ value | P value ($\alpha$=0.05) |
|---|---|---|---|---|---|
| **Drug use for stated health condition** | | | | | |
| Yes | 100 (27.9) | 258 (72.1) | 358 (100) | 1.108 | **0.293** |
| No | 119 (31.5) | 259 (68.5) | 378 (100) | | |
| **Health condition/ drug use** | | | | | |
| Health condition, uses drugs | 100 (27.9) | 258 (72.1) | 358 (100) | 58.613 | **0.000*** |
| Health condition, no drugs | 119 (31.5) | 259 (68.5) | 378 (100) | | |
| No health condition, uses drugs | 23 (19.0) | 98 (81.0) | 121 (100) | | |
| No health condition, no drugs | 122 (14.3) | 734 (85.7) | 856 (100) | | |
| **Assessment of Educational Performance** | | | | | |
| High | 46 (16.5) | 232(83.5) | 278 (100) | 4.385 | **0.037*** |
| Low | 318(22.2) | 1117 (77.8) | 1435 (100) | | |

## 4.9 Regression of Depression Status on Statistically Significant Variables

Respondents of Christian religion have 1.40 times more likely (95% C.I = 1.09 – 1.80) to be depressed than those of Islamic religion. This was found to be statistically significant at P = 0.008.

Late adolescent respondents, aged 17-19 years, are 1.46 times more likely (95% C.I = 1.01 – 2.12, P value= 0.046) to be depressed in comparison with mid adolescent respondents (14-16 years). Also, early adolescents (10-13 years) were observed to be 1.04 times more likely to develop depression as opposed to mid adolescents ( 95% C.I = 0.80 – 1.36, P value = 0.752).

As pertaining to number of siblings, respondents with more than 6 siblings were found to be 1.72 times more depressed (95% C.I=1.12-2.63, P value = 0.013) than those with 2 or less siblings. With a significant value of P = 0.007, respondents who do not live with their parents were found to be 1.64 times more likely to be depressed (95% C.I= 1.14 – 2.36) than those who do not live with their parents.

Sporting activity displays a highly significant association (P value = 0.007) with the existence of depression as those who do not partake in sporting activities are more likely to develop depression than those who do (O.R= 1.45, 95% C.I = 1.11 – 1.92).

Respondents embarrassed by their families' financial status were found to have 1.4 times higher risk of being depressed than their counterparts who were not. This result has a significance value of 0.017 and a 95% confidence interval of 1.06-1.81. Maltreated respondents were about 1.3 times more likely (95% C.I = 1.00 – 1.67) to be depressed than those not maltreated, P value = 0.054.

Presence of persistent health condition has a highly significant relationship with depression status as those who had persistent health conditions were found to be 2.30 times more likely (P value=0.000, 95% C.I=1.80 – 2.94) than those who reported not having persistent health conditions.

The Hosmer and Lemeshow goodness of fit had a significance of 0.094.

**TABLE 4.10: Regression of Depression Status on Significant Correlates**

| Variable | Odds Ratio (OR) | 95% C.I OR | P value |
|---|---|---|---|
| **RELIGION** | | | |
| Christianity | 1.40 | 1.09 --- 1.80 | 0.008* |
| Islam (Ref) | 1.00 | ----- | |
| **AGE IN 3 GROUPS** | | | |
| Late, 17-19 | 1.46 | 1.01 --- 2.12 | 0.046* |
| Early, 10-13 | 1.04 | 0.80 --- 1.36 | 0.752 |
| Mid, 14-16 (Ref) | 1.00 | ----- | |
| **NUMBER OF SIBLINGS** | | | |
| >=6 | 1.72 | 1.12 --- 2.63 | 0.013* |
| 3-5 | 1.30 | 0.96 --- 1.75 | 0.089 |
| 0-2 (Ref) | 1.00 | ----- | |
| **LIVE WITH PARENTS** | | | |
| No | 1.64 | 1.14 --- 2.36 | 0.007* |
| Yes (Ref) | 1.00 | ----- | |
| **CHANGED LIVING LOCATION** | | | |
| Yes | 1.46 | 1.13 --- 1.88 | 0.003* |
| No (Ref) | 1.00 | ----- | |
| **PARTAKE IN SPORTS** | | | |
| No | 1.45 | 1.11 --- 1.92 | 0.007* |
| Yes (Ref) | 1.00 | ----- | |
| **EMBARASSED BY FINANCIAL STATUS** | | | |
| Yes | 1.39 | 1.06 --- 1.81 | 0.017* |
| No (Ref) | 1.00 | ----- | |
| **MALTREATMENT STATUS** | | | |
| Yes | 1.29 | 1.00--- 1.67 | 0.054 |
| No (Ref) | 1.00 | ----- | |
| **PRESENCE OF PERSISTENT HEALTH CONDITION** | | | |
| Yes | 2.30 | 1.80 --- 2.94 | 0.000* |
| No (Ref) | 1.00 | | |

*: Significant at 5% level of significance/ 95% Confidence Interval.

## 4.10: Assessment of Depression Screening Instruments, PHQs

PHQ 9 displayed a reliability value of 0.78 (Cronbach's α) among this population using 328 cases for all the items of the instrument.

As portrayed in Table 4.11 below, with a cut-off of 3, PHQ 2 displayed a Positive Predictive value of 66.8% while PHQ (7+4) had PPV of 60.6% and PHQ (8+7) had PPV of 63.3%.

In **Table 4.12,** the best trade-off point of PHQ 2 was at >= 2.0. At this level, the instrument displayed a sensitivity of 72% and specificity of 80%.

The Area under the ROC curve was 0.829 when the sensitivity and 1- specificity of PHQ-2 was plotted using the PHQ9 as standard (Table 4.13).

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The Area under the ROC curve was 0.829 when the sensitivity and 1- specificity of PHQ-2 was plotted using the PHQ9 as standard (Table 4.13).

Table 4.11: Validity testing for PHQs '1+2', '7+4' and '8+7'.

| Screening Tool | PPV | NPV | Kappa |
|---|---|---|---|
| PHQ(1+2) | 66.8% | 88.1% | 0.500 |
| PHQ (8+7) | 63.3% | 91.6% | 0.568 |
| PHQ (7+4) | 60.6% | 92.0% | 0.556 |

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| Screening Tool | PPV | NPV | Kappa |
|---|---|---|---|
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| PHQ (8+7) | 63.3% | 91.6% | 0.568 |
| PHQ (7+4) | 60.6% | 92.0% | 0.556 |

**Table 4.12: Sensitivity and Specificity values of PHQs '1+2', '7+4' and '8+7'.**

| Cut-off | PHQ-2 | | PHQ (8+7) | | PHQ (7+4) | |
|---|---|---|---|---|---|---|
| Positive if greater or equal to | Sensitivity (%) | Specificity (%) | Sensitivity (%) | Specificity (%) | Sensitivity (%) | Specificity (%) |
| 1.0 | 91.5 | 49.0 | 96.4 | 46.4 | 97.3 | 41.4 |
| 2.0 | 71.7 | 80.4 | 87.1 | 83.8 | 89.6 | 68.5 |
| 3.0 | 53.6 | 92.8 | 69.8 | 89.1 | 72.0 | 87.4 |
| 4.0 | 26.9 | 99.0 | 37.1 | 97.1 | 44.0 | 96.1 |
| 5.0 | 11.8 | 99.6 | 20.1 | 99.3 | 18.4 | 99.2 |
| 6.0 | 3.0 | 99.9 | 6.0 | 99.9 | 6.6 | 99.9 |

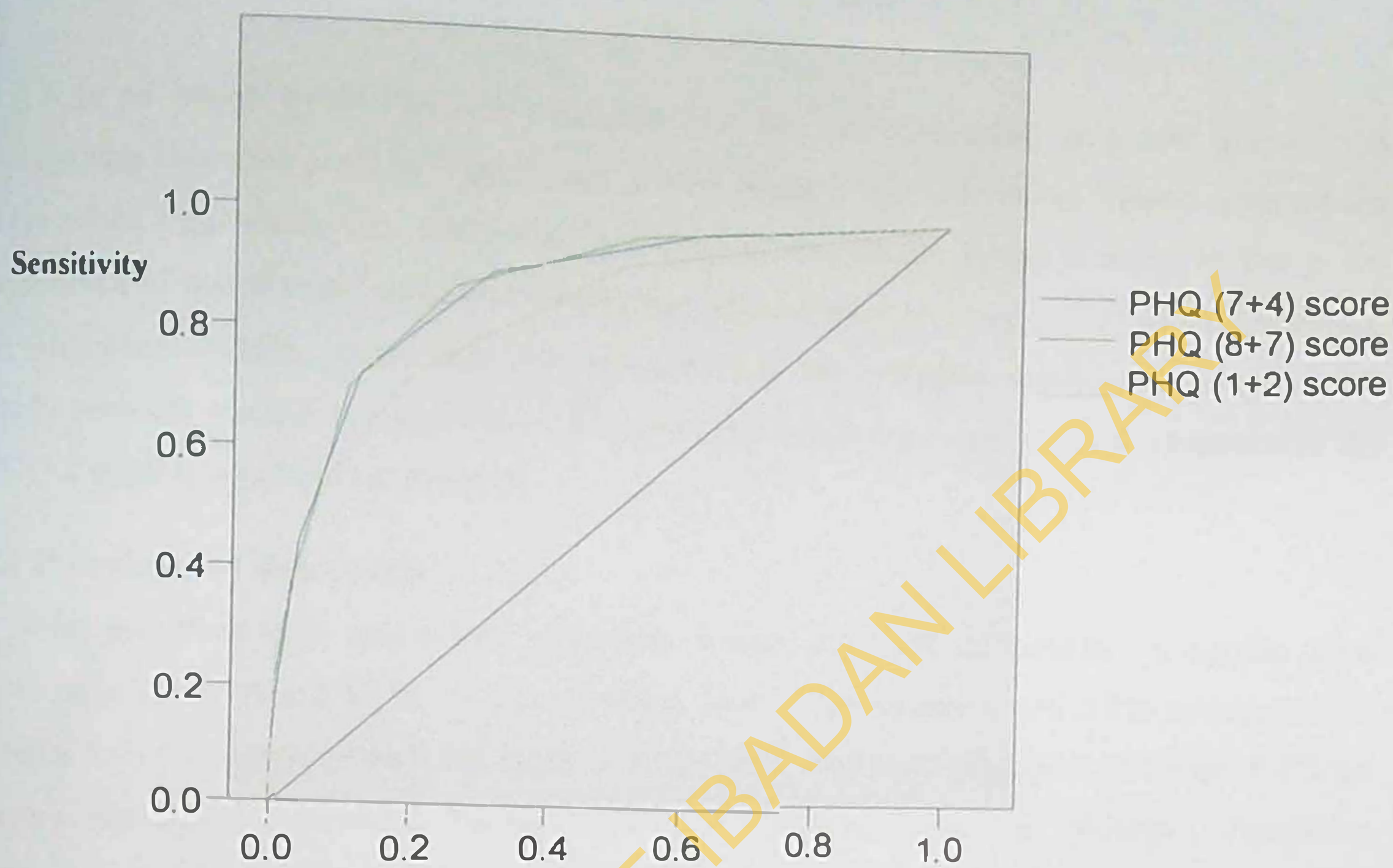


**Figure 4.7: Receiver Operating Curve for PHQs '1&2', '8&7' and '8&7'.**

**Table 4.13: Area under the Receiver Operating Characteristic (ROC) Curve**

| Test Result Variable(s) | Area | Std. Error(a) | Asymptotic Sig.(b) | Asymptotic 95% Confidence Interval | |
|---|---|---|---|---|---|
| PHQ2 (1+2) | .829 | .013 | .000 | .804 | .855 |
| PHQ (8+7) | .877 | .010 | .000 | .857 | .897 |
| PHQ (7+4) | .873 | .010 | .000 | .853 | .894 |

S. Under the nonparametric assumption

# CHAPTER FIVE

# DISCUSSION

It is no longer news that non-communicable diseases have taken on a new relevance in developing countries such as Nigeria and mental health is not left behind. Indeed, gone are the days when depression was considered a disease of the elderly. Focus is being shifted to the occurence of this disease condition among the young. This is not ungrounded as the occurrence of adolescent suicide, crime and other misnomers is fast becoming regular. The scope of this study revolves around the prevalence of depressive symptoms, correlates and validation of the PHQ-2 among in-school adolescents.

## 5.1 Prevalence of depression:

The prevalence of depressive symptoms among in-school adolescents in Egbeda local government was found to be 21.2% of which 16.1% was moderate and 5.1% severe. This is similar to the discovery made by Adeniyi et al, 2011, who reported a prevalence of 5.7% for severe depressive symptoms among Nigerian Adolescents using the Children's Depression Inventory (CDI). He also stated that 23.8% had mild to moderate symptoms. Adewuya (2006), in his research among students in secondary schools in Ilesha, using the Beck Depression Inventory (BDI), obtained a slightly higher prevalence of severe depression, 6.9%. This may be as the result of the difference in the ages of those involved in the study. He studied the prevalence of depressive symptoms among adolescents, aged between 13-18, among whom we observed a higher prevalence as well. It is therefore exciting to note the similarities observed in these studies despite the differences in the instruments used. Counselling (CBT) is the most effective and cost-effective option for the first line treatment of MDD in children and adolescents (Haby et al, 2004). Thus counselling clinics should be established in secondary schools or reinforced where they already exist. School counsellors also need to be trained on what to look out for and what to do in case depressed students are identified.

The prevalence of depressive symptoms observed in this study was slightly higher in Private schools (22.6%) than in Public schools (20.7%) though this was not a significant difference (P value= 0.391). Adeniyi in a similar study conducted in a more metropolitan part of Ibadan

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The prevalence of depressive symptoms observed in this study was slightly higher in Private schools (22.6%) than in Public schools (20.7%) though this was not a significant difference (P value= 0.391). Adeniyi in a similar study conducted in a more metropolitan part of Ibadan

however identified a significant difference between the two school types. Similarity in the social structure of the population in Egbeda Local Government may be contributory to this observation.

## 5.2 Socio-demographic correlates of depression

Unlike what was observed by Adewuya (2007) and Adeniyi (2011), this study showed no serious disparity in the prevalence of depressive symptoms between male and female adolescent students. Although this present study showed a higher prevalence of depressive symptoms among females (21.9% vs 20.5%), the difference was not statistically significant ( P value = 0.514) unlike what was reported in the studies mentioned above. However in a study carried out by Hansson et. al (2009) among out-patients in Sweden , it was also reported that the difference between males and females scoring ≥10 on the PHQ-9 was not significant.

As observed by a variety of other studies, the occurrence of depressive symptoms increased directly with each year increase in age. The lowest in the range (10-19 years) was observed in 10 year olds and the highest among 19 year olds (Fig 4.5). There was however a lull in the 14 and 15 year olds. This may be explained by the fact that the early range, 10-13 signals the onset of puberty while the late range, 17-19, the struggle for independence. It may also be important to note that majority of those in this latter group were older than their classmates and this in itself could result in depression. Also, the mean age of those classified as depressed was significantly higher than was observed in those not classified as depressed. This shows that odds of depression does increase with age. This is supported by reports of the NSDUH, 2005 which stated that adolescents aged 16 or 17 were more than twice as likely to report past year MDE as those aged 12 or 13 (12.3% vs. 5.4%). Gitanjali, 2004 also stated that prevalence of depressive symptoms increased by age among students aged between 11-15 years.

Respondents of Christian religion reported higher occurrence of the symptoms of depression. There is the tendency for differential response bias in the reponses of the participants that may be based on religious classification.

The number of siblings that an adolescent has, had a direct relationship with the occurrence of depressive symptoms (Table 4.8 & 10). This may be as a result of the fact that more often than not, there is less attention and fewer resources available to each of the children in a large family where there are more children than can be effectively managed by the resources available to the

caretakers in the family. In another research conducted by Adewuya and Oloba, large family size was a predictor of depression among university students (Adewuya et.al, 2006).

In the same vein, it is worthy of note that adolescents living with other people apart from their biological parents had significantly higher odds of being depressed (Table 4.8 & 10). Of those who live with others, those who live with relatives had the least odds of being depressed and those who live with others (strangers and boarders) have over 80% probability of being depressed. This should inform the choices that caregivers take on behalf of their wards.

As observed by Adeniyi (2011), among others, participation in sporting activities reduced the odds of coming down with depression among adolescent by 1.5 fold, pointing out that high physical activity may actually protect adolescents from depression. In the words of Ekezie et. Al (2011), *"all our analyses pointed to the fact that those who had lower physical activities had higher levels of depressive symptoms."* This study also discovered that adolescents who do not particpate in sporting activities at all have almost a 50% higher odds of being depressed (Table 4.10). This may be a reason why depression appears to be on the rise among adolescents as the level of physical activities that adolescents undergo has fallen drastically in recent times. Both in school and at home, sports and recreation are fast losing ground among adolescents as there are numerous alternatives to while away time which do not include physical exertion of any sort.

Embarrassment for whatever reason has a tendency to predispose adolescents to depression as they are very sensitive to the perceived opinion of others about them. This study however enquired about their embarrassment based on their family financial status and discovered that those who reported embarrassment had significantly higher odds of depression. In a study carried out by Amoran among singles,using the PHQ, he reported that concerns for finance was a significant predictor for the occurrence of depression among them (Amoran et.al, 2012) . Well, as much as this may inform care-givers, emphasis should also be placed on educating the adolescents on their perception.

## 5.3 Maltreatment Status, Health Condition and Drug use.

Maltreatment actually means a lot of things to adolescents; ranging from their expected duties to discipline for wrong actions to abuse. The truth however is that adolescent depression is not based on reality, it is actually perception-based, thus this study sought to find out about their

perceived maltreatment and made no claims to confirm the existence of this. True as it may be that adolescents often have the tendency to exaggerate discipline and perceive themselves as being maltreated, yet it is beyond chance that maltreatment status, form of maltreatment and the perceived perpetrators are significant predictors of the occurrence of depressive symptoms. Those who perceived themselves abused or maltreated were significantly predisposed to depression (27.2% vs 18.5%). Also those who reported sexual maltreatment had a twice raised odds of being depressed as opposed to those who reported physical and psychological maltreatment. What I consider the most interesting however is the disparity in the occurrence of depression based on the reported perpetrator; those that reported their parents maltreated them had the least prevalence of depressive symptoms (18.5%) as opposed to relatives (41.7%), neighbours (33.3%) and frend (40.4%). This further underscores the risk that parents put their wards in when they are put in the care of others.

The presence of persistent health conditions gives a twice raised odds of being depressed and this is similar to what was reported by the World Health Survey, 2007 that the presence of co-morbidities increased the risk of depression. Among those who reported specific health conditions, drug use was protective. However among those who reported no health condition, drug use was predisposing. It is therefore interesting to note that while the non-use of drugs in those with disease conditions, increased their tendency to be depressed, use of drugs among those who did not report disease conditions was a predictor for the increase in depressive symptoms. Some studies have been done on drug abuse but little mention is made on drug misuse among this class of individuals. The next research question should be what exactly do adolescents use drugs for, what sort of drugs do they use and how regular is this use of drugs. This would inform stakeholders on what to address among this class of individuals.

## 5.4 Screening for depression with PHQs

The PHQs have proven to be an efficient tool for the assessment of depressive symptoms among different populations both within and outside the country. Kroenke et al (2003), in validating the PHQ 2 for depressive disorders stated a sensitivity of 62.3% and specificity of 95.4% at prevalence of 18% and cut-off of 3. Also, Nicholaas et al, 2010 reported the area under the ROC curve of the PHQ-2 as 0.83 with a specificity of 0.94 and sensitivity of 0.42 at

threshold of 3. The PHQ 2 in this study had a sensitivity and specificity trade-off of 53.6% and 92.8% respectively at 21% prevalence and cut-off of 3. It also had an AUC of 0.83.

The instrument however identified fewer people as depressed than was identified by the gold standard. This hints at the fact that among this population, PHQ 2 alone may not be an effective screening tool and other questions within the PHQ 9 should be considered alongside the first 2 questions. The combinations of the 7th and 4th items, and the 8th and 7th items gave better sensitivity/specificity combinations than did that of the 1st two items. They also yielded a higher agreement with PHQ 9 as their ROC curves were closer to 1 (Table 4.6, 4.7, 4.11, 4.12).

Thus, a thorough look at the 7th variable "*Trouble concentrating on things such as reading or watching television?*" may add strength to the ability of the PHQ 2 to screen for depressive symptoms among this population. The PHQ 2 however displayed a higher PPV than the other two. This shows that of the 3 combinations, that of the first 2 items, PHQ 2 still has a higher strength of prediction than the other two. Further research would be required to validate this instrument among this group of individuals.

## 5.5 Limitations of the study

A couple of issues might have introduced a bit of a bias in this study, chief of which is the study design. By nature, a crosss-sectional study does not have the ability to establish causality. It however has the advantage of being able to study a large group of people at a single point in time and thus evaluate prevalence. It is also able to identify correlates and predict associations.

Also the instrument used only has the capacity to screen for depression by identifying the presence of symptoms, it can not diagnose depression. Thus proper clinical interview would be required as a follow up to actually diagnose depression in those identified as positive.

The issue of self-reporting may also pose a bias as recalling of respondents may be altered leading to recall bias. The possibility of differential recall by the respondents may thus lead to a misclassification bias.

## 5.6 Conclusion

Beyond doubt, adolescent depression needs to be given better attention in the country, largely because several of the identified predictors are modifiable. This study has served a variety of purposes and has achieved much by underscoring the need to pay attention to the emotional and psychological wellbeing of in-school adolescents as there is greater risk of depression among them than is being catered for. The government and all stake holders therefore need to join hands to further ensure the safety of adolescents in the community as depression and its concommitant vices, such as suicide, crime, drug abuse e.t.c are on the rise and must be curbed if the future of the youth would be safe-guarded.

**Recommendations**

Thus the following recommendations are made:

1. Family planning should be further strengthened in Egbeda Local Government and in the state at large as higher numbers of siblings tend to predispose adolescents to depression.
2. Parents should also be encouraged to keep their children living with them as much as possible and when that is not, the alternative taken should be someone as related to the child as can be.
3. In-school adolescents should be educated on maltreatment and how to minimize their susceptibility to maltreatment as this would in turn reduce the occurrence of depression among them. Also, options should be made available for adolescents to report maltreatment and be counselled to prevent further complications of such abuse.
4. In-school adolescents also need to be educated on drug abuse and misuse while more attention should be paid to aid rapid treatment in those with health conditions as this will inevitably serve to enhance their mental health.
5. Increased physical activity also needs to be encouraged among this class of individuals both in school and out of school settings.
6. Parents and caretakers need to be educated on depression among adolescents; its causes and consequences. This will serve to aid early detection and prevent progressions such as suicide and drug abuse.

7. Till further research proves otherwise, PHQ 9 and not PHQ 2 should be retained as a screening tool for depressive symptoms among in-school adolescents alongside other validated instruments.
8. More research is needed among adolescents in Nigeria to promote awareness, validate brief and available screening tools and provide available, acessible and suitable therapy for this class of individuals.

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# APPENDIX I

## PUBLIC SCHOOLS IN EGBEDA LOCAL GOVERNMENT

| S. NO. | SCHOOL | MALE | FEMALE | TOTAL |
|---|---|---|---|---|
| 1 | Community High School Junior I, Alakia Isebo | 607 | 712 | 1319 |
| 2 | Bishop Phillips Academic Schools I | 592 | 726 | 1318 |
| 3 | Bishop Phillips Academic Schools II | 438 | 590 | 1028 |
| 4 | Bishop Phillips Academic Junior School III | 351 | 309 | 660 |
| 5 | Ilupeju Community Grammer School, Alugbo Oluwo | 123 | 61 | 184 |
| 6 | Community Commercial High School Ayede | 85 | 74 | 159 |
| 7 | Community High School Egbeda | 347 | 286 | 633 |
| 8 | Community High School Kasumu | 158 | 122 | 280 |
| 9 | Community High School I Kumapayi | 583 | 588 | 1171 |
| 10 | Community High School II Kumapayi | 449 | 464 | 913 |
| 11 | Community High School I Ogungbade | 518 | 397 | 915 |
| 12 | Community High School II Ogungbade | 460 | 405 | 865 |
| 13 | Community Grammer School, Olodo | 474 | 433 | 907 |
| 14 | Community High School Osegere | 103 | 97 | 200 |
| 15 | Community High School Owobale | 159 | 145 | 304 |
| 16 | Idi-Ito High School I, Erunmu | 456 | 416 | 872 |
| 17 | Idi-Ito High School II, Erunmu | 140 | 140 | 280 |
| 18 | Urban Day Grammer School I, Old Ife Road | 756 | 717 | 1473 |
| 19 | Urban Day Grammer School II, Old Ife Road | 516 | 641 | 1157 |
| 20 | Urban Day Grammer School III, Old Ife Road | 495 | 488 | 983 |
| 21 | Urban Day Grammer School IV, Alarere | 411 | 483 | 894 |
| 22 | Urban Day Grammer Junior School V, Olode | 244 | 250 | 494 |
| 23 | Urban Day Grammer School VI, Old Ife Road (Efun) | 164 | 226 | 390 |
| 24 | Urban Day Junior Grammer School VII, Adegbayi | 226 | 244 | 470 |
| 25 | Community High School, Ajagba, Wakajaiye | 421 | 454 | 875 |
| 26 | Community Grammer Junior School, Olodo Akinlumo | 90 | 81 | 171 |
| 27 | Community Junior High School, Alalubosa | 222 | 252 | 474 |
| 28 | Christ Anglican Secondary School, Akinfenwa | 226 | 283 | 509 |
| | TOTAL | 9,814 | 10,084 | 19,896 |

## PRIVATE SCHOOLS IN EGBEDA LOCAL GOVERNMENT

| S. No. | SCHOOL | NUMBER |
|---|---|---|
| 1 | Providence High School | 350 |
| 2 | Sow the Seed Model College | 150 |
| 3 | Morning Star College | 250 |
| 4 | Achievers Comprehensive College | 250 |
| 5 | Amazing Grace College | 120 |
| 6 | Samuel Memorial College | 80 |
| 7 | Stars Comprehensive College | 200 |
| 8 | Al-hayyu Model College | 120 |
| 9 | Ibadan City Model College | 300 |
| 10 | De-Ayo International College | 120 |
| 11 | Deril Model College | 200 |
| 12 | Bethel Comprehensive College | 250 |
| 13 | Tim-Carol College | 80 |
| 14 | Ore-Ofe Oluwa College | 150 |
| 15 | God is Able College | 70 |
| 16 | Thy Will College | 50 |
| 17 | Victor College | 80 |
| 18 | Educational Legacy | 180 |
| 19 | Fazil-ol- Omer Ahmadi-ia College | 70 |
| 20 | Global School of Science | 250 |
| 21 | OliveBranch College | 200 |
| 22 | Prince International College | 80 |
| 23 | Steadfast Comprehensive College | 100 |
| 24 | Davies High School | 40 |
| 25 | Bim-bol College | 30 |
| 26 | Bomac High School | 50 |
| 27 | Spring of Wisdom High School | 100 |
| 28 | David Joe Private College | 60 |
| 29 | East Gate Secondary School | 100 |
| 30 | Christ Life College | 100 |
| 31 | Olatundun College | 90 |
| 32 | Treasure land College | 80 |
| TOTAL | 32 | 4510 |

Source: Local Inspector of Education, Egbeda Local Government Office, SDP Road, Ibadan.

TELEGRAMS.....

TELEPHONE.....

# MINISTRY OF HEALTH

## DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

*Your Ref. No. .....*

*All communications should be addressed to the Honorable Commissioner quoting*

Our Ref. No AD 13/ 479/____ 4th May, 2012

The Principal Investigator,
Department of Epidemiology,
Medical Statistic & Environmental Health,
College of Medicine,
University of Ibadan,
Ibadan.

**Attention: Kumapayi Temilolu Eunice**

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "*Depressive Symptoms and Correlates among In-School Adolescents in Egbeda local Government Area of Oyo State.*"

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey, to you, the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the committee will monitor, closely, and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

4. Wishing you all the best,

OYO STATE RESEARCH ETHICAL REVIEW COMMITTEE
Signature & Date

Mrs. A. Adepoju
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

## INFORMED CONSENT

My name is *KUMAPAYI Temilolu Eunice*, a postgraduate student of the department of Epidemiology, Public Health, University College Hospital, Ibadan. I am conducting a research investigating the factors responsible for *"Depressive symptoms and correlates among in-school adolescents"*. This will require you to fill a questionnaire, which will take not more than 30 minutes of your time.

I assure you that no portion of the information that you disclose will be released to a third party. It will also be ensured that code numbers are used for all the research so that information given will not be traceable to you.

The information obtained will be used to inform recommendations to the authorities of your institution, as well as the state Ministry of Education on methods to employ to facilitate your wellbeing. I will therefore implore you to be as honest and as sincere as possible in answering the questions as whatever information is obtained will be of great benefit to you.

It is also important for you to know that you are under no obligation whatsoever to participate in this study. On receiving this information, if you are uncomfortable with the demands of the research, you are free to opt out without any form of retribution whatsoever. However if you are willing to participate in this research, I would be much obliged if you would proceed to fill out this questionnaire honestly.

THANK YOU.

**Consent:** On receipt of the above information and having understood the demands and implications involved, I am willing to participate in this research.

_____

SIGNATURE & DATE



## DEPRESSIVE SYMPTOMS AND CORRELATES AMONG IN-SCHOOL ADOLESCENTS IN EGBEDA LOCAL GOVERNMENT

**Please tick the appropriate option for each question and elaborate where required.**

### A) Socio-demographic Questionnaire

1. What is your gender? a) male b) female
2. What was your age at your last birthday? .....
3. What is your religion? a)Christianity b)Islam c)Traditional d)others

   If others, please specify .....
4. Do you live with your parents a)yes b)no
5. If yes, please specify a)both b) father c)mother

6. If no, please state who you llve with a) relative b) family friend

c) stranger d) others. If others, please state.....

7. Has your living location changed within the last six months? a)yes b)no

8. How many siblings do you have? .....

9. What position (number) are you among your siblings? a)first b)last c)others

If others, please specify .....

10. What structure does your family have? a)monogamy b)polygamy c)polyandry

11. Do you go to work after school hours? a)yes b)no

12. Does the financial status of your family embarrass you? a)yes b)no

13. Have you ever been maltreated in any one of the following ways? a)yes b)no

a) Physically (*excessive or groundless corporal punishment or manhandling)*

*b)* Psychologically (*addressed in a condescending, abusive or threatening manner, denied of usual benefits or excluded in a manner which threatens your mental wellbeing)*

c) Sexually (*touched in ways that make you uncomfortable without your permission or coerced to perform sexual acts against your wish)*

14. If yes, by whom? a)parent b)relative c)neighbor d)friend e)stranger

f) teacher

15. Do you have any persistent (continuing for a long period of time or recurring on a daily to weekly basis) health conditions? a)yes b)no

16. If yes, please specify a) allergies b) kidney disease c) heart disease

d) sleeplessness e)physical disability f) ulcer g)others.

17. If others, please state.....

18. Are you on medication (drugs) for any of the above? A) yes b)no.

19. Do you take any form of medications for whatsoever reason outside of stated disease conditions? a)yes b)no

20. Do you regularly partake in any sporting activities? A) yes b)no

If yes, please state sport.....

6. If no, please state who you live with a) relative b) family friend
   c) stranger d) others. If others, please state.....
7. Has your living location changed within the last six months? a)yes b)no
8. How many siblings do you have? .....
9. What position (number) are you among your siblings? a)first b)last c)others
   If others, please specify .....
10. What structure does your family have? a)monogamy b)polygamy c)polyandry
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    *b)* Psychologically (*addressed in a condescending, abusive or threatening manner, denied of usual benefits or excluded in a manner which threatens your mental wellbeing*)

    c) Sexually (*touched in ways that make you uncomfortable without your permission or coerced to perform sexual acts against your wish*)

14. If yes, by whom? a)parent b)relative c)neighbor d)friend e)stranger
    f) teacher
15. Do you have any persistent (continuing for a long period of time or recurring on a daily to weekly basis) health conditions? a)yes b)no
16. If yes, please specify a) allergies b) kidney disease c) heart disease
    d) sleeplessness e)physical disability f) ulcer g)others.
17. If others, please state.....
18. Are you on medication (drugs) for any of the above? A) yes b)no.
19. Do you take any form of medications for whatsoever reason outside of stated disease conditions? a)yes b)no
20. Do you regularly partake in any sporting activities? A) yes b)no
    If yes, please state sport.....

## B) Patient Health Questionnaire-9 (PHQ-9)

**Over the past two weeks (14 days), how often have you been bothered by any of the following problems,**

1. Feeling little or no interest or pleasure in doing things?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

2. Feeling down, depressed or hopeless?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

3. Trouble falling asleep, staying asleep or sleeping too much?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

4. Feeling tired or having little energy?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

5. Poor appetite or overeating? ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

6. Feeling bad about yourself or that you are a failure, have let yourself or your family down?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

7. Trouble concentrating on things such as reading or watching television?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

8. Moving or speaking so slowly that other people have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual?

   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

9. Thoughts of harming yourself or that you would be better off dead?

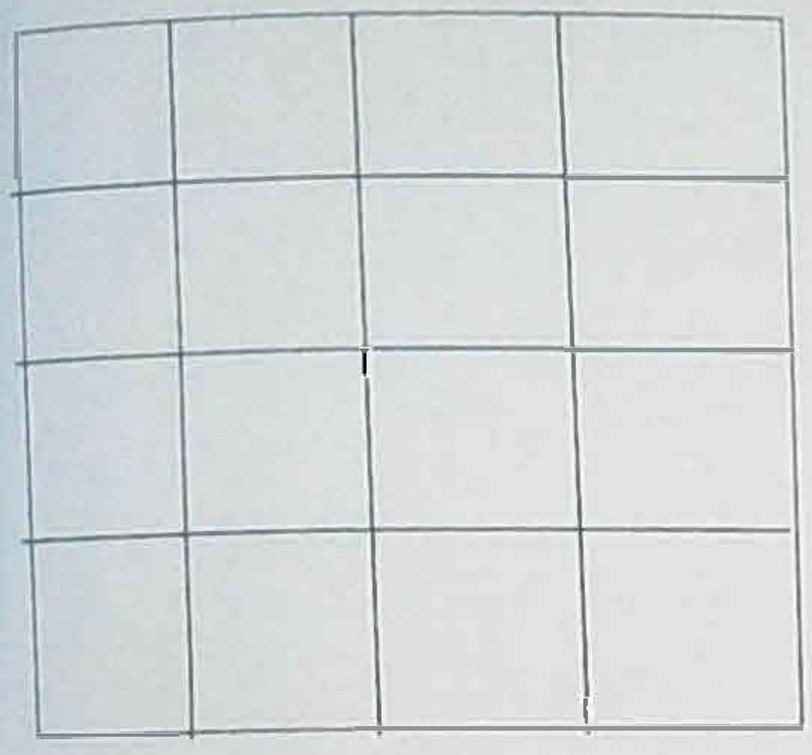
   ○ 0-1 day ○ 2-6 days ○ 7-11 days ○ 12-14 days

**If you checked off any of the above, how difficult have any of the above problems made it for you to do your work, take care of things at home or get along with other people?**

Not at all difficult  A little difficult  Very difficult  Extremely difficult

## C) Educational Performance Assessment

The aim is to enter digits from 1-4 and 1-6 respectively in each cell of a 4×4 and 6×6 cell made up of a 2×2 and 2×3 sub-grid respectively. Starting with some pre-given digits in some cells, each row column and sub-grid must contain only one instance of each digit.



**THANK YOU VERY MUCH FOR PARTICIPATING.**