

**ANALYSIS OF AFFECTIVE DISORDERS AND ITS  
ASSOCIATION WITH RESILIENCE AND OTHER SOCIO  
DEMOGRAPHIC FACTORS AMONG PRIMARY SCHOOL  
CHILDREN IN KENYA USING BINARY LOGISTIC  
REGRESSION**

**BY**

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**DECLARATION AND AUTHORSHIP**

I, Christine Wayua Musyimi declare that I am the sole author of this thesis and it contains no material previously published or written by another person except where acknowledgement has been made in the text.

I certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree.

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**CERTIFICATE OF APPROVAL**

This thesis has been submitted for the degree of Master of Science in Medical Statistics with my approval as a University Supervisor.

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## **LIST OF ABBREVIATIONS**

**YSR:** Youth Self Report

**ADM:** Assessment Data Manager

**ASEBA:** Achenbach System of Empirically Based Assessment

**DSM:** Diagnostic and Statistical Manual

**WHO:** World Health Organization

**YLD:** Years Lost to Disability

**ER:** Ego Resilience

**OR:** Odds Ratio

**CI:** Confidence Interval

## **DEFINITION OF TERMS**

**Affective disorder:** According to the Youth Self Report (YSR), the DSM-Oriented scales scored for affective disorders have items consistent with Dysthymia and Major Depressive Disorder from the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV). Therefore, affective disorder has been herein used to mean depressive disorders.

**Depression:** This is a mental disorder characterized by sadness, loneliness or emotional isolation accompanied by physical symptoms such as poor appetite, weight and sleep disturbances as well as impaired individual daily functioning.

**Mental disorder/psychiatric disorder/mental illness:** This is a mental or behavioural pattern or anomaly that causes either suffering or an impaired ability to function in ordinary life (disability).

**Resilience:** The ability to effectively adapt to deleterious effects of stress and difficulties and in the process maintain psychological and physical functioning or, individual's ability to cope with adversities.

**Comorbidity:** The presence of one or more additional disorders co-occurring with a primary disorder.

**Binary logistic regression:** A statistical model that estimates the probability that a characteristic is present (e.g. estimate probability of "success") given the values of explanatory variables. The dependent variable should be binary.

## **ABSTRACT**

One out of every four people in Kenya is depressed. However, resilience conceptualized as an individual's ability to cope with adversities has been shown to be one of the most protective factors against affective disorders as well as other mental disorders. This study thus aimed at exploring the relationship between affective disorders and resilience as well as other significant predictors of affective disorder among school children in Kenya. Analysis was based on secondary data from a cross sectional study that involved administration of the Youth Self Report (YSR) and socio demographic questionnaire to 23 sampled schools in Kenya. 2261 children and adolescents between standard five through seven were included in our analysis.

A total of 2261 children with a mean age 12.66 years (range 10 to 18 years) were included in our analysis. 14% of school children had affective problems with 12.8% having more than one common psychiatric disorder. Using binary logistic regression, male gender, mother's employment, being older for a particular grade, residing from a peri-urban area and having divorced or separated parents increased the likelihood of having an affective disorder. A key finding was that high resilience trait was a protective factor for affective disorders.

In conclusion, affective disorders are common among children and adolescents. Findings from this study provide evidence that resilience is a significant negative predictor of affective disorder. Therefore, fostering resilience at a younger age especially in schools and at home is crucial in preventing and reducing affective disorders and psychiatric co morbidities in order to prevent any detrimental effects as children and adolescents progress to adulthood.

# CHAPTER ONE

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## INTRODUCTION

Mental disorders have been shown to be highly disabling constituting 13% of the global burden of disease (World Health Organization, 2008). In fact, among the 10 leading cause of Years Lost to Disability (YLD), four are mental disorders with unipolar depression being the leading cause (World Health Organization, 2001).

Affective disorders as scored from the DSM-Oriented scale of the Youth Self Report (YSR) have items consistent with Dysthymia and Major Depressive Disorder from the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV) (American Psychiatric Association, 1994). Therefore, affective disorder has been herein used to mean depressive disorders. Depression is characterized by sadness, loneliness or emotional isolation accompanied by physical symptoms such as poor appetite, weight and sleep disturbances as well as impaired individual daily functioning. Its lifetime prevalence and other mood disorders is estimated to be 28.8% (Kessler et al., 2005) and thus, constitutes a public health problem as it exacts a huge toll on the individuals, families and the community at large.

Globally, depression affects 350 million people while in Kenya one out of every four people is depressed. Among children below the age of 13 years, more than one child out of every 10 is affected by depression. As a matter of fact, major depressive episode and dysthymia are present in 6% and 4% of the children respectively (Mathet F, Martin-Guehl C, Maurice-Tison S, 2003). A study carried out in Rural Southern Africa also found a 14% prevalence of depression among 10-12 year olds (M. A. Cortina, Sodha, Fazel, & Ramchandani, 2012).

Factors such as prolonged social and psychological stress particularly in early years of life have been associated with psychiatric disorders especially depression (Price, Kao, Burgers, Carpenter, & Tyrka, 2013), which has been shown to affect a child's peer and family relationships (Elizabeth Burney Hamilton, Joan R. Asarnow, 1997; Jennifer Connolly, Shari Geller, 1992), reduced academic performance (Kovacs & Goldston, 1991) as well as suicide (Phillips MR, Yang G, Zhang Y, Wang L, Ji H, 2002). However, the degree of control that an individual

possesses will determine whether the adversity will lead to vulnerability or resilience (Feder, Charney, & Collins, 2011).

One of the most protective factors against depression as well as other mental disorders is an individual's ability to cope with adversities, conceptualized as resilience (Rutter, 2006). (Southwick & Charney, 2012; Wu G, Feder A, Cohen H, Kim JJ, Calderon S, Charney DS, 2013) have also defined resilience as the ability to effectively adapt to deleterious effects of stress and difficulties and in the process maintain psychological and physical functioning. In the same studies, they have emphasized that these adversities and other stressful events may result into depression as well as other psychiatric conditions.

Three factors have been found to be related to resilience and include; risk and protective factors (environmental factors), characteristics of the individual and his or her ability to adapt after a negative life experience (Kumpfer, 1999). Recently, (Odin Hjemdal, Patrick A. Vogel, Stian Solem, 2010) stated the need for researchers to explore resilience factors while assessing for psychological symptoms as he found that higher resiliency scores were closely associated with lower levels of depression.

Prior findings from epidemiological studies have reported associations of mental disorders with risk factors such as gender, as there is male preponderance for behavioural problems with higher rate seen in girls for emotional problems (Canino G, Shrout PE, Rubio-Stipec M, Bird HR, Bravo M, Ramirez R, Chavez L, Alegria M, Bauermeister JJ, Hohmann A, Ribera J, Garcia P, 2004). The burden of depression in females is 50% higher as compared to males (World Health Organization, 2008). As a matter of fact, depression is the leading cause of disease burden for women in most of the countries in the world including high, low and middle income countries (World Health Organization, 2008). In regards to parental risk, children from single parent families and low parental education are associated with increased risk of a mental disorder in school children (Heiervang et al., 2007). In fact, low level of education is a dominating risk factor for depression (Heiervang et al., 2007). (Belle, 1990) also reported good parent-child relationships are important sources of social support, as closeness and care with family members is an important contributor to positive mental health outcomes of adolescents.

Recent data indicate that proper identification of prevalence of mental problems, notably depression is salient in reducing psychological disorders and promote resilience among primary school children (Kieling et al., 2011; Murray et al., 2012). (M. A. Cortina et al., 2012) also adds that more research to understand resilience could inform more interventions. However, relatively little is known about the prevalence of depression among primary school children in Kenya and how this is related to protective factors. This study thus explores the relationship between depression and resilience in order to identify coping mechanisms at an early age with an aim of promoting the mental wellbeing of these children.

### **JUSTIFICATION OF THE STUDY**

Depression is the most prevalent disorder among other psychiatric disorders, develop early in life and often go undetected with a treatment gap of over 67% in Africa (Kohn, R., Saxena, S., Levav, I., & Saraceno, 2004). Depression in children is associated with emotional and social impairments which affects their academic and occupational functioning in adulthood (Birmaher et al., 1996; Rao U, Ryan ND, Birmaher B, Dahl RE, Williamson DE, Kaufman J, Rao R, 1995; Weissman et al., 1999). Most of these children often experience recurrent episodes as well as suicidal thoughts and attempts (Kovacs M, 1996; Maria Kovacs, Terry L. Feinberg, Mary Ann Crouse-Novak, Stana L. Paulauskas, 1984; Weissman et al., 1999). Thus, a better understanding of the factors that lead to these consequences is crucial in prevention of first episodes of depression and hence ameliorate their mental wellbeing (Silk et al., 2007). Moreover, understanding the association between depression and resilience, a protective factor for depression and other mental and psychological problems is very crucial in providing an opportunity for processes that can be ameliorated in prevention strategies, among high-risk populations (Silk et al., 2007).

Resilience has been defined as the ability of an individual to successfully cope with stressors and adversities and thus can be used as a measure for treatment of depression (Southwick & Charney, 2012; Wu G, Feder A, Cohen H, Kim JJ, Calderon S, Charney DS, 2013). (Southwick & Charney, 2012) has also stated that, it is imperative to provide children with a supportive environment and offer them opportunities to overcome life challenges in order to be able to identify life stressors and acquire stress inoculation, defined as the capacity to develop an

adaptive stress response and more than average resilience to deleterious effects of repetitive stressors.

Nevertheless, there is no research so far in Kenya on resilience and its relationship with depression. In other countries, resilience has been shown to be a significant predictor for depression and contribute to more favorable outcomes in depressed patients (Kitamura et al., 2009; Min JA, Lee NB, Lee CU, Lee C, 2012). Our study will thus explore this relationship in a rural setting where there is scarcity of mental health specialists in order to promote resilience in child development and reduce the current psychiatric morbidities notably depression.

## **RATIONALE**

Many children in Kenya as elsewhere in other Low-Middle Income Countries are at risk of multiple stressors and are therefore exposed to psychological and mental problems. Depression has been reported to be the most prevalent condition among all mental disorders and often go undetected. In Africa the treatment gap for depression is estimated at 67%. This is therefore a serious public health concern especially in rural areas where families are socio-economically disadvantaged as educational and health needs are incommensurate with the resources provided.

Prior research has shown the importance of accurate identification of depression, a mental health problem and the risk factors in order to reduce psychological problems as well as enhance resilience (Kieling et al., 2011; Murray et al., 2012). In addition, since in Kenya the funds allocated for mental health is very minimal (less than 1% of the total health budget), low cost methods to ameliorate resilience need to be developed in order to help children at-risk as well as their families. One such program developed by Kumpfer in early 1980's to increase resilience among children and focuses on training youth at-risk on positive adaptation strategies by encouraging critical thinking, dreams, goals, social and academic skills is effective in various African countries (Kumpfer, Molgaard, and Spoth 1996, <http://www.strengtheningfamiliesprogram.org/>). Additionally, ("Parenting Breakdown Making and Breaking of Intergenerational Links David Quinton, Sir Michael Rutter 9780566055829," n.d.) observed and concluded that successful adaptation during adolescence starts with positive experiences in school, which aids development of inner strength.

Given that depression has detrimental health effects, research which investigates protective factors for depression is salient. This study thus aims at establishing prevalence estimates for depression and its correlates as well as its association with resilience in order to provide a basis for interventions as well as understand resilience that could inform further interventions for school children.

## **OBJECTIVES**

### **Broad Objective**

To explore the relationship between affective disorder and resilience among primary school going children between standards 5-7 in Kenya.

### **Specific objectives**

1. To estimate prevalence patterns of affective disorder between children between standard 5-7
2. To establish correlates of affective disorder using a socio-demographic questionnaire.
3. To determine the relationship between affective disorder and resilience among 5<sup>th</sup> to 7<sup>th</sup> grade primary school children in Kenya.
4. To determine the psychiatric co morbidities of affective disorder among primary school children in Kenya.

# CHAPTER TWO

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## LITERATURE REVIEW

### Depression

Globally, depression is estimated to affect about 350 million people and is the leading cause of disability for both males and females. However, the disease burden for females is 50% higher as compared to males (World Health Organization, 2008). According to (World Health Organization, 2008) , severe depression has been equated to severe disability.

Depressive disorders often begin at a younger age, recur and have been shown to be associated with decrease in the overall health of an individual. Moreover, high levels increase cognitive difficulties (Nutt, 2004), impair an individual's performance and social interaction and this results into emergence of suicidal ideations and attempts (Nezlek, John B.; Imbrie, Mark; Shean, 1994) (Levine, 2008).

A study by Professor Ndetei and his colleagues found that the prevalence estimates for depression in Kenyan school children are similar to those found in the Western countries and thus require attention as 43.7% of children and adolescents assessed had positive clinical diagnostic scores for depression (Ndetei et al., 2008). Similar results (41.3%) were found among children in hospital-based pediatric units (Ndetei, Khasakhala, Mutiso, & Mwayo, 2009). Despite the aforementioned detrimental effects, effective treatments for depression are available (World Health Organization, 2008).

### Risk factors for depression

Prior epidemiological studies have reported associations particularly with gender and age, for instance; emotional problems such as depression are higher in females as compared to males (Canino G, Shrout PE, Rubio-Stipec M, Bird HR, Bravo M, Ramirez R, Chavez L, Alegria M, Bauermeister JJ, Hohmann A, Ribera J, Garcia P, 2004; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). In addition, the prevalence estimates appear to be in ascendance within successive generations of children with onset occurring in the early years (Gershon ES, Hamovit

JH, Guroff JJ, 1987; Klerman, 1985). In regards to family factors, children from single-parent families and low parent education are at a higher risk (Heiervang et al., 2007). However these risk factors vary between cultures (Gillberg, 1983).

### **Depression and Resilience**

Resilience has been defined as the ability to successfully cope with stressful life experiences (Southwick & Charney, 2012; Wu G, Feder A, Cohen H, Kim JJ, Calderon S, Charney DS, 2013) which comprises of personal competence, personal instincts trust, amenable to change, control and spiritual influences (Connor KM, 2003).

Prevention of depression is an area that requires attention. Many programs that have been implemented to strengthen protective factors for depression in children for instance, programs in schools that deal with cognitive, problem solving as well as social skills have been shown to reduce the high levels of depression (Marina Marcus, M. Taghi Yasamy, 2012).

Previous studies have reported higher resiliency scores for lower levels of depression (Odin Hjemdal, Patrick A. Vogel, Stian Solem, 2010). In addition, resiliency plays a key role in suicidal ideations which are significantly correlated with depression (Izadinia, Amiri, Jahromi, & Hamidi, 2010). Resiliency has also been shown to be very imperative in preventing prevalent psychological problems as its reduction increases the risk of depression and other mental disorders (Izadinia et al., 2010). Conversely, those who have high levels of resiliency seldom suffer from depression and other psychological problems irrespective of having a negative life experience (Pinquart, 2009).

# CHAPTER THREE

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## METHODOLOGY

### Data Source

Secondary data from the study entitled “The Kenya Integrated Intervention Model for Dialogue and Screening to promote children's mental wellbeing (KIDS)” conducted by Africa Mental Health Foundation was used for this study.

### Study Design

This was based on a longitudinal study that was used to promote mental wellbeing, prevent mental illness and facilitate intervention for children identified with mental illnesses. The study described herein represented the baseline component of the project that involved assessing children for mental problems particularly depression.

### Study Site

The study was conducted across two districts in the Eastern Province of Kenya i.e. Machakos district (Peri-urban) and Makindu District (rural). Makindu District is a rural area with a population of 70,302 people. It has 66 primary schools, with a total enrolment of 21,680 children (1:1 ratio of boys to girls). Machakos District is a peri-urban area with a total population of 442,930 people. It has 129 primary schools with a total enrolment of 44,603 children (1:1 ratio of boys to girls). Primary school education is publically funded and freely available, therefore nearly all children in each district would be expected to be enrolled in school.

### Study Sample

The study sample included all primary school going children between standards 5-7 for 23 randomly selected schools (Machakos District = 12 schools; Makindu District = 11 schools). This is a subset of the sample for the study stated above. The schools in each district were divided into six clusters, and one cluster was randomly selected from each district.

## **Consent and Ethical Approval**

Permission was sought from the principal before entry into the schools. Children between standard five to seven at the selected schools and their parents were approached with a request to participate in the study. They were all independently informed of the goals of the project, as well as the benefits, risks, and confidentiality measures associated with participation. Each parent provided a written informed consent for their child to participate. However, for children whose parents did not show up on the day of assessment, they were excluded from the study as per Kenyan Ethical guidelines for studies on Human Subjects that requires an assent and a parental consent for children below the age of 18 years. Ethical approval was obtained from the Research Ethics Boards at the Centre for Addiction and Mental Health and from the Kenya Medical Research Institute.

## **Inclusion Criteria**

1. Children between standard 5-7 in the randomly selected schools
2. Children between standard 5-7 present in school on the day of assessment

## **Exclusion Criteria**

1. All the children in other grades except standard 5-7 in the randomly selected school.
2. Children between standard 5-7 absent from school on the day of assessment

## **Study recruitment and procedure**

As per the above study, all the standard 5-7 pupils from 12 randomly selected schools in Machakos district (Peri-urban) and 11 from Makindu District (rural) were recruited to participate in the study. Before data collection, parents and all the children between grades 5-7 in the randomly selected schools were explained to the benefits, risks, confidentiality measures as well as the right to or not to participate in the study and later consent obtained from both groups as per the Kenyan Ethical guidelines which requires both parental consent and assent for children below the age of 18 years. All the children then filled self-administered questionnaires as supervised by research assistants who had a minimum qualification of college level with prior experience in research.

## Study tools

Socio-demographic questionnaire adapted from the Missouri Student Survey Questionnaire, Youth Self Report (YSR) and Ego Resiliency Scales were used to collect information on socio demographic characteristics, depressive symptoms and resilience levels respectively.

### *1. Socio-demographic questionnaire*

This has been adapted from the Missouri Student Survey (MSS) Questionnaire 2012, for use in Kenyan schools. The (MSS) has been used to track risk behaviors of students attending public schools in Missouri. The survey includes questions on socio-demographic characteristics, alcohol, tobacco, and drug use and other behaviors that endanger health and safety. However, for our study we only included socio-demographic characteristics and children's perceptions and attitudes towards school and at home (<http://dmh.mo.gov/ada/rpts/survey.htm>).

### *2. Youth Self Report*

YSR is a standard instrument used to assess children's competencies particularly their social interaction, school performance and leisure activities and also contains 112 problem items that assess for frequent mental disorders notably depression or affective disorders using DSM-Oriented Scales developed from child psychiatry and psychology experts' clinical judgment, consistency with the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV) (American Psychiatric Association, 1994). The DSM-Oriented scales scored for affective disorders have items consistent with Dysthymia and Major Depressive Disorder from the manual (T. M. Achenbach, Dumenci, & Rescorla, 2001). YSR has been shown to have good psychometric properties with good level of internal consistency (Cronbach's  $\alpha = 0.82$  for DSM-IV oriented scales) and demonstrated test-retest reliability ( $r = 0.88$ ) (T. M. Achenbach, Dumenci, & Rescorla, 2003).

Standardized instruments are important for epidemiological studies as they can be used to extrapolate results if systematically used to gather information (Rubio-Stipec M., et al 1990). Additionally, Brasil has found that child mental health research using standardized instruments with good psychometric properties largely contributes to data reliability and enhances comparison between different cultures (Brasil & Bordin, 2010).

### 3. *Ego-Resiliency Scale*

The Ego Resiliency (ER) Scale is a brief inventory consisting of 14 subjective self-rated items. It was developed by (Block, J. H., & Block, 1980) for use in non-psychiatric settings (Block & Kremen, 1996) and validated by (Letzring, Block, & Funder, 2005). It can be successfully used for studying ego resiliency through various stages of development (Vecchione M, Alessandri G, Barbaranelli C, 2010).

During administration, participants are asked to specify the degree to which they agree with each statement on a 4-point Likert scale, ranging from 1 (*does not apply at all*) to 4 (*applies very strongly*). This scale has shown negative relations with depression and a positive correlation with psychological wellbeing in Spain and Italy (Alessandri, Vecchio, Steca, Caprara, & Caprara, 2007).

The ER scoring interpretation system provides scores ranging from 14 to 56, whereby scores between 0-10 is equivalent to very low ego resilience, 11-22 represents low resilience, 23-34 represents intermediate resilience, 35-46 is equivalent to high resilience and 47-56 represents very high resilience (Block & Kremen, 1996).

## STATISTICAL METHOD USED

### Binary Logistic Regression

Logistic regression is used to predict a categorical (usually dichotomous) variable from a set of predictor variables. i.e. it measures the relationship between a categorical dependent variable and one or more independent variables, which are usually (but not necessarily) continuous, by using probability scores as the predicted values of the dependent variable. When the dependent variable is binary (two), the model is known as **Binary logistic regression**. **Binary logistic regression** estimates the probability that a characteristic is present (e.g. estimate probability of "success") given the values of explanatory variables, in this case a single categorical variable;  $\pi = Pr(Y = 1|X = x)$ .

### Variables:

- Let  $Y$  be a binary response variable  
 $Y_i = 1$  if the trait is present in observation (person, unit, etc...)  $i$   
 $Y_i = 0$  if the trait is NOT present in observation  $i$
- $X = (X_1, X_2, \dots, X_k)$  be a set of explanatory variables which can be discrete, continuous, or a combination.  $x_i$  is the observed value of the explanatory variables for observation  $i$ .

### Model,

$$\pi_i = Pr(Y_i=1|X_i=x_i) = \frac{\exp(\beta_0 + \beta_1 x_i)}{1 + \exp(\beta_0 + \beta_1 x_i)}$$

An alternative model is also outlined below;

$$\begin{aligned} \text{logit}(\pi_i) &= \log\left(\frac{\pi_i}{1-\pi_i}\right) \\ &= \beta_0 + \beta_1 x_i \\ &= \beta_0 + \beta_1 x_{i1} + \dots + \beta_k x_{ik} \end{aligned}$$

### Interpretation of Parameter Estimates:

- $\exp(\beta_0)$  = the odds that the characteristic is present in an observation  $i$  when  $X_i = 0$ , i.e., at baseline.
- $\exp(\beta_1)$  = for every unit increase in  $X_{i1}$ , the odds that the characteristic is present is multiplied by  $\exp(\beta_1)$ . This is similar to simple linear regression but instead of additive change it is a multiplicative change in rate. This is an estimated *odds ratio*.

$$\exp(\beta_1) = \frac{\exp(\beta_0 + \beta_1(x_{i1} + 1))}{\exp(\beta_0 + \beta_1 x_{i1})}$$

In general, the logistic model stipulates that the effect of a covariate on the chance of “success” is linear on the log-odds scale, or multiplicative on the odds scale.

- If  $\beta_j > 0$ , then  $\exp(\beta_j) > 1$ , and the odds increase.
- If  $\beta_j < 0$ , then  $\exp(\beta_j) < 1$ , and the odds decrease.

### Binary Logistic regression Assumptions

- The data  $Y_1, Y_2, \dots, Y_n$  are independently distributed, i.e., cases are independent.
- Distribution of  $Y_i$  is  $Bin(n_i, \pi_i)$ , i.e., binary logistic regression model assumes binomial distribution of the response. The dependent variable does NOT need to be normally distributed, but it typically assumes a distribution from an exponential family (e.g. binomial, Poisson, multinomial, normal,...)
- Does NOT assume a linear relationship between the dependent variable and the independent variables, but it does assume linear relationship between the logit of the response and the explanatory variables;  $\text{logit}(\pi) = \beta_0 + \beta X$ .
- Independent (explanatory) variables can be even the power terms or some other nonlinear transformations of the original independent variables.
- The homogeneity of variance does NOT need to be satisfied. In fact, it is not even possible in many cases given the model structure.
- Errors need to be independent but NOT normally distributed.
- It uses maximum likelihood estimation (MLE) rather than ordinary least squares (OLS) to estimate the parameters, and thus relies on large-sample approximations.
- Goodness-of-fit measures rely on sufficiently large samples, where a heuristic rule is that not more than 20% of the expected cells counts are less than 5.

# CHAPTER FOUR

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## DATA ANALYSIS

Data from YSR was double entered into the ASEBA (The Achenbach System of Empirically Based Assessment) windows Assessment Data Manager (ADM) software version 9.1 (T. Achenbach, 2014), while the socio demographic characteristics and ego resiliency scale were double entered into SPSS version 16.0 by two independent data entry clerks and compared for any inconsistencies in excel.

Using the ADM software (T. Achenbach, 2014), DSM-oriented scales were generated by summing up the YSR behaviour problem items, then the raw scores transformed into T-scores to allow comparison for the same age and gender (Bordin, Rocha, Teixeira, & Rescorla, 2013). These scores were then exported into SPSS version 16.0 and merged with the socio demographic characteristics and ego resilience data for further analysis. T-score cut-off points, based on original school-age 2001 YSR instrument (Bordin et al., 2013) were used to determine the degree of deviance behaviour thus categorizing children as normal or non-clinical (low scores), borderline (at risk or intermediate range of scores) and clinical (high scores) for affective disorders. The borderline category is considered to be at-risk population that requires follow-up (Bordin et al., 2013) and so is the non-clinical category which is also exposed to the same problems. Therefore, for our analysis we collapsed the normal and borderline into one category and clinical into another category.

Mean, percentages and frequencies were generated for age, gender, standard level and prevalence of affective disorders. Binary logistic regression was also used to estimate odds ratios (OR) and their corresponding confidence intervals (CI) using affective disorder as the outcome variable and age, gender, district of residence, parent's marital status, parent's employment, age appropriateness for grade and resilience trait as predictors. (Byrd RS, Weitzman M, 1997) states that children who are older for grade are likely to experience emotional problems than those in the apt grade and therefore age appropriateness for grade was included as a covariate.

Odds ratios from binary logistic regression were also used to estimate comorbidity between affective disorder and other common psychiatric disorders.

## RESULTS

### *Characteristics of the sample*

Out of 2261 children who were assessed, 1086(48%) were males while 1175(52%) were females. The mean age of the children was 12.66 years (range 10 to 18 years). There was an almost equal distribution of children in the two districts. Similarly, the ratio of children who were in the apt grade for age to those older for grade was 1:1. Table 1 below presents the socio demographic characteristics of all the pupils included in our analysis.

**Table 1: Socio demographic characteristics of sampled school children**

Variable	n	%)
<b>Gender, n =2261</b>		
Male	1086	48.0
Female	1175	52.0
<b>Grades 5 to 7</b>		
Standard 5	686	30.3
Standard 6	760	33.6
Standard 7	815	36.0
<b>Grade appropriateness for pupil's age</b>		
Children older for grade	1114	49.3
Children in the apt grade	1147	50.7
<b>Pupil's District of Residence (Rural or Peri-urban)</b>		
Rural (Makindu)	1084	47.9
Periurban (Machakos)	1177	52.1

### *Prevalence and correlates of affective disorder*

The prevalence of affective disorder was 14.1% (CI: 12.74-15.62). Please see table 2 below. Significantly, males were nearly three times likely to have an affective disorder than females (OR= 2.94; CI: 2.20-3.92). With respect to district of residence, living in a peri-urban area exposed a child to a 50% risk of having an affective problem than residing in a rural area OR=

1.53; CI: 1.16-2.03). For every additional year in age, children were less likely to suffer from affective problems (OR= 0.77; CI: 0.67-0.87).

There was no evidence of significance in father's employment. However, mother's employment was significantly associated with affective problems in children (OR= 1.50; CI: 1.14-1.98). In comparison with children whose parents were married, those from divorced or separated families were almost twice as likely to have an affective disorder (OR= 1.97; CI: 1.14-3.40). Additionally, children who were older for their grade either as a result of being held back or late school entry were more likely to suffer from affective disorders as compared to those in the apt grade (OR= 2.06; CI: 1.40-3.01).

***Resilience and affective disorder***

After adjusting for age, gender, district of residence and age appropriateness for grade, children who had low resiliency traits were 41% more likely to have affective problems than children who scored high on the ego resilience scale (OR= 1.41; CI: 1.03-1.94).

The above mentioned correlates of affective disorder and their corresponding 95% confidence intervals are listed in table 2 below.

**Table 2: Correlates of affective disorder and their corresponding OR and 95% CI**

<b>Correlates of affective disorder</b>	<b>Odds ratio (OR)</b>	<b>p-value</b>	<b>95% CI</b>
Gender (male)	2.94	<0.0001	2.20-3.92
Age	0.77	<0.0001	0.67-0.87
District of residence (peri-urban)	1.53	0.003	1.16-2.03
Father's employment	0.83	0.224	0.61-1.13
Mother's employment	1.50	0.004	1.14-1.98
Divorced/separated parents	1.97	0.015	1.14-3.40
Being older for grade	2.06	<0.0001	1.40-3.01
Resiliency trait (low)	1.41	0.035	1.03-1.94

### ***Comorbidity of affective disorder with other psychiatric disorders***

All the common psychiatric disorders assessed using YSR were comorbid with affective disorders and ranged from 0.9% (ADHD) to 10.7% (somatic disorder). Affective disorder was associated with elevated odds of having PTSD. Out of all the children with affective disorders, 12.8% had more than one psychiatric disorder. Table 3 below shows the prevalence estimates and OR of common comorbid psychiatric disorders with affective disorder.

**Table 3: Comorbidity of affective disorder with other psychiatric disorders**

<b>Psychiatric disorders</b>	<b>Comorbidity prevalence estimates (%)</b>	<b>n</b>	<b>OR</b>	<b>95% CI</b>
Anxiety	4.8	108	12.6	9.1-17.4
Somatic	10.7	241	11.1	8.4-14.7
ADHD*	0.9	20	14.4	6.5-31.8
ODD*	2.0	44	18.1	10.2-32.1
Conduct	7.5	169	18.5	13.8-24.7
OCD*	5.0	112	24.5	16.7-35.9
PTSD*	5.7	128	32.7	22.2-48.3

*ADHD\* – Attention Deficit Hyperactivity Disorder, ODD\*- Oppositional Defiant Disorder, OCD\* – Obsessive Compulsive Disorder, PTSD\*- Post Traumatic Stress Disorder*

# CHAPTER FIVE

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## DISCUSSION

The results reported herein represent children between grade five through seven in sampled schools in Kenya. To the best of our knowledge, this is the first study in Kenya to explore the relationship between resilience and affective disorders in school children. The number of children who were older for their grade in school was similar to those in the apt grade for their age. This could perhaps be explained by introduction of Free Primary Education (FPE) to all children of school going age and adults above the age of 16 years (Republic of Kenya, 2003).

### *Prevalence and correlates of affective disorder*

We found a high prevalence of affective disorders (14.1%) which is consistent with findings from South Africa among 10-12 year olds using the same instrument (Melissa A Cortina et al., 2013). Similar estimates (13.2%) were also found among primary school children between grades three through five China using CDI survey (Stewart & Sun, 2007). In Arab world, 17% of a large sample of 5409 school youths presented with depressive symptoms (Jaju, Al-Adawi, Al-Kharusi, Morsi, & Al-Riyami, 2009). These estimates are elevated indicating that affective problems are a major public health concern and warrant attention, otherwise the children's educational progress as well as their general wellbeing is likely to be compromised.

With respect to gender, we found that males were more likely than females to have affective disorders. This is in accordance with earlier studies that showed a male preponderance of affective disorders (Stewart & Sun, 2007; Wichstrøm et al., 2012). However, in older children females have been shown to report depressive problems (Stewart & Sun, 2007)

Prevalence of affective disorders decreased significantly with increase in a child's age. Although, earlier studies have reported the contrary (Egger & Angold, 2006; Leslie Rescorla, Thomas Achenbach, Masha Y. Ivanova, Levent Dumenci, Fredrik Almqvist, Niels Bilenberg, 2007), our current findings are similar to a study in Brazil among adolescents that showed a decreasing trend of depressive symptoms between ages 16 to 17 (Bahls, 2002). These findings thus provide evidence that affective disorders are profound at a younger age, therefore early identification and

proper management of affective and related disorders is necessary in order to improve the daily functioning of children, educational achievement and their quality of life.

In regards to geographical location, children residing in a peri-urban area were more likely to have affective problems as compared to those living in rural areas. Urbanicity has been associated with increased risk of psychiatric disorders notably affective disorders (Pedersen CB, 2006). This could be attributed to the small family structures and industrialization in urban settings, thus leading to coping difficulties (Sidhu, 2012).

Children in divorced or separated families had elevated levels of affective problems which tallies well with other literature (Dong Q, Wang Y, 2002; Wichstrøm et al., 2012; Xianchen Liu, Chuanqin Guo, Masako Okawa, Jing Zhai, Yan Li, Makoto Uchiyama, Jenae M. Neiderhiser, 2000; Xiaoli et al., 2014). In addition, they have also been reported to exhibit more behavioral problems (Dong Q, Wang Y, 2002). This is an indication that familial risk factors are important while assessing children for behavioral and emotional problems.

Mother's employment was significantly positively associated with affective disorders in school children. Given the traditional role of mothers as the caregivers for their children (Bianchi, 2000), employment may hinder their full attention and sociability to their children hence reducing the psychological wellbeing of these children. (Greenberger E, Chen C, Tally SR, 2000) found that increased parental warmth leads to reduced depression symptoms in children and adolescents.

Similar to our finding, earlier studies have reported higher rates of behavior problems among children and adolescents who are older for their grade as a result of delayed school entry or delayed school progress (Byrd RS, Weitzman M, 1997). Since grade retention is one of the key predictors of dropping out of school (Jimerson, Shane R., Sarah M. Woehr, 2001), school based mental health programs that address emotional and behavioral problems are necessary in order to improve their social and academic skills.

Of worthy to note is the negative significant association between resiliency traits and affective disorders which has corroborated findings from earlier studies (Stewart & Sun, 2007; Ziaian, de Anstiss, Antoniou, Baghurst, & Sawyer, 2012). (Stewart & Sun, 2007) states that strategies that foster conducive school and family environments are those that enhance personal characteristics

such as resilience. Moreover, a resilient adolescent copes with negative life experiences as well as adult responsibilities including poverty and health problems without difficulty (Werner, 1995). Therefore, fostering resilience at a younger age especially in schools and at home is crucial in preventing and reducing affective disorders and psychiatric comorbidities in order to prevent any detrimental effects as children and adolescents progress to adulthood.

One out of every 10 people who commit suicide in Kenya suffer from depression. This being the case, interventions that target depressive disorders are key to reducing any suicidal ideations, attempts as well as completed suicide.

We also found that, 91% of the children who had affective disorders exhibited other common psychiatric disorders. In a recent study in China, children with depression were more likely to have a comorbid psychiatric disorder (Xiaoli et al., 2014). The highest comorbidity was seen between affective and somatic problems, consistent with a study by (McCauley E, Carlson GA, 1991) that showed a two-fold increase in somatic complaints among individuals with affective disorders. Additionally, somatic problems are likely to occur four years after the onset of depression (Zwaigenbaum, Szatmari, Boyle, & Offord, 1999). Consequently, assessment of other common psychiatric conditions while assessing for affective disorders is crucial at all times.

One limitation of this study is that it was based on subjective self reports of children and adolescents hence subject to over rating or under rating. Although the sample was large to reduce any errors, future studies should involve multiple raters especially parents or teachers. On the other hand, this is the first study to relate resilience factors with affective disorders among primary school children in Kenya

## **CONCLUSION**

This study underlines the prevalence of affective disorders among school children and provides evidence for all practitioners including school counselors to include resilience, a protective factor for affective disorders while assessing for the mental wellbeing of children in order to promote their educational progress and prevent them from being held back due to flunking.

Due to the variety of disorders associated with affective problems in children and adolescents, it is important to be cognizant of interventions that address multiple psychiatric disorders. Therefore, prevention, early identification and treatment of all psychiatric disorders is a priority in order to ameliorate the mental wellbeing of children and prevent any detrimental effects in adulthood.

## **RECOMMENDATIONS**

The key finding in this study was the negative association between resilience and affective disorders in school children. This indicates that resilience is imperative in reducing depressive outcomes in children and adolescents.

Being older for grade and coming from a broken family background exposed children to psychological problems particularly affective disorders. Therefore, teachers as well as parents should be trained on how to identify strengths and weaknesses among children and use culturally sensitive strategies while teaching in order to enhance their social and academic skills hence accelerating their progress in schools.

There is also a dearth of psychiatrists in Kenya with a psychiatrist to patient ratio of 1: 500,000. This is a huge mental health treatment gap that warrants attention. Therefore integrating programs in schools that focus on identification, management of psychological problems as well as enhancing protective factors such as resilience could be effective in reducing the number of children being held back in school, promoting and ameliorating their mental and overall wellbeing hence increasing their future life opportunities. (Olsson CA, Bond L, Burns JM, Vella-Brodrick DA, 2003) states that a protection framework that aims at developing coping mechanisms prior to encounter with negative life experiences can be a guide for intervention framework for young people.

Most importantly, involving both governmental and non-governmental sectors in supporting such programs will be impactful to the larger population and ensure sustainability.

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