PREVALENCE AND CORRELATES OF MENTAL DISORDERS IN CHILDREN AND ADOLESCENTS IN MENDEFERA COMMUNITY, ERITREA

BY

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DECLARATION

I hereby declare that this study is my original work and was supervised by Professor Olayinka Omigbodun and Dr. Olurotimi Adejumo of the Center for Child and Adolescent Mental Health, University of Ibadan, in partial fulfillment of the requirement for the award of the Degree of Master of Science in Child and Adolescent Mental Health of the University of Ibadan, and that it has not been submitted to any other institution for any award.

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CERTIFICATION

This is to certify that conduct of this study and the preparation of the thesis were carried out by ZERU ESTIFANOS HAILE in the CENTER FOR CHILD AND ADOLESCENT MENTAL HEALTH, UNIVERSITY OF IBADAN under my supervision.

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DEDICATION

To my wife Yordanos, my daughter Lidya and my brother Ghilamichael.

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Key to Acronyms

ADHD	Attention Deficit Hyperactivity disorder
ASD	Autism Spectrum Disorder
CBCL	Child Behavior Checklist
CBQ	Child Behaviour Questionnaire
CDI	Child Depression Inventory
DALYs	Disability Adjusted Life Years
DAWBA	Development and Well Being Assessment
DICA-R	Diagnostic Instrument for Children and Adolescents revised
DISC-IV	Diagnostic Interview Schedule for Children version four
DSM-III	Diagnostic and Statistical Manual version three
DSM-IV	Diagnostic and Statistical Manual version four
ICD-10	International Classification of Diseases version 10
UNIGME	United Nations Intergroup Monitoring for child Mortality Estimates
K-SADS-P	Kiddie Schedule for Affective Disorders and Schizophrenia Present episode
K-SADS-PL	Kiddie Schedule for Affective Disorders and Schizophrenia Life time version
LAA	Local Administration Area
LMICs	Low and Middle Income Countries
MDGs	Millennium Developmental Goals
ODD	Oppositional Defiant Disorder
OR	Odds Ratio
PTSD	Post Traumatic Stress Disorder
RQC	Reporting Questionnaire for Children
SDGs	Sustainable Developmental Goals
SDQ	Strengths and Difficulties Questionnaire
SPSS	Statistical Package for Social Studies
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNICEF   United Nations International Children's Emergency Fund

USA   United States of America

WHO: World Health Organization

YSR   Youth Self Report

Abstract

Background

Globally, the prevalence of mental disorders among children and adolescents is high, affecting one in five youth. There is currently no existing data on the prevalence, correlates or patterns of mental disorders in the Eritrean child and adolescent population. This pioneer descriptive cross-sectional community study in an Eritrean community was conducted to determine the prevalence, correlates and patterns of DSM-IV disorders in children and adolescents in Mendefera community, Eritrea.

Methodology

A two-stage design was used to assess the mental health of children and adolescents aged 4-17 years belonging to households recruited by a multistage random sampling method. In the first stage, parents or adult caregivers were required to complete the sociodemographic questionnaire and the parent version of the Strengths and Difficulties Questionnaire (SDQ) for all children. Adolescents aged 11-17 years were, in addition, administered the self-completed SDQ. All questionnaires were administered by interviewers. The School Health Questionnaire was completed by adolescents between 13 and 17 years of age to screen for suicidal ideation or attempt, alcohol abuse or substance abuse and bullying. Children and adolescents who screened positive for any of the SDQ abnormality subclasses and adolescents who reported either suicide ideations, attempt, alcohol abuse, substance abuse or experienced bullying were then interviewed using the Kiddie Schedule for Affective Disorders and Schizophrenia Lifetime version (K-SADS-PL) 2009 Working Draft, to diagnose specific DSM-IV psychiatric disorders. Data

collected was entered in to CSPro version 6.2 and then transported to and analysed using SPSS version 20 for windows.

Results

High prevalence of both SDQ abnormalities (15.9%) and DSM-IV psychiatric disorders (13.1%) were found. Prevalence rates by both instruments were found to be higher among males (21.3% by SDQ and 16.1% by K-SADS-PL, 2009) than among females (10.7% by SDQ and 10.1% by K-SADS-PL, 2009), and among adolescents aged 11-17 years (20.6% by SDQ and 18.3% by K-SADS-PL, 2009) than among children aged 4-10 years (12.6% by SDQ and 9.3% by K-SADS-PL, 2009). Behavioral disorders were found to be the commonest psychiatric disorders in this population of children and adolescents at a prevalence of 9.9%, followed by affective disorders (3.2%) and anxiety disorders (2.5%). ADHD was the commonest disorder at a prevalence of 4.5%, followed by conduct disorder (4.2%), and depression, GAD and ASD at a prevalence of 3.1% each. A high prevalence of comorbidity (29.3%) was found among these disorders. No substance abuse or alcohol abuse was found among participants in this study. The presence of chronic physical illness either in the child or in family members, unstable parental marital status, parental conflict, presence of psychopathology in the family, low level of maternal educational attainment, poor academic performance, grade repetition and having difficulties with teachers at school were found to significantly increase the risk of having any DSM-IV psychiatric disorders.

Conclusion

The high prevalence of DSM-IV disorders found in this study calls for making child and adolescent mental health services widely available in Eritrea. There is also the need for further research of wider scope. The sociodemographic characteristics identified by this study as having

significant associations with high risk of mental disorders in children and adolescents may be important targets of intervention to reduce the high prevalence of these disorders in this community.

Key words; Prevalence, children and adolescents, Eritrea, mental disorders, SDQ, K-SADS.

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Child and adolescent mental health is defined as the capacity to achieve and maintain optimal psychological functioning and well-being and is directly related to the level reached and competence achieved in psychological and social functioning (WHO, 2005). A child with good mental health has a sense of identity and self-worth, sound family and peer relationships, an ability to be productive and learn, and a capacity to use developmental challenges and cultural resources to maximize development (Dawes et al, 1997). Mental illness or disorder, on the other hand, is defined as a pattern of signs and symptoms that is associated with impairment of psychological and social functioning, and that meets criteria for disorder under an accepted system of classification such as the Diagnostic and Statistical Manual version four (DSM-IV) or the International Classification of Diseases version 10 (ICD-10) (WHO, 2005).

Different cultures set different age limits of childhood and adolescence, or even in many, the concept of adolescence does not exist. For instance, most Western cultures mark the onset of puberty at age 11-13 years as the point of entry from childhood to adolescence, which in turn ends at early 20s as the adolescent becomes an adult (Arnett, 2014), whereas in many African and other rural societies, the onset of puberty is socially celebrated with rites of passages as the entry from childhood to adulthood (Van Gennep, 2011), or even with compulsory assignment of adult roles such as marriage (Bamgbose, 2001. To provide a global framework in understanding of rights of children and adolescents, the United Nations defines children as all persons below

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the age of 18 years and adolescents as all persons aged 10-19 years (Convention on the Rights of the Child, 1989).

Studies have shown that the negative effect of mental disorders that develop during childhood is larger than that of physical health problems (Currie and Stabile, 2006). Unfortunately, until recently, the public health measure of disease was mortality, leaving mental health disorders barely attended to (Murray et al, 2010). In 1996, however, a study of disease burden published by Murray and Lopez, in addition to mortality, measured the morbidity or disability caused by diseases, disorders and injuries and the risk factors for these conditions (in terms of the disability adjusted life years (DALYs), and showed the huge disease burden caused by mental disorders (Lopez and Murray, 1996). Research carried out in different countries also found high prevalence rates of these mental disorders in children and adolescents. Castello et al, (1996) reported a 22% prevalence of mental disorders among 9-13-year-old children in the United States. The prevalence in Finish children aged 8-9 years was found to be 15% (Almkvist et al, 1999) and 22.5% among Swiss 1st to 9th graders (Steinhausen et al, 1998). Up to 25.17% prevalence rate was reported among Ethiopian children and adolescents (Mulatu, 1995). Prevalence rates of 15% among Nigerian (Abiodun, 1993) and 15.2% among South African children and adolescents (Robertson et al, 1999) were reported. Moreover, it was shown that the burden of diseases from mental disorders would increase significantly if these conditions continue to be sidelined (Murray and Lopez, 1997) and researchers reported that high proportions of abused children and adolescents suffer long term psychiatric problems (Silverman, Reinherz and Giaconia,1996).

There have been numerous recent gains in child and adolescent mental health globally. Even though the Millennium Developmental Goals (MDGs), declared in September 2000, did not

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mention mental health, almost all the goals targeted a number of factors that had direct link with mental disorders in children and adolescents (Barimah and Diko, 2013). Eradication of extreme poverty and hunger (Goal 1), achieving universal primary education (Goal 2), promoting gender equality and empowering women (Goal 3), reducing child mortality (Goal 4), improving maternal health (Goal 5), combating communicable diseases (Goal 6) and ensuring environmental sustainability (Goal 7) all had direct bearing on the mental health of children because research has shown that poverty, hunger, being out of school, gendered exposure to adversities, chronic physical ill health, maternal ill health and an impoverished or high risk neighborhood are associated with high rates of mental disorders in children and adolescents (Anda et al, 2010, Mash and Barkley, 2014). The focus on MDGs improved children's physical health and survival significantly in several regions of the world (Barimah and Diko, 2013). However, the mental health of surviving children need to be addressed with specific goals, measurable targets and indicators. This is well addressed by the Sustainable Developments Goals (SDGs) declared in September 2015, which target a health goal of ensuring healthy lives and promoting wellbeing for all, at all ages (Goal 3) (Sachs, 2012). This goal has specific mental health and substance use targets (target 3.4-promote mental health and wellbeing, target 3.5-strenghten the prevention and treatment of substance abuse including narcotic drug abuse and harmful use of alcohol.

Such explicit and specific targeting of mental disorders in children and adolescents has significant public health importance for a number of compelling reasons.

Firstly, children and adolescents comprise a large proportion of the global population, and still a greater proportion of the developing world population (UNICEF, 2008). There are 2.2 billion children in the world making up one third of the global population. Ninety percent of these

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children and adolescents live in the developing world, constituting half (50%) of the population (UNICEF, 2008).

Secondly, the childhood and adolescence period is the period of the fastest (Berardi, Pizzorusso and Maffei, 2000, Cameron and Demerath, 2002), but also the most vulnerable developmental period (Shonkoff and Phillips, 2000, Chugani, 1998) in the human lifespan with lifelong consequences (Kendler et al, 2000). Studies such as the Dutch famine study, which studied adults whose mothers had suffered malnutrition during early gestation found significant consequences in survival, physical health and mental health regardless of their current situation (Roseboom, Rooij and Painter, 2006). Enduring mental and cognitive consequences have been reported as a result of neglect and deprivation of an optimal environment and care during early infancy in studies such as the Romanian orphans study (Smyke et al, 2010). The damaging effect of risks accumulated during childhood, resulting in subsequent development of antisocial behaviors, has been reported as a major reason behind public shootings in the United States, which are usually committed by adolescents or young adults (Beruyere and Garbarino, 2013).

Thirdly, child and adolescent mental disorders are found to be highly prevalent, affecting up to one in every five children and adolescents in the world (Kieling et al, 2011, Polanczyk et al, 2015). A study of Canadian adolescents, for example, reported that self-inflicted injuries accounted for 24.1% of mortality among Canadian adolescents aged 10-19 years in the years 1979-2003 (Sai Yi et al, 2007) making injuries the leading cause of death among adolescents in the country, a rate not expected to reduce under the present conditions (Skinner and McFaull, 2012).

A fourth reason is the fact that most adult psychiatric disorders start during childhood and adolescence. Studies have shown that 75% and 50% of adult psychiatric disorders originate in

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adolescence before the age of 24 years and 14 years respectively (Patel et al, 2007). Moreover, adult psychopathologies that have their roots in childhood are found to be more severe than disorders of adult onset (Zisook et al 2007).

Fifth, evidence based cost effective interventions have been shown to be highly effective for the treatment of mental disorders in children and adolescents (Cartwright-Hatton et al, 2004, Harrington et al, 1998). The public significance of this is that most disabilities suffered from mental disorders, and most adult psychiatric illnesses, can be alleviated by appropriate intervention during childhood.

Lastly, it is imperative to address the mental health of children because 'there is no health without mental health' (Prince et al, 2007). Health is defined as 'complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity' (WHO,2003). The bidirectional relationship between physical health and mental health has been confirmed in that mental disorders impact the health seeking behaviour for physical illnesses, treatment outcomes and prognosis (Prince et al, 2007), and that physical illnesses and their treatment procedures may predispose to mental health problems (Ramsawh, Chavira and Stein, 2010).

1.2. Justification

There is evidence of the significance of studies on the prevalence and correlates of health conditions to inform policy on local priorities and for setting up rational services (Krieger, 2011). The large child and adolescent population of low and middle income countries (LMICs) can be regarded as an asset that can derive the future economic prosperity of these countries if their holistic health needs are addressed (Sawyer et al, 2012). Despite the demonstrated high burden of mental disorders and the existence of multiple mental health risks, research in these countries have been few and limited, contributing to only 6% of publications from all over the world

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(Saxena et al, 2006) and child and adolescent mental health research lags behind this figure (WHO, 2005). Community studies of child and adolescent mental disorders in Sub Saharan Africa continue to be almost nonexistent (Cortina et al, 2012). There is no published work on the prevalence, correlates and patterns of child and adolescent mental disorders in Eritrea, a country whose child and adolescent population makes up about 53% of the total population (Eritrea Population Health Survey, 2010). This study will contribute by filling in the wide gap of knowledge in this area.

In LMICs, community studies are more informative than facility based studies such as school based or hospital based studies, because a significant number of children with mental health risks and girls do not go to school (Filmer, 2000), have dropped out of school (UNESCO, 2002, Weldehanna and Hagos, 2015), or do not seek treatment (Abera, Robbins and Tesfaye, 2015) and they can be reached by house to house community studies. Interestingly, children who have dropped out of school constitute a significant proportion of children with mental disorders (Wang et al, 2015), meaning that school studies would miss most children with the target pathology, especially in low-income settings. Determining the prevalence and identifying the correlates and patterns of mental disorders can inform policy towards developing treatment and preventive interventions, and can be used as a basis for further research.

1.3 Aim

The aim of this study was to assess the prevalence and correlates of mental disorders among children and adolescents in Mendefera community, Eritrea.

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1.4 Specific Objectives of the study

The study was conducted with three specific cardinal objectives;

1. To determine the prevalence of mental disorders among children and adolescents in the Mendefera community

2. To determine the pattern of mental disorders among children and adolescents in the Mendefera community

3. To identify the socio-demographic correlates of mental disorders among children and adolescents in Mendefera community

CHAPTER TWO

LITERATURE REVIEW

2.1 The period of childhood and adolescence

Developmentally, the period of childhood and adolescence can be divided into the early childhood period (from prenatal period to age 6 years), middle childhood period (7 to 11 years) and adolescence (12 to 18 years) (Berk, 2001, Irwin, Siddiqi and Hertzman, 2007). Children and adolescents are vulnerable because their immature physical, psychological and social stage of development renders them dependent on adults for care and protection (Hoogeveen et al, 2004, Woods et al, 2005).

2.1.1 Early Childhood period

Development during early childhood period, which expands from the time of conception to age 6 years (Irwin, Siddiqi and Hertzman, 2007), proceeds at a rate unmatched by that of later human development stages (Shonkoff and Phillips, 2000). Shonkoff and Philips (2000) emphasize that development during this period is not only fascinatingly robust but also highly vulnerable to the risk of developing severe and lasting impairments. Biological factors and environment are at nearly equal play during this period. In utero experiences have been shown to influence infant temperament and self-regulation (Wang, Hua and Xu, 2015) as well as motor and cognitive outcomes (Servilli et al, 2010). The postnatal early childhood period includes the sensory-motor and preoperational stages described by Jean Piaget (Piaget, 1971), in which the child's cognitive development proceeds from learning according to the responses her/his actions elicit to symbolic encoding (the use of words and images for communication) and then to some intuitive reasoning (Piaget, 1971). Children of these stages need secure, protective, nurturing relationships,

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responsive interactions and encouragement for exploration to build hope and drive (trust), willpower, self-control and emotional regulation (autonomy), and purpose and direction (initiative) (Erikson, 1950). Biology and environment interplay during this stage in such a manner that parenting and other regular caregiving relationships provide experiences to model the expression of genes that influence the child's cognitive, socio-emotional and physical development trajectories in a lasting manner (Vegas and Santibanez, 2010).

2.1.2 Middle childhood period

Sigmund Freud describes the middle childhood period as a "latent" phase to imply the suppression of aggressive and sexual urges and that this stage has no significant contributions to the development of personality (Freud, 1937). Nevertheless, it represents a distinctive developmental transition period in itself, between early childhood and adolescence (Collins, 1984, Del Giudice, 2014). This period is the human juvenility, the period of intense learning through play in which the child plays adult roles (Hochberg, 2008). In many cultures, children start being assigned mature social, cultural and sexual responsibilities, making this stage a stage of integration in to society (Rogoff et al 1975). Their social setting expands with school entry as the compulsory education age in most countries starts at age 6-7 (Gathmann and Reinhold, 2012, Bandiera et al, 2015), increasing the cognitive demand on the child for academic and social competence, which is the main cognitive task of this age (Tomonary, 2008).

Cognitively, individuals in the middle childhood period develop hands-on concrete operational thinking (Piaget, 1971), which enables them to learn cultural values and rules, as well as some methodological problem-solving skills, which enhance their competence and facilitate their successful integration. Achievements, rewards and positive interactions at home, school and with peers foster the development of a sense of satisfaction and confidence in their purpose and

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meaning (industry), whereas negative experiences in these contexts lead to feelings of incompetence and inferiority (Erikson, 1950).

2.1.3 Adolescence

Adolescence is a transitional period between childhood and adulthood during which the person is no longer a child but not yet an adult (Kaplan, 2004). More than a century ago, G. Stanley Hall, (1904), described adolescence as a period of inherent heightened stress and storm, because children of this age go through frequent and intense conflicts with parents, experience recurring mood disruptions and may engage in risky behaviors unmatched by experiences earlier or later in life (Arnett, 1999). Even many centuries before this, Aristotle had described adolescents as 'heated by nature as drunken men by wine" and Socrates characterized them as "inclined to contradict their parents" and "tyrannize their teachers" (Arnett, 1999). Today, even though the inherence and cultural universality of such experiences is not fully supported (Kaplan, 2004), it is still agreed that conflicts, instabilities and risky behaviors are more likely to occur during adolescence than at any other age (Petersen and Leffert, 1997, Steinberg and Levine, 1997). Adolescents are abstract thinkers and their concern about the future intensifies (Piaget, 1971). Advice from adults, including parents, is less heeded because they believe that adults do not understand their feelings (Christie and Viner, 2005). Affiliation with peers takes priority and peer groups serve as references regarding what is normal and accepted. Seeking to develop an independent identity and roles that warrant them peer acceptance and admiration, they explore important issues such as religion and politics, and commit to those which satisfy their desire (Erikson, 19950). This quest for peer acceptance and admiration also causes heightened interest in their looks, hence pubertal growth spurt and changing body shape (example breast growth in females, genital changes in both sexes and muscularity in males) receive significant attention and

concern in both sexes (Christie and Viner, 2005). Favorable experiences in this stage help the adolescents to emerge as independent adults with clear identity, high self-esteem and integrity, whereas adversities leave them in dilemma of their identity and roles.

2.2. Prevalence and patterns of mental disorders in children and adolescents

A number of research studies conducted all over the world have shown generally high prevalence rates of child and adolescent mental disorders that with variations in patterns which might be due to cultural and geographical influences (Kieling and Rhode, 2012) or differences in the methodology followed (Polanczyk et al, 2015).

2.2.1 International studies of prevalence and patterns of child and adolescent mental disorders

The World Health Organisation reports high global prevalence of childhood psychopathology, 10-20%, (WHO, 2008). Furthermore, reviews of studies conducted in different countries of the world have consistently reported high prevalence. A review of 52 publications from all the continents, which attempted to determine the overall prevalence of child and adolescent psychiatric disorders between 1970 and 1996 found a pooled mean prevalence of 15.8%, range 1%-51% (Roberts et al, 1998). Prevalence by age group was reported to be 8% in preschoolers, 12% in preadolescents and 15% in adolescents. A subsequent review of papers published between 1995 and 2005 reported a mean prevalence of 12 % (Costello et al, 2005). A meta-analysis of research published between 1985 and 2012 also reported an overall prevalence of 13.4% (Polanczyk et al, 2015).

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2.2.2. Prevalence and patterns of child and adolescent mental disorders in the developed world

A number of nationwide surveys have been conducted in the developed world, majority of which were done in the USA and United Kingdom (UK) (Polanczyk et al, 2015). All of these studies have reported high prevalence of mental disorders among children and adolescents. A cross-sectional community survey in the United States of America (USA) which enrolled 3042 children and adolescents aged 8-15 years reported a 13.1% twelve- month prevalence of Diagnostic Statistical Manual version four (DSM-IV) defined mental disorders using the Diagnostic Interview Schedule for Children version four (DISC-IV) and other supplemental modules for specific diagnosis (Merikangas et al, 2010). The most prevalent disorder was attention deficit hyperactivity disorders (ADHD) (8.7%) while anorexia and bulimia nervosa were the least prevalent (1.1% each). The prevalence of mood disorders, conduct disorders and anxiety disorders were found to be 3.7%, 2.1% and 0.7% respectively. They found higher prevalence of any mental disorders in the previous 12 months in boys than in girls. ADHD in boys was 2.1 times more prevalent than in girls whereas prevalence of mood disorders in girls was 2 times that of boys. Older children (age 12-15 years) were found to have higher prevalence of mood disorders and conduct disorders whereas ADHD was significantly commoner in younger children. Another important finding in this study was that less than 50% of those diagnosed with at least one mental disorder sought treatment and this behavior was affected by age, early adolescents (12-15-years old) seeking treatment more and gender (males more than females). Findings of this study were similar to previous research findings in the USA which used comparable design and diagnostic instruments (Roberts, Roberts and Xing, 2007, Canino et al, 2004).

The study by Canino et al in which the DISC-IV and Child's Global Assessment Scale were used to assess 1,886 children aged 4-17 years, reported an overall prevalence of DSM-IV disorders of 16.4%. ADHD was the most prevalent (8%). In addition to similar findings regarding to age, gender and service utilization, this study reported that neither parental education nor income had significant association, while single, divorced or widowed parents and urban living were associated with higher rates of diagnosis of any disorder and of depressive disorder.

Roberts, Roberts and Xing (2007) also found similar prevalence (17.1%) of DISC-IV assessed DSM-IV disorders in 4,175 US adolescents aged 11-17 years.

In a 1999 Epidemiological survey in Britain, 10,438 children and adolescents aged 5-15 years were assessed using parent, teacher and child versions of the Development and Well Being Assessment (DAWBA) and an overall DSM-IV prevalence of 9.5% was reported (Ford, Goodman and Meltzer, 2003). They reported the most prevalent disorders to be conduct disorders (5%) and emotional disorders (depression and anxiety) (4%). Boys scored higher overall prevalence of any mental disorders (11%) than girls (8%) across all age groups. Prevalence increased with age as the prevalence of any mental disorders among age 5-10 years was 10% for boys and 6% for girls, whereas it was 13% for boys and 10% for girls in the 11-15 years age group. One strength of this study was the inclusion of teacher reports for the diagnosis of conduct disorders and ADHD in school children, because child-only reports resulted in missed cases, who received these diagnoses after including teacher reports. Furthermore, they documented significant association between the diagnosis of any mental disorders and socio-demographic correlates including ethnicity, family size, educational level of the interviewed parent, marital stability, unemployment of parents and low household income and others. In a subsequent publication, in which they compared the relative importance of the correlates by

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analyzing data of 8,772 English children 5 to 15 years old, Ford, Goodman and Meltzer (2004) concluded that individual child and family characteristics are more important correlates than aggregate characteristics such as disadvantaged schools, deprived neighborhood, low socio-economic status, parental unemployment, large family size and poverty. Child characteristics such as poor general health and life events were identified as relatively more important correlates of emotional disorders and ADHD while family characteristics such as living with a single parent qualified for relatively more important correlates of conduct disorders.

A nationwide community study of prevalence and patterns of child and adolescent mental disorders conducted in Germany between 2003 and 2006 recruited 2,863 children and adolescents aged 7-17 years (Ravens-Sieberer et al, 2008). Using the Strengths and Difficulties Questionnaire (SDQ) for the detection of overall mental health problems and then the SDQ-Impact supplement for impairment, the researchers administered other standardized screening instruments for specific diagnoses. The researchers found an overall prevalence of 14.5%, with conduct disorders reported to be as high as 9.7% among the 11-17-year age group and 8.7% among the 7-10-year age group. ADHD was the least prevalent disorder (2.2% among age 11-17 years and 3.9% among age 7-10 years). Males scored higher prevalence in both childhood (7-10 years) and adolescence (11-17 years). More than 50% of boys and more than 75% of girls with mental disorders in this study did not seek treatment until the time of interview.

Studies conducted in school children have also reported similarly high prevalence. A prevalence study of child and adolescent mental disorders among 3,418 Italian school children aged 10-14 years living in seven urban settings in a two-phase design using the Child Behavior Checklist (CBCL) for screening and the DAWBA interview instrument, with both children and parents found an 8.2% prevalence of DSM-IV disorders (Frigerio et al, 2009). Internalizing disorders

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were found to be significantly more prevalent (6.5%) than externalizing disorders (1.2%). This peculiarly low rate of externalizing disorders, which is in agreement with such reports from studies of Italian adults (Gigantesco et al, 2006, Demyttenaere et al, 2004), merits interest because, it might reveal significant evidence in the relationship between culture and mental health. However, school teacher ratings are important to accurately identify disorders of conduct (Ford, Goodman and Meltzer, 2003) and the absence of teacher report in this study may explain the low prevalence of externalizing disorders detected.

2.2.3. Prevalence and patterns of child and adolescent mental disorders in the developing world

Even though research in the developing world lags far behind that of the developed world (Polanczyk et al, 2015), a number of community, school and hospital based studies have been conducted in developing regions.

Vicente et al (2012) conducted the pioneer nationwide representative child and adolescent mental disorder prevalence, correlates and service utilization survey in Latin America. In this cross-sectional community study, 1,558 Chilean children and adolescents aged 4 to 18 years were evaluated using the DISC-IV administered by interviewers to all participant children aged 12-18 years and to parents of children aged 4-11 years. A high prevalence (22.5%) of impairing DSM-IV mental disorders was reported. Disruptive behavior disorders were the most prevalent disorders reported (14.6%) followed by anxiety disorders and affective disorders, 8.3% and 5.1% respectively. Substance use was also documented to be 1.2% prevalent. Nearly 60% of those diagnosed with mental disorders did not seek any form of treatment.

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This study reported a very high rate of comorbidities. Nearly a quarter (24.8%) of those diagnosed with any mental disorder received more than one diagnosis and 6.3% of them received three or more DSM-IV diagnosis.

Gender and age were found to be strongly correlated with mental health in this study. Strong correlations between gender and specific diagnoses were also reported. The gender-based prevalence was, however, opposite to results recorded in studies in developed settings. Girls had significantly higher diagnosis of any mental disorders (25.8%) compared to the 19.3% prevalence in boys. Moreover, girls were found to be more likely to have anxiety disorders such as generalized anxiety disorders (Odds Ratio (OR) =4.5) and social phobia (OR= 3.4). Interestingly, no gender difference was observed in regard to disruptive behaviors and substance use disorders.

Prevalence of mental disorders was significantly higher among children aged 4-11 years (27.8%) than among adolescents aged 12-18 years (16.5%). This finding is also opposite to results found in studies conducted in developed settings. Regarding prevalence of specific disorders by age, no age difference for affective disorders and anxiety disorders was reported. ADHD and oppositional defiant disorders (ODD) were more common among age group 4-11 years than age group 12-18 years whereas conduct disorders were more prevalent in the latter group.

In addition to gender and age, perception of poor family functioning, parental psychopathology and family income were found to be strongly associated with the mental health of children and adolescents in this community.

Research in Asian countries also repots high prevalence of child and adolescent mental disorders. A community-based cross-sectional study in United Arab Emirates assessed 620 children of Arab origin aged 8-18 years old using the Rutter A2 questionnaire (Eapen et al, 2001). This

study reported a mental disorder prevalence of 11.8%. The prevalence of conduct disorders among boys was found to be 1.4 times that of girls whereas prevalence of emotional disorders in girls was 1.3 times that of boys.

The researchers in the Asian study also reported statistically significant associations between child and adolescent mental health and psychopathology and alcohol or drug abuse in family. However, they did not find any association between mental health and family size, socioeconomic status and family structure, factors that are documented to be strong correlates of mental disorders in many studies. This can be explained by two reasons. First, Eapen et al enrolled two children from the same household if that household had a boy and a girl in the sample age group. This resulted in only 321 households participating in this study, which might have constituted a sample too small to detect the strengths of the association of these family characteristics with mental health satisfactorily. Secondly, three quarters of participant households had more than four children. This means a great majority of the households had similar size, which apparently makes it difficult to measure the effects of family size.

An overall DSM-IV disorders prevalence of 15.7% was reported among Yemeni children and adolescents in a study by Alyahri and Goodman (2008). In this cross-sectional community study, 1,210 children and adolescents aged 7-10 years from urban and rural settings were assessed using the SDQ and DAWBA. Anxiety disorders were found to be the most prevalent disorders (9.3%) followed by behavioral disorders (7.1%). No urban-rural differences were detected.

A national representative survey in Vietnam interviewed 1,314 adult informants of children and adolescents aged 6-16 years old using the SDQ and CBCL and 591 adolescents aged 12-16 years using the SDQ-self report and Youth Self Report (YSR) (Weiss et al, 2014). Overall, a prevalence of 13.2% from SDQ score and 11.9% from CBCL scores was reported. Prevalence

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among adolescents aged 12-16 years was reported to be 10.7% from SDQ self-report and 12.4 from the YSR scores.

They also documented child's age and gender, family size, income, time parents spend talking to child and parental educational level as correlates of mental disorders in the community of Vietnamese children and adolescents.

A study that assessed 2,064 children aged 0-16 years from middle class urban, urban slum and rural communities in India reported prevalence of mental disorders by age group (Srinath et al, 2005). This study reported that 13.8% of children aged 0-3 years had at least one mental disorder while the proportion among the 4-16 years age group was 12%. They reported no difference in prevalence between middle class urban, slum urban and rural dwellers.

A cross-sectional community based study of 261 children aged 4-16 years in Bangladesh using the SDQ found a 17.9% prevalence of mental problems (Mullick and Goodman, 2001). The same researchers using the DAWBA in a sample of 922 children aged 5-10 years in another Bangladeshi community found a 15% prevalence of ICD-10 disorders (Mullick and Goodman, 2005).

Prevalence among school children is also found to be high in the developing world. A school based study of 9,806 children and adolescents aged 6-17 years in Northeast China reported the overall prevalence of DSM-IV disorders to be 9.49% using the SDQ for screening and the DAWBA for final diagnosis. A high proportion of these children (15.2%) who received a diagnosis had more than one disorder. Another study in North India which recruited 963 school children aged 4-11 years reported ICD-10 disorders prevalence of 6.33%, the most prevalent disorder being enuresis (Malhorta and Pradhan, 2013). They used the Rutter B scale and an Indian adaptation of the CBCL in this study.

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The lower prevalence of mental disorders found in school-based studies in the developing world may be explained by the fact that many mentally ill or at risk children do not enroll is school (Filmer, 2000) or dropout from school (UNESCO, 2002) more commonly than other children.

2.2.4. Prevalence and pattern of child and adolescent mental disorders in Africa

Studies of prevalence and patterns of child and adolescent mental disorders on the continent of Africa have been very limited (Cortina eta al, 2012). In their review of such studies in the Sub Saharan Africa region, Cortina et al found only 11 studies that addressed prevalence of more than one disorder which used sample sizes greater than 100 in the age range of 0-16 years between 1977 and 2008. Furthermore, all these 11 studies were conducted in only 6 Sub Saharan countries. These studies consistently show that mental disorders among children and adolescents of this region are common.

The first child and adolescent mental health epidemiologic study in the developing world was conducted in rural central Sudan by Cederblad in 1968 (Cederblad, 1968). This community based study of 1,716 children aged 3-15 years reported an 8% prevalence of psychiatric disorders.

A cross-sectional community study in rural Western Ethiopia used Reporting Questionnaire for Children (RQC) and CBCL to assess 611 children aged 6-11 years and reported a prevalence of 21.45% in boys and 25.17% in girls (Mulatu, 1995). Another community study in central Ethiopia which recruited 3,000 children from rural and urban settings reported mental disorders in 17.75 of them (Tadesse et al, 1999). This study used only the RQC. They found prevalence higher in boys than in girls. They also reported that children whose parents were above 52 years of age or unmarried, divorced, separated or widowed and those whose mothers had

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psychopathologies had statistically significantly higher (OR>2) rates of mental disorder diagnosis. They did not report prevalence by location of residence. Another study in rural Southern Ethiopia interviewed 718 parents or caregivers of 1477 children aged 5-15 years using the Diagnostic Instrument for Children and Adolescents revised (DICA-R) and reported a 3.5% prevalence of DSM-III mental disorders, with 78% of these having two or more mental disorders (Ashenafi et al, 2001). In this study an unexpectedly low prevalence of internalizing disorders (1.6% for anxiety) was reported. Disruptive behaviors and mood disorders were also detected among few children in this study (1.5% and 1% respectively). Generally, the study lacked procedural standards because diagnostic interviews were administered by eight local residents. Even though all of these studies report high prevalence estimates, there is large disparity in the estimates. This, in addition to the methodological inconsistency (some using screening instruments while others used diagnostic instruments), may be due to the fact that the three studies were conducted in geographically different locations. Researcher has shown that prevalence can vary geographically even within a country (Kieling and Rohde, 2012).

A rural community study of 500 Nigerian children aged 5-15 found a 15% prevalence of mental disorders, emotional disturbance and conduct disorders constituting the majority (66.7%) of diagnoses (Abiodun, 1993). A prevalence of 15.2% was found in another community study of 500 children aged 6-16 years in South Africa using both children and their parents interviews with the DISC version 2.3 (Robertson et al, 1999).

School-based studies have also reported high prevalence in many African countries. In a study, which screened 1,276 secondary school students aged 13-22 years old for depression, using the Child Depression Inventory (CDI), in Nairobi, clinically significant depression was reported in 26.4% of them (Khasakhala et al, 2012). There was no age difference observed but girls and

boarding school students had higher rates of the depression. This was found to be strongly correlated to suicidal behavior.

In a cross-sectional study in economically disadvantaged rural schools in South Africa Cortina et al (2013) assessed 1,025 children aged 10-12 years using the teacher and child completed SDQ, YSR, Trauma Symptom Checklist and scales for depression and anxiety. From the teacher completed questionnaires, they found that 41% of the children had at least one mental disorder. Child completed questionnaires revealed that 14.1% of children had clinically significant anxiety and depressive disorders while 23.9% had Post Traumatic Stress Disorder (PTSD). They also identified correlates including maternal educational level, mother's partnership status and second generation refugee status. In Nigeria, Adelekan et al (1998) interviewed parents of primary school children using the Rutter scale A2 and reported a prevalence of 18.6%.

Studies of children and adolescents visiting primary paediatric facilities have also reported high prevalence of mental disorders. Giel et al (1981) found a prevalence of 12% in Sudan in which they assessed 250 children attending a primary care facility using RQC as a first stage screening tool followed by a clinical interview by a psychiatrist for diagnosis. However, primary health workers detected less than a quarter of those children with mental disorders. A cross-sectional study that assessed 990 children and adolescents aged 7-14 years who attended the general outpatient department of a tertiary hospital in Nigeria using the Child Behavior Questionnaire (CBQ) and the Schedule for Affective Disorders and Schizophrenia present episode (KSADS-P) reported that 19.6% of them had clinically significant DSM-III mental disorders (Gureje et al, 1994). Furthermore, Gureje and Omigbodun (1995) reported factors significantly correlated to the diagnosis of any DSM-III disorders including having a mother with no formal education, having repeated grades at school, frequent visit to the clinic in the previous six months, living

with only one or neither of the parents and having come from a low socioeconomic background. The diagnosis of anxiety disorders was also found to associate with the presence of serious illness and having a mother with high level of psychological distress.

2.2.5. Prevalence and pattern of child and adolescent mental disorders in Eritrea

A small cross-sectional hospital based descriptive study in Eritrea, which recruited 42 inpatient children in the pediatric national referral hospital found the prevalence of anxiety disorders to be 33%, pervasive developmental disorders 30%, psychosomatic disorders 25% and behavioral disorders, predominantly ADHD, 10% (Joshi et al, 20009. There is no other published prevalence study conducted among Eritrean children and adolescents.

2.3. Correlates of mental disorders in children and adolescents

The identification of conditions or events or factors associated with high incidence of mental disorders in children and adolescents as well as protective factors is one of the first and most important steps in the development of rational prevention strategies (Shaw et al, 1994). Research has found a number of differences between children who receive a mental disorder diagnosis and those who do not, and these can be categorized as biological, psychological and social factors (correlates) (Bronfenbrenner, 1979).

2.3.1. Biological correlates

A number of biological correlates of mental disorders among children and adolescents have been described including genetic factors, intelligence, temperament, age, gender and the child's as well as family members' physical health (Whitlock and Schantz, 2008).

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Significant genetic risk has been documented for developmental disorders (Landrigan, 2010, Thapar et al, 2013), conduct disorders (Reif et al (2007) and affective disorders (Smearman et al, 2016). Moreover, a study published in 2014 found that the same alleles that predispose to schizophrenia also predispose to the use of cannabis, a drug which has been associated with a risk for psychotic symptoms (Power et al, 2014). However, it does not mean that all who have the genetic factors develop disorders or all those who develop disorders have the risk genes (Whitelock and Schantz, 2008) as environmental context influences the expression of genes (Shonkoff and Phillips, 2000).

A child's temperament, defined as biologically constituted consistent individual differences in reactivity to internal or external stimulations in patterns of motor and attention regulation (Prior, 1992) is strongly linked to the child's mental health (Sanson and Prior, 1999). A child with easy or flexible temperament enjoys favorable interactions and relations which minimize stress and promote mental health while a child with difficult or slow-to-warm-up temperament has high probability of growing up under maladaptive parenting which predisposes to mental disorders (Laukkanen et al, 2014).

Even though the overall prevalence of mental disorders in boys and girls is similar, prevalence of specific disorders varies by gender. Most anxiety disorders and adolescent depression are more common in girls, whereas ADHD, autism, childhood conduct and oppositional defiant disorders, learning disorders, speech and language disorders and adolescent substance use are commoner in boys (Hartung and Widiger, 1998). Different ages of onset for different classes of disorders were described by Merikangas et al (2010). They found median age of anxiety, behavior, mood and substance use disorders to be 6 years, 11 years, 13 years and 15 years respectively in a nationwide representative study in the United States of America.

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Chronic illnesses and disabilities in children and adolescents cause significant stress that is associated with increased risk of developing emotional and behavioral disorders (Hack et al, 2005, Gortmaker et al, 1990, Cadman et al, 1987). Cohen et al (1998) identified independent association of physical ill health and increased risk for mental disorders in a longitudinal study by controlling for other known correlates. In addition to the direct suffering from the illness, stressful experiences in relation to medications or treatment procedures and their complications cause significant risk (Ramsawh, Chavira and Stein, 2010).

Early resilience (successful adaptation and maintaining of normal mental health after exposure to adversity) is an identified protective factor in vulnerable children and predicts adult adjustment and better health, whereas children who struggle in face of adversity and fail to appropriately attain developmental stages exhibit more mental disorders (Luthar, Cicchetti and Becker, 2000). Psychopathology in family members is strongly linked to increased child mental disorders. Maternal chronic depression increases the risk of infant psychopathology by fourfold compared to infants of mothers with no depression (Apter-Levy et al, 2013, Grote et al, 2010) and such children followed longitudinally for 20 years were found to have three times higher risk as adolescents (Weissmann et al, 2006).

2.3.2. Psychological correlates

Intelligence and personality exert significant influences on mental health in children and adolescents through their impact on academic achievement, self-efficacy and future optimism (Laidra, Pullmann and Allik, 2007). Matthys et al (1999) reported that children who have deficiencies in encoding social cues and generating responses experience more social challenges and hence are at higher risk for externalizing and internalizing disorders than children who have no problems in these areas. Moreover, higher social intelligence and coping positively predict

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empathy, which in turn mitigates disruptive behavior disorders and promotes prosocial behavior (Carlo et al, 2012)

High self-esteem protects children and adolescents from mental disorders (Dekovic, 1999), whereas low self-esteem predisposes them to failure to form positive social networks (Marshall et al, 2014) resulting in higher risk for mental disorders (Orth, Robins and Meier, 2009).

2.3.3. Social correlates

Multiple social stressors that increase the probability of a child developing mental disorders have been published. Child-parent attachment security during early childhood and adolescence is significantly associated with child mental health (Lyons-Ruth et al, 1993, DeVito and Hopkins, 2001 Madigan et al, 2013, Obsuth et al, 2014) and their interpersonal relationships throughout life (Schneider, Atkinson and Tardif, 2001, Pallini et al, 2014). These studies showed that disorganized or insecure avoidant or coercive insecure attachment pose specifically high risk for internalizing and externalizing disorders.

Family and peers are the second most important influential factors, after individual dispositions, in the development and wellbeing of children and adolescents (Bronfenbrenner, 1979, Parker et al, 2014). Maltreating families are exemplified as toxic relational environments that put children at high risk of mental disorders (Cicchetti and Toth, 2005). Moreover, victimization to bullying and rejection by peers are strongly associated with high risk of externalizing and internalizing disorders, whereas peer acceptance is associated with lower internalizing symptoms (Kim and Cicchetti, 2010).

Mental health of children is also strongly influenced by the parenting style they experience (Calafat et al, 2014). In their review of association of parenting style with mental health outcomes of children using data from six European countries, Calafat et al compared the four

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parenting styles classified based on the degree of responsiveness and demandingness exercised by the parents as authoritative (highly demanding and highly responsive to the needs of the child), authoritarian (highly demanding but less responsive to the needs of the child), indulgent (highly responsive to the demands of the child but no demands on the child) and negligent (not responsive and not demanding). They found that authoritative and indulgent parenting styles were associated with better mental health outcomes than authoritarian and negligent styles in all the countries. Many other studies have reported that authoritative parenting promotes child's mental health while authoritarian parenting exposes the child to emotional and behavioral disorders (Uji et al, 2014). Smokowski et al (2015) conducted a longitudinal study on 2,617 adolescents and found that present negative parenting was strongly related to higher adolescent anxiety, depression, aggression, low self-esteem and lower school performance and satisfaction, whereas positive parenting was associated with future optimism, higher school performance and satisfaction, high self-esteem and less depression.

A non-supportive family environment is significantly associated with high risk of child psychiatry (Repetti, Taylor and Seeman, 2002). Parental conflict and divorce are associated with increased risk of anxiety, depression and antisocial behaviors in the child (Strohschein, 2005). This study reported that children whose parents later divorced had higher levels of these disorders before the event of divorce than children whose parents lived married. Divorce further increased the risk of anxiety and depression.

Children of low socioeconomic status, which is characterized by a constellation of risks including low household income, low level of parental employment, poor nutrition, low parental (particularly maternal) education, single parent status, limited resources, high risk neighborhood (Mash and Barkley, 2014), family disruption and residential instability (Gilman et al, 2003),

manifest significantly higher rates of all classes of mental disorders with higher recurrence and poorer remission than children of higher socioeconomic status (Chen et al, 2014) during childhood and adulthood (Gilman et al, 2003).

Adverse childhood experiences confer significantly high risk of psychopathology during childhood and later in adult life (Widom, DuMont and Czaja, 2007, Anda et al, 2006). Such experiences include the experience of abuse (emotional, physical, social), and neglect (emotional, physical). Also, growing up in households where domestic violence is witnessed, members abuse drug or alcohol or have mental illnesses, there is relational stress (such as separation or divorce) or where members exhibit criminal behaviors results in high risk for developing mental health problems. An expert consultation in May 2009 added forced marriage, witnessing criminal and collective violence in the community, early conscription, exposure to bulling and sibling physical and emotional violence to the above list (Anda et al, 2010).

2.4. Relevance of the study to Eritrea

The child and adolescent population of Eritrea constitute 53.6% of its total population (Eritrea Population Health Survey, 2010). Such a large population of children and adolescents with optimal mental health is a great asset for nation building and future prosperity (Sawyer et al, 2012), whereas unattended mental health problems diminish productivity and cause major economic burden and reinforces poverty at individual and national levels (Knapp et al, 2006). Even though no community research regarding the prevalence, patterns and correlates of mental disorders in the child and adolescent population of Eritrea had been published to date before the conduct of this study, it was expected to be high based on the findings of studies in neighboring countries (Mulatu, 1995, Tadesse et al, 1999, Giel et al, 1981, Alyahri and Goodman, 2008).

In its aspiration to promote the mental health of the population of the nation, the Ministry of Health of the State of Eritrea has drafted a National Mental Health Policy which aims to deliver mental health services through integration in primary care and community based services (Eritrean National Mental Health Policy and Strategic Action Plan, 2012-2016). The firm stance of the government of the State of Eritrea that mental health is indivisible from general health is explicitly stated in the policy. However, there is no separate Child and Adolescent Mental Health policy in the country. Among other determinant factors, lack of awareness among policy makers has been found to result in low prioritization of child and adolescent mental health (Patel et al, 2008). This findings of this project will contribute by filling this gap which may result in the formulation of a child and adolescent mental health policy to guide resources mobilization, service organization, training and research. Given the prominent necessity of timely local situational assessment to inform policy (Ford, 2008) and the failure of policies which lack information from such sources, to provide rational services (Albrecht et al, 2012), this study has high relevance. The commitment shown and the experience and confidence gained in remarkably achieving MDG 4 (WHO IGME report, 2015), lays solid ground for a successful investment in the mental health of the children and adolescents of Eritrea and a repeat of that success in achieving SDG 3. This project is the first research study to assess the prevalence, correlates and patterns of child and adolescent mental disorders in an Eritrean community.

CHAPTER THREE

METHODOLOGY

3.1 Study Location

Mendefera is the capital city of the Debub Region in Eritrea and is located 54 km south of Asmara, in the southern highlands of Eritrea, and 1972 meters above sea level. It is home to 41,854 inhabitants out of which 51.2% are children and adolescents (Eritrea Population Health Survey, 2010). Mendefera's administrative structure consists of four Local Administration Areas (LAAs) under the City Municipality. These LAAs are Adi Ugri, Adi Bari, Hadish Adi and Adi Hare LAAs. The Tigrigna language is spoken by all inhabitants of Mendefera and the entire community shares similar culture and lifestyle (The State of Eritrea, Zonal Administrative Structure, 1997).

The rate of enrollment at the primary school level is 95.5% and it is 93.4% at Junior School level , while dropout rate is 5% (State of Eritrea, Ministry of Education Statistics, 2012). This record shows that literacy rate in the adult population of Eritrea is 81.0% for males and 76.0% for females.

3.2 Study Design

The study is a cross-sectional descriptive community study aimed at determining the prevalence, pattern and correlates of mental disorders among children and adolescents aged 4-17 years in Mendefera, Eritrea using interviewer administered questionnaires.

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3.3 Sample size calculation

The minimum sample size is calculated using the formula

$$N= \frac{Z\alpha^2 P(1-P)}{D^2}$$, (Naing et al, 2006)

Where N= the minimum sample size required for the study

Zα= standard normal deviation corresponding to two sided level of significance (α) of 5% (1.96)

P= proportion with outcome (mental disorder/s)

D= degree of precision at 5%.

There is no published research on the prevalence and correlates of mental disorders among children and adolescents in the Eritrean community. However, since a study in neighboring Ethiopia found a prevalence of 25.17% in boys (Mulatu 1995), prevalence report will be used. Using this prevalence, the above formula gives:

$$N= \frac{(1.96)^2(0.2517)(0.7483)}{(0.05)^2}$$

N=290

Anticipating a non-response rate of 10%, N= 320. Therefore, the study will assess mental health of a minimum of 320 children and adolescents aged 4-17 years.

3.4   Study Population

3.4.1 Inclusion Criteria

All members of the child and adolescent population of the Mendefera community aged 4-17 years were sampled for random selection to participate in this study.

3.4.2 Exclusion criteria

1. All children and adolescents whose ages were doubtful and did not have a birth certificate to prove their age lied within the age brackets of this study

2. All children and adolescents who did not assent or whose parents or adult caregivers did not consent to participate in the study

3. Children below age 4-10 years whose parents couldn't speak either Tigrigna or English

4. Adolescents age 11-17 years who couldn't speak either Tigrigna or English

5. Children and adolescents who were too ill to participate or who had hearing or speech disabilities.

3.5 Sampling Technique

To select the participants, a multi-stage random sampling method was used to select the Local Administration Area, the households and finally the participant child or adolescent as follows.

3.5.1. Selection of the Local Administration Area

Out of the four Local Administration Areas of the Mendefera subzone, Hadish Adi LA was selected by balloting.

3.5.2 Selection of the household

Records of the Hadish Adi LA office show that there are 11,050 inhabitants in 1,380 households. This was taken as the sampling frame. By dividing this by the minimum number of households to be approached (320), the sampling interval was found to be 4. This means after recruiting the first household randomly, subsequently, every 4th household in the sample frame was selected for the study.

3.5.3 Selection of children and adolescents

In every randomly selected household which had more than one child or more than one adolescent, one child or one adolescent was randomly selected and interviewed. If a selected household had only one child or one adolescent, the child or adolescent was recruited automatically. If a selected household had children and adolescents, one of the children and adolescents was selected randomly. If the selected household did not have any children and adolescents, the household immediately next to it was recruited.

3.6 Study Instruments

The Socio-demographic Questionnaire (Omigbodun et al, 2008), The School Health Questionnaire, The Strengths and Difficulties Questionnaire (SDQ) Self and Parent versions and

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the Kiddie Schedule for Affective Disorders and Schizophrenia Lifetime version 2009 Working Draft (K-SADS-PL 2009 Working Draft) were used for data collection. The researcher was trained on the use of both SDQ and the K-SADS-PL 2009 Working Draft by a Child Psychiatrist from the Center for Child and Adolescent Mental Health, University of Ibadan, Nigeria. The training included a lecture on the techniques on how to use the instruments and administer each part of the questionnaires, demonstration by the trainer and then finally practice exercise by the trainee (the researcher) supervised by the trainer.

3.6.1 Socio-demographic Questionnaire (Omigbodun et al, 2008)

This is a 44-item questionnaire designed to collect information regarding personal, family and school life of the respondent adapted from a 40-item socio-demographic questionnaire used in a recent Nigerian study of child and adolescent mental health (Omigbodun et al, 2008). It was adapted and translated in to Tigrigna using the back-translation method to suit local use.

3.6.2 The School Health Questionnaire

This instrument is used to collect socio-demographic and health information of adolescents aged 13 to 17 years. It was developed by World Health Organization and Center for Disease Control for Global School Based Health Surveillance System. It is a self-completed questionnaire, and it was administered to participants aged 13-17 years in this study. Out of the 12 core modules of this questionnaire, 6 core modules (Alcohol Use Module, Drug Use Module, Mental Health Module, Protective Factors Module, Tobacco Use Module and part of the Violence and Unintentional Injury Module) were used to collect data from adolescents regarding alcohol and substance use, suicidality, violent behaviors, victimization to bullying and protective factors.

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This also was translated in to Tigrigna using the back-translation method. This was the only instrument which was not administered by interviewers, but rather completed by the adolescents themselves.

3.6.3. The Strengths and Difficulties Questionnaire

Overall mental health will be assessed using the extended version of the SDQ. This is a 25-item behavioral screening questionnaire to identify children at high risk (Goodman, 2001), which assesses negative attributes in four subscales of mental symptoms (conduct problems, emotional symptoms, peer problems, hyperactivity-inattention) and positive attributes in terms of prosocial behavior in the previous 6 months (Muris, Meesters and van den Berg, 2003). It also enquires whether the informant thinks the child has emotional or behavioral problems, and if they think so, it asks about the degree of stress and impairment in social competence. The teacher and parent versions can be administered to teachers and parents of children aged 4-17 years, while the self-report version can be completed by children aged 11-17 years themselves (Goodman, 1997). The reliability and validity of this instrument has been shown to be acceptable (Muris, Meesters and van den Berg, 2003). This instrument is widely used (Klasen et al, 2000) including in many developing countries (Cortina et al, 2013, Kashala et al, 2005), the most similar setting of its use being neighboring Ethiopia (Mulatu, 1997). The instrument performs at least as well as the CBCL, with the added advantages of its brevity, better coverage of inattention, peer relationship and prosocial behavior, and its focus on strength (Klasen et al, 2000).

After scoring the 25 items on a 3-point scale, (0=not true, 1=somewhat true, 2=certainly true), all items of the four problem areas (sub-scores of which range from 0 to 10 (Goodman, 1997)) were summed up to generate a total difficulty score between 0 and 40. Scores 0-13 were classified as

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normal, 14-16 as borderline and 17-40 as abnormal (Meltzer et al, 2000). The SDQ- Impact questions (5 items) were asked to assess functional impact of the problems on the child and classified as 0=normal, 1=borderline and two and above as abnormal. Children scoring in the abnormal range in any subclass of disorders or in the total scores were further assessed using the K-SADS-PL 2009 Working Draft.

3.6.4 The Kiddie Schedule for Affective Disorders and Schizophrenia Lifetime version 2009 Working Draft (K-SADS-PL 2009 Working Draft)

The Schedule for Affective Disorders and Schizophrenia Lifetime version 2009 Working Draft (K-SADS-PL 2009 Working Draft), which is adapted from the Kiddie Schedule for Affective Disorders and Schizophrenia Lifetime (K-SADS-PL) by Axelson et al (2009), with modifications including the removal of any references to DSM-III, addition of screening and supplement questions for Pervasive Developmental Disorders and revision of the bipolar disorders section, is a semi structured interviewer administered diagnostic interview instrument designed to assess current and past episodes of psychiatric disorders in children and adolescents aged 6-18 years according to DSM-IV criteria (Axelson et al, 2009). It is administered to children, parents or teachers to generate summary ratings. This instrument has two parts; the diagnostic screening part which surveys for and rates the primary symptoms of disorders and the diagnostic supplement part in which children who score above threshold during screening are assessed for the diagnosis of current and most severe past psychiatric episodes. In this study, the diagnostic supplement part was used by the author of this research to make a diagnosis of present or severe

past episode of DSM-IV disorder in children screened to have either of the emotional, conduct, peer relationship or hyperactivity/inattention problems on SDQ screening.

3.7 Ethical Considerations

3.7.1. Ethical Approval

Ethical approval was obtained from the Health Research and Scientific Ethical Review Committee of the Ministry of Health, State of Eritrea. Local authorities were addressed with formal letters for permission and cooperation.

3.7.2 Informed Consent

Consent was obtained from the parents or adult guardians of every child or adolescent, while voluntary assent was obtained from every child or adolescent participant. This was done after detailed information about the study had been provided to the child and guardian in the Tigrigna or English language, as appropriate.

3.7.3 Voluntariness

Every participant was clearly informed that participation was fully voluntary and decision not to participate had no negative consequences. Every participant was also informed of their right to withdraw at any stage of the research interviews with no consequences.

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3.7.4 Beneficence

Children, adolescents and parents or adult caregivers participating in this study did not get any direct and immediate benefits from the study. The benefits to the community, and thereby to them, that results from the information this study may highlight to inform public health policy for better child and adolescent mental health service structure was explained to them. Children and adolescents diagnosed by the researcher with a mental disorder were provided information about and linked to the available treatment services.

3.7.5 Non-maleficence

The study did not pose any threat to the participants. Participants' autonomy was respected during the interviews.

3.7.6 Confidentiality

Every participant's identity was anonymous. Index numbers were used. Data gathered will be kept confidential and will be accessible only to the researcher and the analysis team. Data will also be used in publications and presentations.

3.8 Study Procedure

3.8.1 Adaptation of survey instruments

All interview instruments were translated into Tigrigna. In order to preserve the original meaning of each item during translation, the back-translation method was used (Parry, 1996). First a

physician, fluent in both Tigrigna and English, translated the instruments in to Tigrigna. Then another doctor, with fluency in both Tigrigna and English, previously unfamiliar with these instruments, translated them back to English. Even though the SDQ questionnaires can be completed by parents and adolescents themselves, all interview instruments were administered by interviewers unless the adolescent wanted to complete it themselves, which happened in few cases during this study.

3.8.2 Training of research assistants

Four research assistants, one physician and three Nursing Degree graduates with work experiences in general hospitals, who speak Tigrigna and English fluently were given a one day training in the use of the interview Sociodemographic, School Health and SDQ questionnaires and scoring the SDQ results by hand.

3.8.3 Pretesting the instruments

A one-day pre-test study was conducted on a small sample (N=12) of children and adolescents with in the study sample age brackets in a different LA area from the study site, to field test the general feasibility of the procedures in terms of time, ease of understanding of the contents and level of proficiency of the assistants and to identify potential problems ahead of the main study. The Adi Ugri LA was selected for the pretesting. During this day, each research assistant completed three interviews; one each for ages 4-10 years, 11-12 years and 13-17 years. This was necessary because different number of questionnaires were used for these different age groups.

3.8.4 Results of the pretesting study

On average, it took 30 minutes to complete the interview and scoring of age group 4-10 years, whereas it took on average 40 minutes for the age group 11-12 years and 50 minutes for the age group 13-17 years. Based on this, it was agreed up on that it would take 40 to 50 minutes to complete each interview and scoring during the actual data collection process. Interviewers were comfortable using the survey instruments. Level of proficiency of interviewers was good and further discussions enabled the exchange of ideas and developing a common understanding in using similar ways when trying to explain survey questions, whenever needed, in order to increase inter-rater reliability.

3.9 Data collection process

In order to ensure that a considerable number of selected households were able to participate in the study, the interview was conducted after school and work hours: between 5 pm and 9 pm and during weekends. Completing 10 to 16 interviews daily, the data collection process was completed in 37 days between February 1 and March 16 2017.

3.9.1 Stage one interview procedures

Only SDQ (P^{4-10}) and the Sociodemographic Questionnaire were administered to parents or adult guardians of children aged 4-10 years in the first stage, whereas in the case of adolescents aged 11-17 years, in addition to the Sociodemographic Questionnaire and the parent completed SDQ (P^{11-17}) completed by parents or adult guardians, the self-completed SDQ (S^{11-17}) was administered to the adolescents themselves for mental health screening and The School Health

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Questionnaire was used only in age group 13-17 to assess for substance and alcohol abuse, suicidality and bullying. The same sociodemographic questionnaire was administered to all participants. Figure 3.9.3 shows the steps which were followed in the data collection process.

Scores for each SDQ subclass and total difficulty scores were determined by the interviewers at the scene by hand scoring.

3.9.2 Selection of participants for stage two interview

All children who scored in the abnormal range of scores on the parent completed SDQ P[4-10], all adolescents who score in the abnormal range on either the parent completed SDQ P[11-17] or the self-completed SDQ (S[11-17]) or who were found to have had suicidal ideations or attempts, substance or alcohol abuse by the School Health Questionnaire, regardless of their SDQ score, were selected for further assessment using the K-SADS-PL 2009 Working Draft. Research assistants reported abnormal scores immediately through telephone calls and researcher went to the household on the same day and carried out the diagnostic assessment using the K-SADS-PL 2009 Working Draft to assess for affective, psychotic, anxiety, behavioural, substance use and autism spectrum disorders. In occasions when two or more assistants called at the same time, or parents preferred to postpone the stage two interview, an appointment was fixed for a convenient time.

3.9.3 Stage two interview procedures

SDQ subclasses were paired with K-SADS-PL 2009 Working Draft Supplements as shown in Table 3.1 below. Those who screened as having emotional problems by SDQ were assessed

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using the supplements for affective disorders, psychotic disorders and anxiety disorders. Those who screened as having conduct problems or hyperactivity/inattention problems were assessed using the supplements for behavioral disorders and substance use disorders. Children and adolescents with peer relationship problems were assessed using the supplements for autism spectrum disorders, conduct disorders and substance use disorders. Children and adolescents who screened positive for more than one SDQ subclass of disorders were assessed with each of the appropriate supplements for specific disorders as per the table below.

Adolescents who reported positive for suicidal ideation or attempt or substance or alcohol use by the School Health Questionnaire were further assessed using the Affective, Conduct and Substance use disorders supplement of the K-SADS-PL 2009 Working Draft.

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Figure 3.9.3 Data collection steps flow chart

SDQ administered by research assistants to parents or adult guardians of every randomly selected child & to adolescents 11-17 years. Hand scoring done at the scene	**Those scoring in the abnormal range selected for further assessment**
Children & adolescents scoring in SDQ abonrmal range & their parents or adult caregivers interviewed using K-SADS-PL 2009 Working Draft	**Specific DSM-IV diagnoses generated**
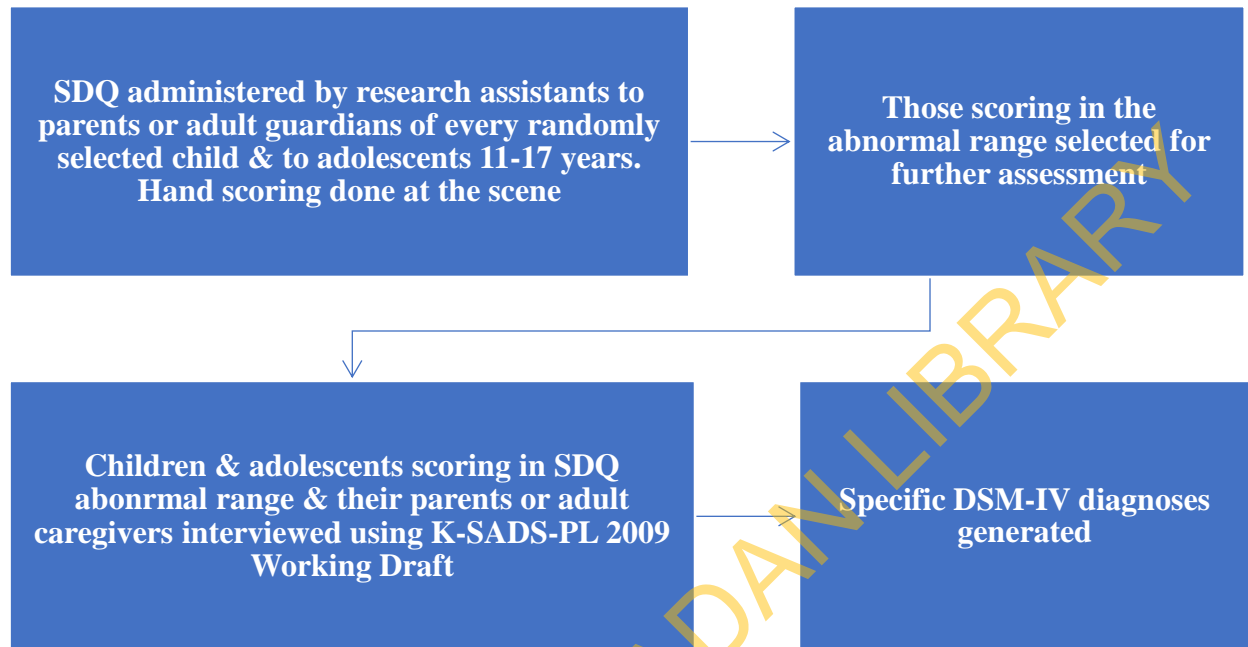
Table 3.9.3 SDQ subclasses and K-SADS 2009 supplements pairing

Abnormal SDQ subclass	Diagnostic K-SADS-PL 2009 Working Draft supplement	Specific disorders sought
Emotional problems	Affective disorders supplement	Depression, mania, hypomania, bipolar disorder
	anxiety disorders supplement	panic disorder, separation anxiety disorder, social phobia, phobic disorders, generalized anxiety disorders, PTSDs, obsessive-compulsive disorders
Conduct problems	Behavioural disorders supplement	Conduct disorders, oppositional defiant disorders, ADHD,
	substance use disorders supplement	Alcohol abuse, substance abuse

Table 3.9.3 SDQ screen subclasses and K-SADS 2009 supplements pairing (continued)

Hyperactivity/inattention problems	Behavioural disorders supplement	ADHD
Peer relationship problems	Autism disorders supplement,	Conduct disorders, oppositional defiant disorders, ADHD,
	Substance use disorders supplement	Alcohol abuse, substance abuse
	Behavioural spectrum disorders supplement	ASD
	Affective disorders supplement	Depression, mania, hypomania, bipolar disorder
	Anxiety disorders supplement	panic disorder, separation anxiety disorder, social phobia, phobic disorders, generalized anxiety disorders, PTSDs, obsessive-compulsive disorders

3.10 Data Management

All data gathered was entered in to CSPro version 6.2 and was transported in to the Statistical Package for Social Sciences (SPSS) version 20 for analysis. Participants' socio-demographic characteristics are presented in percentages and frequencies. The overall prevalence of mental health problems and the prevalence of mental problems by age and gender are also presented in frequencies and percentages. For adolescents age group 11-17 years, prevalence estimates from parent completed SDQs and from self-completed SDQS are compared. Overall prevalence, prevalence within gender and within age of K-SADS-PL 2009 Working Draft, supplements-based specific DSM-IV disorders and their patterns are presented in frequencies and percentages. Association of these disorders with selected socio-demographic characteristics are examined using Chi-square test at a significance value of 5%. For all significant bivariate relationships, binary logistic regression at significance level of 5% and 95% confidence interval was done.

CHAPTER FOUR

RESULTS

A total of 320 randomly selected households were approached, and out of these, 314 (98.1%) children and their parents or adult caregivers completed all the interviews while 06 (1.9%) households rejected participation, and hence, this chapter presents the results of analysis of data only from these 314 participants, excluding the six selected households which rejected the interviews.

4.1 Socio-demographic characteristics of participants

Socio-demographic characteristics of participants is analyses in three headings as personal characteristics of the participants, family characteristics of the participants and school related characteristics of the participants.

4.1.1 Personal sociodemographic characteristics of the participants

There were nearly equal proportions of female and male participants in this study, making up 50.6% (159) and 49.4% (155) respectively. In the age group 4-10 years, 103 (56.3%) were boys while 80 (43.7%) were girls. The proportion of females was higher (79; 60.3%) in the 11-17 year adolescent group making up to 60.3%, boys making up to the remaining 52 (39.7%).

Among the entire sample, the proportion of children aged 4-10 years was higher [183 (58.3%)] than that of adolescents aged 11-17 years who made up [131 (41.7%)]. The mean age of participants was 9.55 years (SD: 3.5 years) and the highest and lowest ages were 4 years and 17

years respectively, while the modal age was 8 years. In the adolescent group, aged 13-17 years old, adolescents who completed the school health questionnaire, made up 73 (55.7%).

In this study, 8(2.5%) participants reported having a chronic medical illness. Heart disease was the commonest chronic medical illness reported, accounting for 25% (2) of the conditions.

A history of health facility visit in the previous six months was reported by 54 (17.2%) participants, with repeated visit reported by 16 (5%). Common cold (3.5%), tonsillitis (2.5%), dental caries (1.6%), gastroenteritis (1.6%), eye problems (1.3%) and pneumonia (1.3%) were the commonest reasons for hospital visit in descending order of frequency.

Almost all participants (93%) said they spend their spare time either playing with peers, watching television or chatting with parents and siblings, while 1.9% spent their spare time alone in their bedrooms.

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Table 4.1.1 Personal sociodemographic characteristics of participants (N=314)

Variable	Frequency (%)	Mean (SD)	Minimum	Maximum
Age (years)				
4-10	183(58.3)			
11-17	131(41.7)	9.55(3.5)	4	17
Total	314(100)			
Gender				
Females	159(50.6)			
Males	155(49.4)			
Total	314(100)			
Chronic physical illness in child				
Yes	8(2.5)			
No	306(97.5)			
Total	314(100)			
Use of health services in the previous six months	54(17.2)			
Yes	260(82.8)			
No	314(100)			
Total				
Repeated use of health services in the previous six months	16(5)			
Yes	298(95)			
No	314(100			
Total				
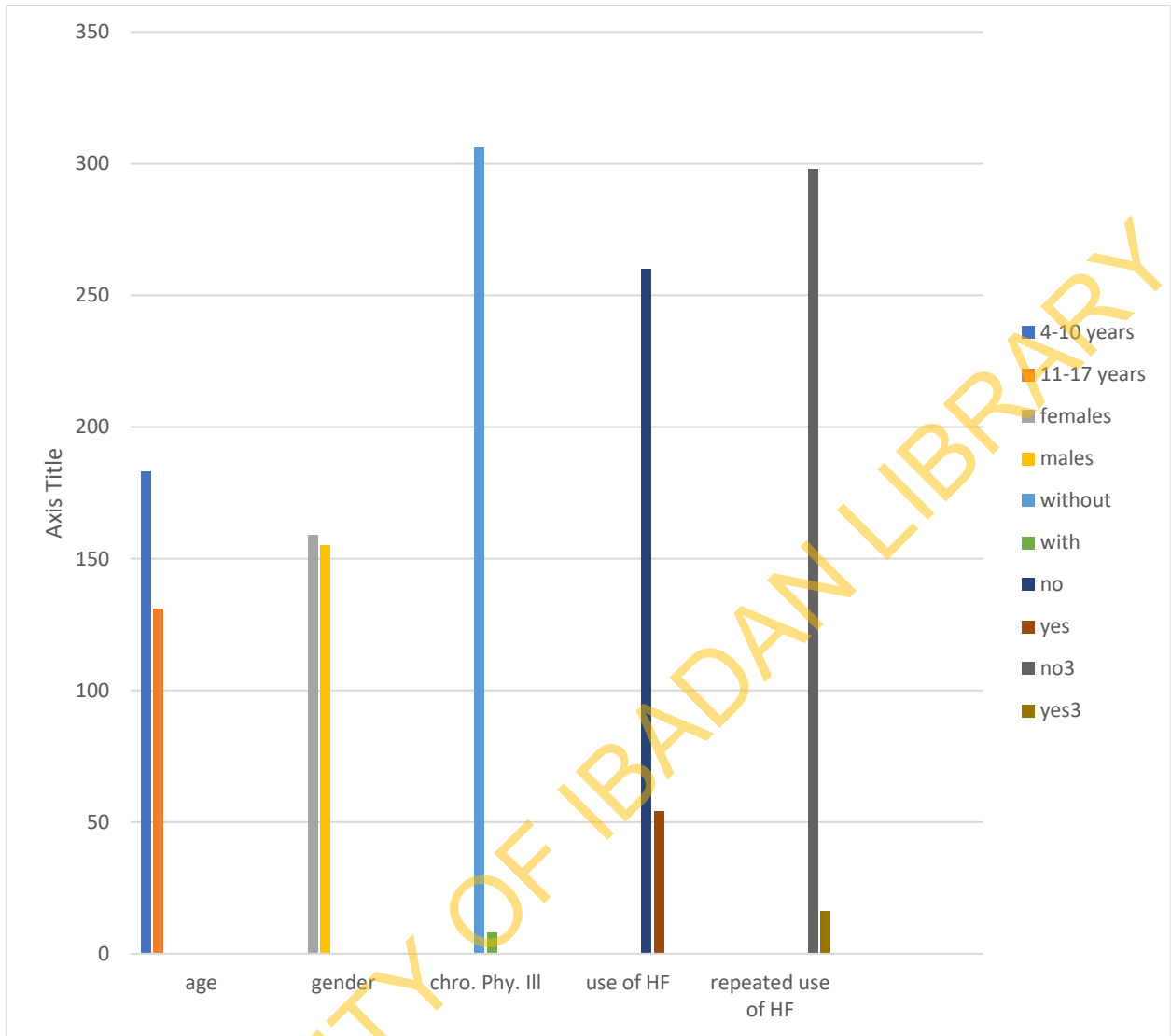
Figure 4.1.1 Personal sociodemographic characteristics of participants

4.1.2 Family related sociodemographic characteristics of participants

The average number of siblings participants had was 3 and the maximum was 9. Close to two third (65.6%) of the participant households had four or less children, households with only one child accounting for 8.9% (28) of the total sample. In this study, 267 (85%) of parents were married while 14 (4.5%) of them were unmarried and 4 (1.3%) were separated or divorced. The proportion of participants who had both parents alive was 285 (90.8%), while 29 (9.2%) of participants reported parental death (22 (7%) paternal death, 4 (1.9%) maternal death and 3(0.9%) death of both parents). Twenty nine (9.2%) participants lived in reconstituted families, with a remarried parent. Parental conflict was reported by 9 (2.9%) of participant households. Only one adolescent (0.3%) did paid work before or after school.

Nearly two thirds of mothers [198(63.1%)] received below secondary level education, out of whom 21 (6.7%) didn't receive any formal education, whereas 116(36.9%) had secondary or post-secondary (including university or non-university education) education. The proportion of fathers who had below secondary level education was lower than those who received secondary or post-secondary education [128(40.8%) vs 186(59.2%)]. The proportion of fathers who had not received any formal education was nearly equal to those of mothers [18(5.7%)].

Junior government workers, junior army personnel and private workers constituted the largest subgroup of fathers' occupations, making up 202 (64.3%). In comparison, 22 (7.0%) of mothers fell into this category of occupations among the mothers. The proportion of fathers and mothers in the occupational category of senior government workers and business owners was 49 (15.6%)

and 27 (8.6%), while unemployment was recorded in 38 (12.1%) of the participants' fathers and 256 (81.5%) mothers.

The proportion of participants who had chronic physical illnesses in family members was 67 (21.3%). Hypertension and diabetes mellitus were the commonest illnesses reported. The proportion of participants who had a family member with only hypertension was 20 (6.4%) and that of those who had a family member with only diabetes mellitus was 14 (4.5%). Another 4 (1.3%) of participants reported that a family member had comorbid hypertension and diabetes mellitus. War-related injury ranked third with a proportion of 11 (3.5%) followed by bronchial asthma [5(1.6%)], and eye problems [4 (1.3%)]. Comorbidities were recorded in [6 (1.9%)] of the sample. Out of the 67 family members with chronic illnesses, fathers accounted for 29 (43.3%), mothers made up 21 (31.3%), and siblings made up 12 (17.9%). Both parents had chronic illnesses in 4 (6.0%) of the total 67 with chronic illnesses.

Diagnosed psychiatric disorders in family members were reported by 7 (2.2%) of participants in this study, 5 (1.6%) in fathers and 2 (0.6%) in mothers. Table 4.1.2 summarizes the family related sociodemographic characteristics of participants.

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Table 4.1.2 Family related sociodemographic characteristics of participants (N=314)

Variable	Frequency (%)	Mean	Maximum
Parents alive?			
Both parents alive	285(90.8)		
Father dead	22(7)		
Mother dead	4(1.3)		
Both parents dead	3(0.9)		
Total	314(100		
Parent's marital status			
Married	267(85)		
Separated/divorced unmarried or deceased	47(15)		
Total	314(100)		
Child living with a remarried parent			
Yes	29(9.2)		
No	285(90.8)		
Total	314(100)		
The only child			
Yes	28(8.9)		
No	286(91.1)		
Total	314(100)		
Number of siblings			
Four or less	252(80.3)	3	9
More than four	62(19.7)		
Total	314(100)		
Parental conflict			
Yes	9(2.9)		
No	305(97.1)		
Total	314(100)		
Mother's educational level			
Junior or primary or no formal education	198(63.1)		
Secondary or post-secondary	116(36.9)		
Total	314(100)		
Mother's occupation			
Senior government workers and business owners	27(8.6)		
Junior government workers, junior army personnel, private workers	22(7)		
Unemployed	256(81.5)		
Deceased	9(2.9)		
Total	314(100)		

Table 4.1.2 Family related sociodemographic characteristics of participants (N=314)

(continued)

Variable	Frequency (%)	Mean	Maximum
Father's educational level			
Junior or primary or no formal education	128(40.8)		
Secondary or post-secondary	186(59.2)		
Total	314(100)		
Father's occupation			
Senior government workers and business owners	49(15.6)		
Junior government workers, junior army personnel, private workers	202(64.3)		
Unemployed	38(12.1)		
Deceased	25(7.9)		
Total	314(100)		
Chronic illness in family			
Yes	67(21.3)		
No	247(78.7)		
Total	314(100)		
Psychiatric illness in family	7(2.2)		
Yes	307(97.8)		
No	314(100)		
Total			
Alcohol abuse in family			
Yes	4(1.3)		
No	310(98.7)		
Total	314(100)		

4.1.3 School related sociodemographic characteristics of the participants

Out of all the participants, 276 children (87.9%) were in school while 38 (12.1%) were not. Out of the total participants, 163 (51.9%) adult respondents said that their children were performing well in their academics while 113 (40.0%) adult respondents said their children were not doing well in their academics. They were categorised as having good/average performance or poor performance after adult respondents provided evidence of academic performance to the interviewers. Among the participants, 227 (72.3%) had good/average performance, while 49 (15.6%) had poor performance. The proportion of children and adolescents who had repeated any grades was 50 (15.9%).

Eleven children (3.5%) were reported to have difficulties with their teachers, most issues, with five (1.6%) of these caused by the child's poor conduct in class. Truancy was the cause of the difficulties in 3 (1.0%) of the sample children. There was one report of a student who had attacked his teacher and another one who bullied schoolmates, each accounting for 0.3% of the entire sample. The proportion of children who complained of being bullied at school was 18 (5.7%). Of these, 9 (50%) had experienced being bullied once, four (22.2%) had had repeated experiences of bullying in the past, while 5 (27.8%) were still experiencing bullying which had not stopped.

Table 4.1.3 School related sociodemographic characteristics of participants (N=314)

Variable	Frequency (%)
Child in school	
Yes	276(87.9)
No	38(12.1)
Total	314(100)
Doing well academically	
Yes	163(51.9)
No	113(36.0)
Total	276(87.9)
Performance	
Good/average	227(72.3)
Poor	49(15.6)
Total	276(87.9)
Grade repetition	
Yes	50(15.9)
No	226(72.0)
Total	276(87.9)
Difficulties with teachers in school	
Yes	11(3.5)
No	265(84.4)
Total	276(87.9)
Child complained of being bullied	
Yes	18(5.7)
No	258(82.2)
Total	276(87.9)
Repeated bullying	
Yes	9(2.9)
No	267(85)
Total	276(87.9)

4.2 Prevalence of mental disorders in participants

Prevalence of mental disorders is reported as prevalence of abnormalities on the Strengths and Difficulties Questionnaire (SDQ) in the first stage of the study, and prevalence of K-SADS-PL (2009) Working Draft-based DSM-IV psychiatric diagnoses in the second stage.

4.2.1 Prevalence of SDQ abnormalities in participants

In the first stage of the study, 50 children and adolescents screened positive for any of the SDQ subclasses or total difficulties score giving an SDQ prevalence of 15.9%. Screen results were positive in 23 of the 183 children aged 4-10 years and 27 of the 131 adolescents aged 11-17 years, for at least one of the four subclasses of the SDQ abnormalities or the total difficulty score, giving an SDQ prevalence of 12.6% and 20.6% in the two age groups respectively. In the age group 11-17 years, the prevalence of SDQ abnormalities accounted for by only parent report (SDQ P[11-17]) was found to be 16.8% (22), whereas the prevalence accounted for by only self-report (SDQ S[11-17]) was found to be 13.7% (18). Parent- and self-reports in this age group agreed in almost half of the adolescents who screened positive (51.9%).

Gender-wise, the proportion of SDQ abnormality in males was double that of females in this study. Out of the 155 males, 33(21.3%) screened positive for at least one SDQ abnormality subclass while 17 out of the total 159 girls (10.7%) screened positive. Males had proportions more than double that of females in both age groups as well, 7.5% females and 16.5% of males in the age group 4-10 years, and 13.9% of females and 30.8% of males in the age group 11-17 years screening positive for at least on abnormality subclass. Table 4.2.2 summarizes the results of first and second stage assessments distributed by gender and age.

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4.2.2 Prevalence of K-SADS-PL 2009 Working Draft based DSM-VI psychiatric disorders in participants

None of the 73 adolescents between ages 13 and 17 years who completed the school health questionnaire reported any suicidal ideations, suicide attempt, and substance or alcohol abuse. Therefore, only these 50 children and adolescents who screened positive by SDQ were selected for the second stage of the study and were interviewed by the researcher using the K-SADS-PL 2009 Working Draft. Out of those 50 children and adolescents, 41 (82.0%) received at least one K-SADS-PL 2009 Working Draft based DSM-IV psychiatric diagnosis resulting in a final mental disorder prevalence of 13.1%. Nine (18%) of those who screened positive by SDQ did not receive any DSM-IV diagnosis.

The prevalence of DSM-IV psychiatric disorders in children aged 4-10 years was 9.3%, while it was double (18.3%) in the adolescent age group (11-17 years). Prevalence in males was higher than that in females, 16.1% and 10.1% respectively. This pattern was also recorded in both age groups. In the age group 4-10 years, 6.3% of female and 11.7% of male participants received at least one DSM-IV diagnosis, while in the age group 11-17 years, 13.9% of girls and 25.0% of boys were diagnosed. Prevalence also increased with age within gender. A prevalence of 6.3% in girls aged 4-10 years, 13.9% in girls aged 11-17 years, 11.7% in boys aged 4-10 years, and 25.0% in boys aged 11-17 years were recorded. Table 4.2.2 summarizes the results of first and second stage assessments distributed by gender and age.

Table 4.2.2 Results of first stage and second stage assessments distributed by gender and age

Variable	Result of SDQ screening N=314		Result of K-SADS-PL 2009 Working Draft interview N=314	
	Positive [n(%)]	Negative[n(%)]	Diagnosed	Not diagnosed
Gender				
Male	33(21.3)	122(78.7)	25(16.1)	130(83.9)
Female	17(10.7)	142(89.3)	16(10.1)	143(89.9)
Total	50(15.9)	264(84.1)	41(13.1)	273(86.9)
Age (years)				
4-10	23(12.6)	160(87.4)	17(9.3)	166(90.7)
11-17	27(20.6)	104(79.4)	24(18.3)	107(81.7)
Total	50(15.9)	264(84.1)	41(13.1)	273(86.9)
Age group 4-10 years				
Males (N=103)	17(16.5)	86(83.5)	12(11.7)	91(88.3)
Females (N=80)	6(7.5)	74(92.5)	5(6.3)	75(93.7)
Total	23(12.6)	160(87.3)	17(9.3)	166(90.7)
Within 11-17 years				
Males (N=52)	16(30.7)	36(69.3)	13(25)	39(75)
Females (N=79)	11(13.9)	68(86.1)	11(13.9)	68(86.1)
Total	27(20.6)	104(79.4)	24(18.3)	107(81.7)

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4.3 Patterns of DSM-VI psychiatric disorders in participants

In this study, disruptive behavioral disorders (CD, ODD and ADHD) were the commonest mental disorders observed at prevalence of 9.9% followed by affective disorders (depression and hypomania) (3.2%), anxiety disorders (GAD and social phobia) (2.5%) and ASD (1.9%).

Attention Deficit Hyperactivity Disorder (ADHD) was found to be the most prevalent psychiatric disorder with a prevalence rate of 4.5%, followed by conduct disorder (4.1%), depression (2.5%), Generalised Anxiety Disorder [GAD] (1.9%), Autism Spectrum Disorder [ASD] (1.9%), Oppositional Defiant Disorder [ODD] (1.3%) and both hypomania and social phobia (0.6% each). None of the children or adolescents met the criteria for alcohol or substance use disorder. ADHD was still the most common diagnosis in children aged 4-10 years (5.5%) followed by conduct disorder (2.7%), depression (2.2%), ODD (1.6%), ASD (1.1%) and social phobia (0.5%). In the adolescent age group, conduct disorder had the highest prevalence (6.1%). GAD was the second most common disorder with a prevalence of 4.6% followed by depression, ADHD and ASD each scoring a prevalence rate of 3.1%. Hypomania was 1.5% prevalent and ODD and social phobia were the least prevalent disorders at a rate of 0.8%. Table 4.3 summarizes the prevalence rates of the individual DSM-IV disorders in participants.

Table 4.3 Prevalence of individual DSM-IV psychiatric disorders (N = 314)

DSM-IV disorders	Frequency (% of N) N=314
Affective disorders	
Depression	8(2.5)
Hypomania	2(0.6)
Anxiety disorders	
Generalized anxiety disorder	6(1.9)
Social phobia	2(0.6)
Behavioral disorders	
ADHD	14(4.5)
ODD	4(1.3)
Conduct disorder	13(4.1)
ASD	
ASD	6(1.9)

4.4 DSM-IV comorbidities in participants

A high proportion [13 (31.7%)] of participants who were diagnosed with DSM-IV disorders had two or more diagnoses. Of all disorders, ADHD and CD were the two diagnoses associated with most comorbidities [6 (14.6)] followed by depression found comorbid in 4 (2.8%) participants. There was no clustering pattern of comorbidities, which might be due to the relatively small number of participants with these disorders Table 4.4 shows the distribution of DSM-IV comorbidities in participants.

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Table 4.4 Distribution of DSM-IV comorbidities in participants (N=41)

Variable	Frequency (%)
Presence of comorbidity	
Present	12 (29.3)
Absent	29(70.7)
Total	41(100)
Comorbidities of ADHD	
CD	2(4.9)
ASD	2(4.9)
ODD	1(2.4)
GAD	1(2.4)
Total	6(14.6)
Comorbidities of depression	
GAD	2(4.9)
CD	1(2.4)
CD and ODD	1(2.4)
Total	4(9.8)
Other comorbidities	
ASD and CD	1(2.4)
Hypomania and CD	1(2.4)
Total	2(4.9)
Total	12(29.3)

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4.5 Correlates of mental disorders in participants

4.5.1 Personal sociodemographic characteristic associated with DSM-IV disorders in participants

The proportion of DSM-IV diagnosis was higher in males than in females but the difference was not statistically significant (16.1% vs 10.1%, p=0.111). Among the personal characteristics evaluated, only age and presence of chronic physical illness were found to be significantly associated with the diagnosis of any DSM-IV disorders, with a higher proportion of adolescents aged 11-17 years (18.3%) receiving a diagnosis, compared to 8.3% of children aged 4-10 years (p=0.019), and a higher proportion of participants with chronic physical illnesses (37.5%) receiving a diagnosis, compared to 12.4% of those without these conditions (p=0.038). Repeated hospital visits in the previous six months was not significantly associated with the diagnosis of DSM-IV disorders. Table 4.5.1 shows the results of associations examined between personal characteristic and mental disorders.

Table 4.5.1 Personal sociodemographic characteristics of participants' association with DSM-IV

disorders

Variable	Result of K-SADS-PL 2009 Working Draft N=314		Total	p-value
	Not diagnosed [n(%)]	Diagnosed [n(%)]		
Gender				
Female	143(89.9)	16(10.1)	159(100)	0.111
Male	130(83.9)	25(16.1)	155(100)	
Total	273(86.9)	41(13.1)	314(100)	
Age (years)				
4-10	166(90.7)	17(9.3)	183(100)	0.019[*]
11-17	107(81.7)	24(12.3)	131(100)	
Total	273(86.9)	41(13.1)	314(100)	
Physical illness in child				
Yes	5(62.5)	3(37.5)	8(100)	0.038[*]
No	268(87.6)	38(12.4)	306(100)	
Total	273(86.9)	41(13.1)	314(100)	
Hospital visit in the last 6 months				
Yes	44(81.5)	10(18.5)	54(100)	0.191
No	229(88.1)	31(11.9)	260(100)	
Total	273(86.9)	41(13.1)	314(100)	

- **indicates statistically significant p-value**

4.5.2 Family related sociodemographic characteristics associated with DSM-IV disorders in participants

Parental marital status was significantly associated with the diagnosis of DSM-VI psychiatric disorders with higher proportions of disorders in children whose parents were either separated/divorced, unmarried or in whom one or both parents were deceased (27.7%) than in children of married parents (10.5%) (p=0.001).

The association between parental death and DSM-IV disorders was tested for three different scenarios. The first scenario tested was the difference in proportions among children with no report of parental death and among children who reported any parental death (one or both parents). The second scenario tested was the difference in proportions of mental disorders among participants who reported maternal death and those who reported no maternal death regardless of paternal death. And the third scenario tested was the reverse of the second situation, i.e, having paternal death or not having it regardless of maternal death. The proportion of diagnosis of DSM-IV disorders among participants with parental death (17.2%) was higher than that among those who reported no parental death (12.6%). It was also higher among participants who reported maternal death (28.6%) than among those who reported no parental death or only the father dead (12.7%). Analysis of the third scenario also yielded similarly higher proportion of DSM-IV disorders among participants who reported paternal death (16%) than among those who reported no parental death or only the mother dead (12.8%). All these differences were, however, not statistically significant upon univariate analysis.

 Statistically significantly higher proportions of participants who reported parental conflict (44.4%) also received at least one diagnosis, as compared to participants who reported no

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conflict (10%) (p=0.001). Significantly higher proportions of children whose mothers had low levels of educational attainment (junior or primary level or no formal education) than those whose mother's educational level was high (secondary level and above) received a diagnosis of at least one DSM-IV disorder (16.7% vs 6.9%, p=0.013). Participants who had a family member with a chronic medical illness or psychiatric disorders also received higher proportions of DSM-IV diagnosis at a statistically significant level. Family size, living with a remarried parent, father's educational level and occupation and alcohol abuse in the family were not significantly associated with the diagnosis of mental disorders in this study. Table 4.5.2 shows the family characteristics associated with the diagnosis of mental disorders in participants.

Table 4.5.2 Family related sociodemographic characteristics of participants' association with

DSM-IV disorders

Variable	Result of K-SADS-PL N=314		Total	p-value
	Not diagnosed [n(%)]	Diagnosed [n(%)]		
Paternal death-1				
No	249(84.7)	36(12.6)	285(100)	
Yes	24(82.8)	5(17.2)	29(100)	
Total	273(86.9)	41(13.1)	314(100)	0.560
Parental death-2				
Mother alive regardless of father's case	268(87.3)	39(12.7)	307(100)	0.229
Mother dead regardless of father's case	5(71.4)	2(28.6)	7(100)	
Total	273(86.9)	41(13.1)	314(100)	
Parental death-3				
Father alive regardless of mother's case	252(87.2)	37(12.8)	289(100)	0.550
Father dead regardless of mother's case	21(84)	4(16)	25(100)	
Total	273(86.9)	41(13.1	314(100	
Parental marital status				
Married	239(89.5)	28(10.5)	267(100)	0.001*
Separated/divorced or unmarried or deceased	34(72.3)	13(27.7)	47(100)	
Total	273(86.9)	41(13.1)	314(100)	
Living with a remarried parent				
Yes	23(79.3)	6(20.7)	29(100)	
No	250(87.7)	35(12.3)	285(100)	0.242
Total	273(86.9)	41(13.1)	314(100)	
Parental conflict				
Yes	5(55.6)	4(44.4)	9(100)	
No	268(90)	37(9.3)	305(100)	0.000*
Total	273(86.9)	41(13.1)	314(100)	
Mother's educational level				
No formal education or primary or junior	165(83.3)	33(16.7)	198(100)	
Secondary or post-secondary	108(93.1)	8(6.9)	116(100)	0.013*
Total	273(86.9)	41(13.1)	314(100)	

Table 4.5.2 Family related sociodemographic characteristics of participants' association with

DSM-IV disorders (continued)

| Variable | Result of K-SADS-PL N=314 | | Total | p-value |
	Not diagnosed [n(%)]	Diagnosed [n(%)]		
Only child				
Yes	25(89.3)	3(10.7)	28(100)	1.000
No	248(86.7)	38(13.3)	286(100)	
Total	276(86.9)	41(13.1)	314(100)	
Number of siblings				
4 or less	217(86.1)	35(13.9)	252(100)	0.378
More than 4	56(90.3)	6(9.7)	62(100)	
Total	273(86.9)	41(13.1	314(100)	
Chronic physical illness in family				
Yes	52(77.6)	15(22.4)	67(100)	
No	21(89.5)	26(10.5)	247(100)	0.011[*]
Total	273(86.9)	41(13.1)	314(100)	
Psychiatric illness in family				
Yes	3(42.9)	4(57.1)	7(100)	0.007[*]
No	270(87.9)	37(12.1)	307(100)	
Total	273(86.9)	41(13.1)	314(100)	

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4.5.3 School related sociodemographic characteristics associated with DSM-IV disorders in participants

The proportion of DSM-IV disorders was higher in children who were not attending school than that of who were in school, but the difference was not statistically significant (15.8% vs 12.7%, p=0.608). Taking only parents' report on whether the child was doing well academically, significantly higher proportions of DSM-IV diagnoses (21.2%) were made in those reported to be performing poorly than in those said to be doing well (6.7%) (p=0.001). Similarly, significantly higher proportions of participants who demonstrated poor educational performance (40.8%) by evidence of records were diagnosed with at least one DSM-IV disorder compared to the proportions of good/average performers (6.6%) (p<0.001). The proportion of DSM-IV disorders was also higher in children who had repeated any grades than the proportion in those who had not repeated (30.0% vs 8.8%, p=0.001). The proportion of DSM-IV disorders among children who had difficulties with teachers in school was significantly higher than that among children who reported no difficulties (12.7% vs 10.2%, p<0.001). Even though higher proportions of participants who reported being bullied at school received at least one diagnosis of mental disorders compared to those who had not been bullied, there was no statistically significant difference (16.7% vs 12.5%, p=0.629). Neither was repeated bullying significantly associated with the diagnosis of at least one DSM-IV disorder. Table 4.5.3 shows school related sociodemographic characteristics associated with DSM-IV disorders in participants of this study.

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Table 4.5.3 School related sociodemographic characteristics of participants' association with

DSM-IV disorders

Variable	Result of K-SADS-PL N=314		Total	P-value
	No diagnosed [n(%)	Diagnosed [n(%)]		
Is child in school				
Yes	241(87.3)	35(12.7)	276(100)	0.608
No	32(84.2)	6(15.8))	38(100)	
Total	273(86.9)	41(13.1)	314(100)	
N= 276#				
doing well academically (Parents' report)				
Yes	152(93.3)	11(6.7)	163(100)	0.001*
No	89(78.8)	24(21.2)	113(100)	
Total	241(87.3)	35(12.7)	276(100)	
Performance based on recent results				<0.001*
Good/average	212(93.4)	15(6.6)	227(100)	
Poor	29(59.2)	20(40.8)	49(100)	
Total	241(87.3)	35(12.7)	276(100)	
Grade repetition				
Yes	35(70)	15(30)	50(100)	0.001*
No	206(91.2)	20(8.8)	226(100)	
Total	241(87.3)	35(12.7)	276(100)	
Difficulties in school				
Yes	3(27.3)	8(72.7)	11(100)	
No	238(89.8)	27(10.2))	265(100)	<0.001*
Total	241(87.3)	35(12.7)	276(100)	
Bullying				
Yes	15(83.3)	3(16.7)	18(100)	0.629
No	226(87.5)	32(12.5)	258(100)	
Total	241(87.3)	35(12.7)	276(100)	
Was bullying repeated?				
Yes	6(66.7)	3(33.3)	9(100)	0.128
No	235(88.0)	32(12.0)	267(100)	
Total	241(87.3)	35(12.7)	276(100)	

*indicates statistically significant p-value, #indicates the number of children attending school

4.5.4 Sociodemographic characteristics associated with specific DSM-IV disorders in participants

4.5.4.1 Personal sociodemographic characteristics of participants associated with specific DSM-IV disorders

Higher proportions in the adolescent age group (11-17 years) than in children aged 4-10 years received a diagnosis of depression (3.1% vs 2.2%), conduct disorders (6.1% vs 2.7%), GAD (4.6% vs 0%) and ASD (3.1% vs 1.1%). However, these differences were not statistically significant on univariate Chi square analysis, except for GAD where p was =0.005. Higher proportions of children aged 4-10 years (5.5%) had a diagnosis of ADHD than the proportion in adolescents aged 11-17 years (3.1%). However, this difference was also not statistically significant upon univariate analysis.

Significantly higher proportions of males (7.1%) than females (1.3%) had conduct disorders (p=0.009). More males also had a diagnosis of ADHD than females (6.5% vs 2.5%), and males had twice the proportion of ASD as females (2.6% vs 1.3%), but these differences were not statistically significant (p=0.091, p=0.443 respectively). Higher proportions of females (2.5%) than males (1.3%) were diagnosed with GAD, but this difference was also not statistically significant (p=0.685). Equal proportions of males and females (0.6% each) were diagnosed with social phobia and almost equal proportions in males (2.6%) and females (2.5%) had a diagnosis of depression.

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Much higher proportions of children and adolescents with chronic physical illnesses (12.5%) had a diagnosis of depression than those who did not have such conditions (2.3%), but on univariate analysis, this difference was not statistically significant (p=0.188). Significantly higher proportions of children with chronic physical illness than those without those conditions received a diagnosis of conduct disorders (37.5% vs 3.3%, p=0.003), and ADHD (25.0% vs 3.9%, p=0.044). There were no significant differences between the proportions of children with and without chronic medical conditions diagnosed with the other DSM-IV disorders.

4.5.4.2 Family related sociodemographic characteristics of participants associated with specific DSM-IV disorders

Comparing participants whose parents were married to those from separated/divorced or unmarried or deceased parents, higher proportions in the latter group had GAD, conduct disorder (CD), ADHD and ASD. However only the difference in proportions of CD (3.0% vs 10.6%) was found to be statistically significant upon univariate analysis (p=0.031). Slightly higher proportions of participants from married parents had depression (2.6% vs 2.1%) but the difference was not statistically significant.

Participants who had their mothers or both parents deceased had significantly higher proportions of GAD (28.6%) than in participants whose parents were alive or whose fathers only were deceased (1.3%) (p=0.006). Depression, CD and ADHD were found in higher proportions of participants with either both parents alive or only the father dead, than in participants whose mother or both parents were dead. However, the differences were not statistically significant.

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Children of mothers whose level of educational attainment was junior level or below had higher proportions of diagnoses of depression, GAD, CD and ADHD than the proportions in children of mothers whose educational level was secondary level or above. Only the proportion of ASD diagnosis was higher in the latter group. However, on univariate analysis, all these associations were not statistically significant.

Higher proportions of participants who had more than four siblings (3.2%) were diagnosed with depression compared to the proportion in participants who had four or less than four siblings (2.4%). Proportions of diagnoses of GAD, CD, ADHD and ASD were higher in children who had four or less than four siblings than the proportion of diagnoses made in those who had more than four siblings. However, all these differences were not statistically significant upon univariate analysis.

4.5.4.3 School related sociodemographic characteristics of participants associated with specific DSM-IV disorders

Significantly higher proportions of participants who had poor academic performance were diagnosed with depression (p=0.005), CD (p<0.001), ADHD (p=0.001) and ASD (p<0.001) compared to those with good/average performance. Higher proportions were also diagnosed with GAD in the poorly performing participants (4.1% vs 1.8%) but the difference in this case was not statistically significant.

There was no statistically significant difference in the proportions of diagnoses of specific DSM-IV disorders between participants who experienced bullying and those who did not.

4.6 Sociodemographic characteristics of participants independently associated with DSM-IV diagnosis

Variables that were found to be significantly associated with DSM-IV disorders and variables with p-value less than 10% after univariate analysis were analyzed using binary logistic regression to test for independent association. Chronic physical illness in the child, parental conflict, psychiatric illness in a family member and poor academic performance were found to be independently associated with DSM-IV disorders.

On binary logistic regression, children who had a chronic physical illness had eight times the odds of being diagnosed with a DSM-IV psychiatric disorder (p=0.023), while children who had at least one family member with a diagnosed psychiatric illness had fourteen times the odds of having a DSM-IV diagnosis (p=0.004). Also, children with poor academic performance had 5 times the odds of having a DSM-IV psychiatric diagnosis than those with good academic performance (p=002).

Table 4.6 shows the results of binary regression analysis.

Table 4.6 Binary regression analysis of associations between selected sociodemographic correlates and DSM-IV psychiatric diagnoses

Characteristics	OR	95% CI	p-value
Age (years)			
4-10	1	0.91-6.62	0.075
11-17	2.46		
Chronic physical illness in child			
Yes	8.64	1.34-55.78	0.023[*]
No	1		
Parental marital status			
Married	1	0.99-7.95	0.051
Separated/divorced or unmarried or deceased	2.82		
Parental conflict			
Yes	6.649	1.208-36.612	0.030[*]
No	1		
Maternal educational level			
Junior or primary level or no formal education	1.048	0.369-2.979	0.929
Secondary or post-secondary level	1		
Chronic physical illness in family			
Yes	2.51	0.98-6.43	0.054
No	1		
Psychiatric illness in family			
Yes	14.07	2.34-84.48	0.004[*]
No	1		
Academic performance of child			
Good/average	1	1.84-13.91	0.002[*]
Poor	5.06		
Grade repetition			
Yes	1.47	0.513-4.195	0.475
No	1		
Difficulties in school			
Yes	9.25	1.79-47.79	0.008[*]
No	1		

[*]indicates statistically significant p-value.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND

RECOMMENDATIONS

5.1 Discussion

This study is a community based descriptive cross-sectional study conducted to determine the prevalence, correlates and patterns of mental disorders in children and adolescents in the Mendefera community, Eritrea. To the best of our knowledge, it is the first of its kind to be conducted in children and adolescents in an Eritrean community. Results of this study have established important findings.

This section will discuss the findings under the headings of sociodemographic characteristics of participants, prevalence of SDQ abnormalities in participants, prevalence of DSM-IV disorders in participants, and sociodemographic characteristics of participants associated with DSM-IV disorders. Findings of this study are also discussed in comparison to results of studies conducted in other developed and developing countries.

5.1.1 Sociodemographic characteristics of participants

5.1.1.1 Personal sociodemographic characteristics of participants

More than half of the sample was comprised of children in the 4-10-year age range, with adolescents aged 11-17 years accounting for a smaller proportion of respondents. This is in line with the proportions indicated by the Eritrean population health survey data which indicates that

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children in the age group 4-10 years constitute 36.5% of the country's youth population, while those aged 11-17 years make up 24% of the total child and adolescent population of the country (Eritrean Population Health Survey, 2010).

There is currently no existing data on the gender proportions in the general child and adolescent population of Eritrea. However, the proportions of males and females recruited in this study are roughly in keeping with the nearly equal proportions of males and females in school (Eritrea, Essential Education Indicators, 2004) which can be taken as a proxy measure of these proportions in the general child and adolescent population. A community study of prevalence of mental disorders in an Ethiopian community also reported similar gender proportions among children (Ashenafi et al, 2001).

The researcher could not access data regarding the prevalence of chronic physical illnesses and hospital use by children and adolescents in Eritrea for comparison with what was found in participants in this study.

5.1.1.2 Family related sociodemographic characteristics of participants

The average number of children per family (four) found in this study is similar to data from the records of the Mendefera sub zone population statistics of 2007. This study recruited a reasonable number of households with four or fewer children (65.6%) and more than four children (34.4%) to detect any possible difference in mental health in the children, following the study by Meltzer et al (2000), which took four children as a cutoff.

The proportions of participants whose parents were married (85%) and those whose parents were not (separated/divorce or unmarried or deceased) (15%) also provided a fair number of households in each group for assessing for associations with mental health in children. However, no data on this aspect of the study population was available to refer to. Similarly, no data regarding the prevalence of parental death was accessible with respect to the study population. However, the 9.2% detected by this study potentially gave a fair chance of detecting any effects of parental death. The 7% paternal death reported by participants is also a good proportion to detect an effect. Nevertheless, maternal death and death of both parents were reported by very low numbers of participants (4(1.3) and 3(0.9%) respectively), which makes missing the effects of these events in the mental health of children highly likely. Similarly, the low number of parental conflict (9(2.9%)) reported by participants in this study may not have been sufficient enough to detect significant effects, while the 9.2% of participant children and adolescents living with a remarried parents may be considered good enough to detect the metal health effect of this sociodemographic factor.

The literacy rate of parents/ adult caregivers of this study (94.4% in males and 93.3% for females) is very much higher than the literacy rate of the general Eritrean adult population (81.0% for males and 76.0% for females) (Eritrea, Essential Education Indicators, 2004). No data in this regard was available for the location represented by the specific study population. Hence, the study population can be assumed to be one of the fairly literate populations in the country. For this reason, the maternal level of education cut off taken in this study was not the same as the cut off taken by other studies in Africa (having or not having received any formal education) (Gureje and Omigbodun 1995), but rather having or not having received 'above junior level education' was used in this study. This particular cut off was chosen because on analyzing the

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data gathered separately, it was detected that having received a secondary or post-secondary education was associated with better chances of mother's being employed more than any other levels.

The disproportionately higher unemployment rate among women (81.5%) than among men (12.1%) found in this study suggests that the study population is a grossly patriarchal population. No data was available regarding local unemployment rates or proportions of the population within professional categories. The three professional categories compared in this study were formed based on the standard ISCO-2008 classification and the researcher's knowledge of income levels per occupation reported by participants.

The proportion of family members with chronic physical illness found in this study [67 (21.8%)] is higher than the prevalence rates of diabetes mellitus (2.2%) and hypertension (16.0%) (Usman et al, 2006), the two most common physical illnesses reported in this study. No data was available on the overall prevalence of chronic physical illnesses in the study population. The proportion found in this study, however, can be considered good enough to detect any potential effects on children's mental health.

5.1.1.3 School-related sociodemographic characteristics of participants

The proportion of out-of-school children in this study was high (12.1%) compared to the 95.5% enrollment rate at primary level and 93.4% at junior level in Eritrea (Eritrea, Essential Education Indicators, 2004). However, 33(86.8%) of them were between 4 and 6 years old, meaning they were likely to be in nursery and yet to enroll, rather than confirmed as not going to school due to

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other reasons. This results in a small number, 5(1.6%), of children of compulsory education age reported as not in school. This is low in comparison to the enrolment rates stated above.

The parental judgement of children's academic performance resulted in almost equal proportions of those who reported that their child was doing well and those who reported they were not doing well. This gives a good chance of detecting parental perception of child's academic performance in association with child's mental health. The 15.6% of children who were classified as having poor academic performance up on providing school records to the interviewer and the 15.9% of those who reported ever repeating a grade can also be considered sizeable enough proportions to detect potential link with mental health of these children. The 5.7% of participants who had experienced bullying in school and the 3.5% of those who had difficulties with their teachers may be enough to detect potential associations as these usually result in poor academic performance as well.

5.1.2 Prevalence of SDQ disorders in participants

This study found a high prevalence of SDQ abnormalities (15.9%) in children and adolescent in the first stage. This finding is within the estimated global prevalence, 10-20%, of child and adolescent mental disorders in the general population (WHO, 2008). It is also similar to findings of studies conducted in developing and developed countries, especially to those conducted using the SDQ as a screening instrument. Particularly such a study conducted in neighboring Yemen used the SDQ in 2008 and found a prevalence of 15.7% (Alyahri and Goodman, 2008). Other studies in which the SDQ was used in a developing country settings also reported similar prevalence. Such a study in Bangladesh reported 17.9% prevalence of SDQ abnormalities (Mullick and Goodman, 2001) and another study in Vietnam reported 13.2% of SDQ

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abnormalities (Weiss et al, 2014). Ravens-Sieberer et al (2008) also used the SDQ in Germany, a developed country setting, and reported a prevalence close to what this study found (14.5%).

This study also found a higher prevalence of SDQ abnormalities in males (21.3%) than in females (10.7%). Prevalence increased with age from 12.6% in the younger group (4-10 years) to 20.6% in the older group (11-17 years). Prevalence among females 4-10 years old was the lowest prevalence found (7.5%), and this rate almost doubled in females 11-17 years old (13.9%). Males 4-10 years old also had lower prevalence (16.5%) than boys 11-17 years old (30.7%). These trends are in agreement with reports from a number of studies from both developed and developing settings, which will be discussed in the next section (Prevalence of DSM-IV disorders), because most of the reports were made from the analysis of diagnosed, not screened, study samples.

5.1.3 Prevalence of DSM-IV disorders in participants

A 13.1% prevalence of K-SADS-PL 2009 Working Draft-based DSM-IV disorders was found in this study. This is in keeping with most prevalence findings of DSM-IV disorders in both developing and developed settings. There is no local data in Eritrea to compare findings of this study with.

The prevalence found in this study is similar to that found in many low and middle income settings. A community study conducted in the United Arab Emirates reported a similar prevalence (11.8%) by Eapen et al (2001). Moreover, Abiodun (1993) found a similar prevalence rate (15%) in a rural Nigerian community. Srinath et al (2005) also found a 12% prevalence of mental disorders in Indian children and adolescents aged 4-16 years. However, the prevalence

found in our study differs from findings of studies conducted in Ethiopian communities, which are communities most similar to the population in this study. Tadesse et al (1999) reported a prevalence of 17.7% and another study in Ethiopia reported prevalence in males as 21.4% and in females as 25.1% (Mulatu, 1995), both of which are much higher than the overall and gender-wise prevalence rates recorded in this study (16.1% for males and 10.1% for females). These differences may be attributed to differences in study design, instruments used as discussed in chapter two. These differences may also be due to the considerable chronological difference between the conduct of these studies and the current study. The most recent of the Ethiopian studies was conducted in 1999 (Tadesse et al, 1999), which is close to two decades ago. Over these two decades, sociodemographic, political and socioeconomic changes may have changed the nature of these societies, and that might explain the differences. Findings of a nationwide community study in Chile also differ from the findings of the current study. That study reported a much higher prevalence of DSM-IV disorders (22.5%) (Vicente et al, 2012). Moreover, the gender-wise prevalence findings of the current study are lower than the findings of the Chilean study, 16.1% vs 19.3% in males and 10.1% vs 25.8% in females. These variations might be due to dissimilarities in culture, which might affect the recognition of mental health symptoms and forthcoming nature differentially in the two genders, and geography of the two study populations.

Prevalence findings of this study also agree with findings in many developed countries. A community study conducted in the United States of America by Merikangas et al (2010) in particular reported exactly the same prevalence (13.1%) of DSM-IV disorders. That US study also reported that prevalence was higher in boys than in girls which is what the current study has documented. The 18.3% prevalence of DSM-IV disorder in adolescents aged 11-17 years is also

in keeping with what Roberts, Roberts and Xing (2007) found in the same age group in the United States of America (17.1%).

Prevalence rates lower or higher than the finding of this study have also been reported from studies in developed countries. Compared to the 9.5% prevalence found in a UK study by Ford, Goodman and Meltzer (2003), the finding of the current study is higher, whereas it is lower than the prevalence in Swiss children and adolescents (22.5%) reported by Steinhausen et al (1993). These divergent findings may be due to differences in the instruments used or the methodological designs. Cultural and socio-demographic variations of the study populations are also possible explanations.

Compared to findings from studies conducted in schools, the prevalence found in the current study is higher. Studies conducted in schools in developing countries such as India (6.33%) and China (9.49%) reported lower prevalence (Xiaoli et al, 2014, Malhorta and Paradhan, 2013).

This study found higher prevalence of DSM-IV psychiatric diagnoses in adolescents aged 11-17 years (18.3%) than in children aged 4-10 years (9.3%). This shows that prevalence in the older group was twice the prevalence in the younger group. This finding is opposite to what Vicente et al (2012) found in Chile. In that study, children 4-11 years old had nearly double (27.8%) the prevalence in adolescents 12-18 years old (16.5%). Nevertheless, the finding in the current study is in line with most other reports. An increase in prevalence with age was reported in the German study by Ravens-Sieberer et al (2008) and in the Vietnamese study by Weiss et al (2014). A study in the UK by Ford, Goodman and Meltzer (2003) also documented this pattern. However, the doubling of prevalence in the older age group was not reported by any of these studies.

Overall prevalence of psychiatric disorders was higher among boys (16.1%) than among girls (10.1%) in this study and this difference was maintained across both age groups. Prevalence rates in girls (13.9%) and boys (25.0%) in the older age group were double those in the younger age group (6.3% in girls and 11.7% in boys). A similar finding was reported by Tadesse et al (1999) in Ethiopia and in the above-mentioned Vietnam study. Ford, Goodman and Meltzer (2003) and Merikangas et al (2010) also found the same prevalence patterns. However, this finding disagreed with the findings of Vicente et al (2012).

Generally, it can be concluded that the findings of this study in terms of prevalence are in line with majority of reports from studies in parts of the developed and developing world.

5.1.4 Patterns of specific DSM-IV disorders

This study found a high prevalence of behavioral disorders (9.9%), making these disorders the most prevalent in the study sample. Vicente et al (2012) also reported that disruptive behavioral disorders were the commonest disorders in their Chilean study population. However, the prevalence in that study was higher than the prevalence found in the current study. ADHD was the commonest disorder diagnosed in this study at a prevalence of 4.5%. This prevalence is in agreement with the median prevalence of ADHD (4.0%) reported by a review study of studies across the globe (Merikangas et al, 2009). ADHD being the commonest was reported by Merikangas et al (2010) and Canino et al (2004) although at higher magnitudes. The prevalence of conduct disorder (CD) in this study was 4.1%. This is not far removed from the global median prevalence of CD (6.0%) reported by Merikangas et al (2009). Prevalence rates of CD reported by Canino et al (2004) (5.5%), Ravens-Sieberer et al (2008) (8.7%) and Merikangas et al (2010) (2.1%) have large disparities among themselves. The 2.5% prevalence of depression found in

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this study is lower than the global median prevalence (4%) estimated by Merikangas et al (2009) and the rate found in the community study by Merikangas et al (2010) (3.7%) but it is similar to the rate (3%) reported by Canino et al (2004). The prevalence rates of GAD (1.9%) and ODD (1.3%) found in this study are much lower than most of the studies above reported. Anxiety disorders are reported to be the most prevalent mental disorders in children and adolescents at a prevalence of 8% with GAD and social phobia reported to be the commonest forms (Merikangas et al, 2009). The prevalence found in this study, nevertheless, is higher than that reported by Merikangas et al (2010) (0.7%).

ADHD was more prevalent in the younger age group (5.5%) than among the older age group (3.1%) while CD was commoner in the adolescent age group (6.1%) than in the child age group (2.7%). This pattern of ADHD decreasing with age and CD increasing with age has been well established by numerous studies (Merikangas et al, 2009, Merikangas et al, 2010, Canino et al, 2004, and Ravens-Sieberer et al, 2008). The increased prevalence of GAD and depression in adolescents is also in line with the findings of these studies.

The prevalence of ASD (0.6%) found in this study is lower than prevalence reported by Blumberg et al (2013) (2%) but consistent with what Bertrand et al (2001) reported (0.67%). In the current study, prevalence of ASD in the adolescent age group was threefold the prevalence in the child age group.

A high prevalence of psychiatric comorbidities (31.7%) was also found in this study. This is higher than the 24.8% comorbidity rate reported by Vicente et al (2012) but lower than 78.0% rate found in Ethiopia (Ashenafi et al, 2001) and the 40.0% rate reported by Merikangas et al (2010).

5.1.5 Sociodemographic Correlates of DSM-IV disorders in participants

A number of sociodemographic characteristics found to be associated with DSM-IV disorders in this study are discussed in this section.

5.1.5.1 Personal sociodemographic characteristics associated with DSM-IV disorders in participants

Gender, age and the presence of chronic physical illness in the child have been reported as child characteristics associated with mental disorders by a number of studies (Tadesse et al, 1999, Hack et al, 2005, Merikangas et al, 2010, Vicente et al 2012). On analyzing the association of these sociodemographic characteristics with DSM-IV disorders in this study, only age and presence of chronic physical illness in the child were found to be significantly associated with the diagnosis of any DSM-IV disorder. The prevalence of DSM-IV disorders was also higher among males than among females but the difference was not statistically significant. All the studies mentioned above, except the study by Vicente et al (2012), also found higher prevalence of disorders among males than among females. The significantly higher prevalence of mental disorders among the adolescent age group than among the child age group and among participants with chronic physical illness than among those with no chronic physical illness found in this study is in agreement with findings by Merikangas et al (2010), Meltzer et al (2000) and many other studies. In addition, repeated hospital visits for any physical illness (be it chronic or acute) in the previous six months was also tested for association. The result showed that

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participants who had repeated hospital visits had higher prevalence of DSM-IV disorders, but the association was not significant.

5.1.5.2 Family related sociodemographic characteristics of participants associated with DSM-IV disorders

Divorce/separation, unmarried or widowed status (Meltzer et al, 2000, Strohschein, 2005, Anda, 2010), parental conflict (Strohschein, 2005, Anda, 2010), mental illness in a family member, alcohol or substance abuse by a family member (Anda, 2010), family size and living in a reconstituted family (Meltzer et al, 2000), residential instability (Gilman et al, 2003) and low maternal education (Gureje and Omigbodun, 1995) have been consistently published as family characteristics associated with mental disorders in children and adolescents. The significantly higher prevalence of DSM-IV disorders among participants belonging to separated/divorce or unmarried or deceased parents, families with parental conflict, mothers with low educational level and families having a member with chronic physical or psychiatric illness found in this study was in keeping with these findings, establishing these family characteristics as correlates of DSM-IV disorders in the study population.

Interestingly, the small number of households that reported parental conflict (9(2.9)) was enough to establish a significant association between parental conflict and DSM-IV disorders in children and adolescents of this community. This emphasizes that children and adolescents in this community are very sensitive to parental conflict, most of such experiences possibly contributing to psychopathologies in the child.

Many western country studies have published contradicting findings regarding association between number of siblings and child's social skills, educational performance and many other areas that affect the mental health of children and adolescents. Growing up with no siblings has been found to be associated with poorer outcomes (Downey et al,2013), while having many siblings was also associated with higher risk of mental disorders mediated by the resource dilution process (Downey, 1995). In a UK study, however, with more than four siblings were found to have lower prevalence of mental disorders than the prevalence among children with fewer than four siblings Meltzer et al (2000).

We analyzed the association of number of siblings in two steps. The first analysis showed lower prevalence of mental disorders among children with no siblings than among children with siblings, directly contradicting the implications of the study by Downey et al (2013). Two possible explanations might be the reason for this difference. A first possible explanation is the structural difference of most western families (usually nuclear) and African families (usually extended). Children in African societies do not learn skills necessarily from siblings, and have the advantage of opportunities for widespread interaction in extended families, and better socially connected neighborhoods. The second possible explanation may be the absence of the resource dilution process enabling only children to enjoy parents' energy, time, money and all other resources with no competitors. The second analysis tested the findings of Meltzer et al (2000) and found similar results in that lower prevalence of mental disorders was found among children with more than four siblings than among children with four or fewer siblings.

Given the established link between parental death and various mental disorders (Pfeffer et al, 2000), the researcher theorized that a significant correlation would be found between parental death and DSM-IV disorders in this study. After analyzing the three different scenarios (no

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parental death vs any parental death, maternal death vs no maternal death regardless of paternal death, paternal death vs no paternal death regardless of maternal death), there was no significant association detected. Nevertheless, the prevalence of DSM-IV disorders was higher among participants who reported parental death (17.2%) than among those who reported no parental death (12.6%), among those who reported maternal death (28.6%) than those who reported no maternal death regardless of father's status (12.7%), and among those who reported paternal death (16.0%) than among those who reported no paternal death regardless of maternal status (12.8%). Out of the three scenarios, the one which resulted in biggest difference of proportions and smallest p-value (0.229) was the case of maternal death regardless of father's status. This was against the researcher's hypothesis of paternal death potentially having greater effect on children in the community studied. Based on the patriarchal nature of the study population evidenced by the widely disproportionate unemployment levels of mothers and fathers, the loss of a father would imply the loss of the main breadwinner, leaving the family vulnerable. The relatively small number of maternal deaths reported (1.3%) compared to paternal death reported (7.0%) may not have been big enough to detect potential associations with mental disorders. However, this interesting finding in spite of these conditions suggests that maternal death, regardless of father's case, is more severely felt and significant associations may be detected by studies with bigger sample size.

5.1.5.3 School-related sociodemographic characteristics of participants associated with DSM-IV disorders

Poor academic performance, grade repetitions, trouble with teachers in school and experiencing bullying in school have been published as correlates of mental disorders (Gureje and

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Omigbodun, 1995, Clark, Prior and Kinsell, 2002, Loe and Feldman, 2007, Anda, 2010).

Findings of significant association between poor performance, grade repetition and problems with teachers and higher risk of DSM-IV disorders this study are in keeping with the above findings. This study found higher rates of mental disorders in participants who experienced bullying, albeit with no statistical significance. This non-significance of the association of bullying with mental disorders might be possibly due to some unexplored mitigating resilience factors, which might need further study.

5.1.6 Sociodemographic characteristics of participants associated with specific DSM-IV disorders

In this section findings of analysis of association between sociodemographic characteristics and specific DSM-IV disorders in this study are discussed in comparison to findings of published research works which examined these associations.

5.1.6.1 Personal Sociodemographic characteristics of participants associated with specific DSM-IV disorders

The higher proportions of depression, CD and GAD among the adolescent age group in this study are in keeping with previous findings in studies which reported correlates of specific DSM-IV disorders (Merikangas et al, 2009, Canino et al, 2004, Ravens-Sieberer et al, 2008). The only disorder which had significantly higher prevalence among adolescents, however, was GAD. The higher prevalence of ADHD in the child age group found in this study is also in agreement with reports from the above studies, but the difference was not statistically significant.

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The higher prevalence of ADHD and CD among male than among female participants found in this study is also in agreement with what Merikangas et al (2009) found in their review of research publications from all over the world and with findings reported by Froehlich et al (2007). The higher prevalence of ASD among boys is also similar to previous findings but it is less than the global estimate of 4:1 ratio.

The higher proportion of GAD among girls than among boys found in this study is also in line with the results of most published work, but the equal male-female prevalence of social phobia fails to agree with findings of most studies which report higher prevalence in girls. This most likely is due to the very few number of participants who received the diagnosis of social phobia, which may make this finding nongeneralizable.

The higher prevalence of depression and significantly higher prevalence of CD and ADHD among participants with chronic physical illnesses is supported by findings in the developed world (Bennett, 1994, Cadman et al, 1987). This study, however, did not detect any difference between proportions of anxiety disorders among children with and without chronic physical illnesses. This contradicts with previous findings (Ortega et al, 2002, Kellerman et al, 1980). This might be caused by the relatively small sample size used in this study and the low prevalence of GAD found.

5.1.6.2 Family related sociodemographic characteristics of participants associated with specific DSM-IV disorders

This study found higher significant association between conduct disorder and marital status, participants from married families having significantly lower prevalence. This is supported by

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findings in other countries (Peterson and Zill, 1986; Amato and Keith, 1991). Similarly, GAD and ADHD were higher among children of separated/divorced, unmarried or deceased parents.

This study also examined the effects of having the mother or both parents deceased on child mental health. GAD was significantly higher in prevalence among children whose mother or both parents were deceased than children who had both parents alive or only the father deceased. Strikingly, no diagnosis of depression or any behavioral disorders was made in children with their mother or both parents dead. It is possible that the psychological, social and economic hardships potentially imposed by the death of a parent may be mitigated by unique resilience factors in this community, such as the supportive effect of extended family.

Prevalence of depression, GAD, CD and ADHD was higher in children mothers with lower level of education (below secondary level). This is supported by the finding reported by Desai and Alva (1998) that low maternal education level is associated with poorer child health.

This study found higher prevalence of depression in children who had more than four siblings and higher prevalence of GAD, CD, ADHD and ASD in those with more than four siblings. Meltzer et al (2000) however found lower prevalence rates of these disorders in children who had more than four siblings. The one difference in the current study is the finding of a high prevalence of depression among those who had more than four siblings.

5.1.6.3 School related sociodemographic characteristics of participants associated with specific DSM-IV disorders

The significantly higher prevalence rates of depression, CD, ADHD and ASD among poorly performing participants in this study are well documented in studies in developed countries. The

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prevalence of GAD was also higher among children with academic difficulties, even though the association was not statistically significant. No developing country publications were accessible for comparison.

No association of bullying with any specific disorder was detected in this study. It is possible that future studies with larger sample size may detect significant associations with bullying, similar to findings reported elsewhere in the literature.

5.1.6.4 Sociodemographic characteristics of participants independently associated with DSM-IV diagnosis

In this study, chronic physical illness in the child, parental conflict, psychiatric illness in a family member and poor academic performance were found to be independently associated with an increased risk of any DSM-IV disorders. The associations observed with the other sociodemographic characteristics are mediated by these variables identified to be independently associated.

5.2 Conclusion

This study has found a high prevalence of DSM-IV disorders in an Eritrean community which is consistent with findings of studies in developing as well as developed countries. Prevalence is high among both females and males as well as among children and among adolescents. Behavioral disorders are the commonest DSM-IV disorders in this community followed by affective disorders and anxiety disorders. The prevalence of these specific DSM-IV disorders found in this study are generally lower than findings in developed countries. Moreover, this

study has documented some important sociodemographic correlates which can be targeted to maximize mental health benefits in children and adolescents of this community.

This study had some strengths and limitations. This is the first ever study to determine the prevalence, correlates and patterns of DSM-IV disorders among children and adolescents in an Eritrean community. The use of a two-stage procedure, the utilization of both parent and self-reports during the screening stage by SDQ, and the use of a standardized diagnostic tool for the diagnosis of specific DSM-IV disorders are also remarkable strengths. This study also sought for both parent report and school evidence for school performance, which is another strength.

One of these limitations of this is the relatively small sample size recruited which resulted in detection of only small numbers of children and adolescents with some of the characteristics of interest. It is possible that our reliance on the School Health Questionnaire to detect bullying for the second stage may have excluded some participants due to the nature of the questionnaire's wording, and thus limited our ability to detect associations with mental health disorders.

5.3 Recommendations

Based on the high prevalence of DSM-IV disorders found in this study, the following recommendations are made;

➢ Child and adolescent mental health services need to be made widely available in Eritrea

➢ A nationwide study of prevalence, correlates and patterns of mental disorders in Eritrea should be conducted in order to develop evidence-based need-oriented service.

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APPENDIX I

Socio-demographic Questionnaire

Please write the answers to the questions or draw a circle where it applies to you. This is not an examination. It only to find out about your child and her/his health.

Section I

Personal Information

1. Gender: A) Female   B) Male

2. How old is she/he?

3. What is her/his date of birth? _____ _____ _____

   Day   Month   Year

4. What grade is she/he?

5. Does she/he have any known medical illness like diabetes, hypothyroidism or congenital heart disease? A) Yes B) No

6. If yes, please specify _____

7. Has she/he used health service in the past 6 months? A) Yes B) No

8. If yes, how many times? _____

9. For what illness? _____

10. How does she/he spend her/his free time?

    A) Playing with peers B) Watching TV or chatting with siblings and parents at home

    C) Alone in her/his room D) I don't know

    E) Other [Please specify]_____

Section II

Family information

11. How many children do you have? _____

12. What is her/his position among your children? _____

13. Your marital status:

    A) Married   B) separated/divorced   C) Father is dead   D) Mother is dead

    E) Father and mother are dead F) Unmarried

14. If your answer is A, then, are you living together? A) Yes B) No

15. Was there any conflict between you in the past 6 months? A) Yes B) No

16. Have you ever been married to anyone before? A) Yes B) No

17. If yes, how many times? _____

18. Who brought her/him up from her/his childhood?

    A) Both parents B) Mother C) Father) D) Grandparents E) Grandmother F) Grandfather

    G) Other [please specify]

19. How many different people has she/he left you (parents) to live with from her/his

    childhood? _____

20. If more than one person, list the people, time spent and whether experience was good or

    bad.

    Person lived with   from which age to which age   Experience (good or bad)

    _____   _____   _____

    _____   _____   _____

    _____   _____   _____

21. Does she/he do any kind of work to earn money before or after school? A) Yes B) No

22. If yes, please describe what she/he does_____

23. Father's level of Education

   A) No formal Education B) Primary School C) Junior School D) Secondary School E)

   Post-secondary (Non-University) F) University degree and above H) I don't know

24. Occupation of father [Write the exact occupation] _____/I don't know

25. Mother's level of Education

   A) No formal Education B) Primary School C) Junior School D) Secondary School E)

   Post-secondary (Non-University) F) University degree and above H) I don't know

26. Occupation of mother [Write the exact occupation]_____/I don't know

27. Is there any family member with chronic medical illnesses like diabetes mellites,

   hypertension or disability or unexplained pain which cause repeated hospital visits?

   A) Yes B) No

28. If yes, who? _____

29. Specify disease_____

30. Is there any family member with a psychiatric disorder? A) Yes B) No

31. If yes, who? _____ (father, mother, brother, sister)

32. Does any member of your family get drunk repeatedly? A) Yes B) No

33. If yes, how often?

    A) Rarely B) During the weekends C) Most days of the week D) Always

34. Have you changed your place of residence in the last six months? A) Yes B) No

Section III

School related questions

35. Does she/he do well academically? A) Yes B) No

36. Please show record evidence of recent results _____

37. Has she/he ever repeated any grade? A) Yes B) No

38. If yes, how many times? _____

39. How often do you check her/his exercise books to see how she/he is doing?

    A) Always B) Most of the time C) Sometimes D) Rarely E) Never

40. Does she/he have difficulties with her/his teachers? A) Yes B) No

41. If yes, what sort of difficulties? _____

42. Has she/he ever complained of being bullied at school? A) Yes B) No

43. If yes, when? A) In the past 30 days B) In the past 6 months C) In the Past 12 Months

    D) More than 12 months ago

44. How many times did the bullying occur?

    A) only once B) Many times but it has stopped now C) Many time and it has not stopped

APPENDIX II

School Health Questionnaire (Adapted)

The next four questions ask about drinking alcohol. This includes drinking local liquor. Drinking alcohol does not include drinking a few sips of wine for religious purposes. A "drink" is a glass of wine, a bottle of beer, a cup/small glass of liquor or a mixed drink.

1. Do you drink alcohol/ have you ever drunk alcohol?
   A) I have never had a drink of alcohol other than a few sips
   B) Yes, I used to, but I have not drunk in the past 30 days.
   C) Yes, and I still drink alcohol continually
2. What age were when you first drunk alcohol? _____

Staggering when walking, not being able to speak right, or throwing up are some signs of being really drunk.

3. During your life, how many times did you drink alcohol so much that you were really drunk?
   A) 0 times
   B) 1 or 2 times
   C) Up to 10 times
   D) More than 10 times
4. During your life, how many times have you got into trouble with your family or friend, missed school, or got into fights as a result of drinking alcohol?
   A) 0 times
   B) 1 or 2 times
   C) Up to 10 times
   D) More than 10 times

The next two questions ask about drug use. This includes using marijuana, amphetamines, cocaine, inhalants, glue sniffing and other local examples.

1. Have you ever used drugs?
   A) No, I have never used any drugs
   B) Yes, but it has been more than a month since I stopped using drugs.
   C) Yes, and I still sue drugs
2. Which of the drugs do you take/ have you ever taken?
   A) Marijuana
   B) Amphetamines
   C) Cocaine
   D) Inhalants
   E) Glue
   F) Benzene
   G) Chat
   H) Cannabis

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The next 6 questions ask about your feelings and friendships.

1. During the past 12 months, how often have you felt lonely?
   A) Never
   B) Rarely
   C) Sometimes
   D) Most of the time
   E) Always
2. During the past 12 months, how often have you been so worried about something that you could not sleep at night?
   A) Never
   B) Rarely
   C) Sometimes
   D) Most of the time
   E) Always
3. During the past 12 months, did you ever **seriously** consider attempting suicide?
   A) Yes
   B) No
4. During the past 12 months, did you make a plan about how you would attempt suicide?
   A) Yes
   B) No
5. During the past 12 months, how many times did you actually attempt suicide?
   A) 0 times
   B) 1 time
   C) 2 or 3 times
   D) 4 or 5 times
   E) 6 or more times
6. How many close friends do you have?
   A) 0
   B) 1
   C) 2
   D) 3 or more

The next 4 questions ask about cigarette and other tobacco use.

1. Have you ever tried cigarette?
   A) No, I have never tried cigarette.
   B) Yes, I used to smoke but it has been more than a month since I stopped smoking
   C) Yes, and I still smoke or have smoked in the last 30 days.
2. Have you ever used tobacco products other than cigarettes?
   A) No, I have never used tobacco products
   B) Yes, but it has been a month since I last sued tobacco
   C) Yes, and I still use or have used tobacco in the last 3o days.
3. (If you still smoke), have you ever tried to stop smoking cigarettes?
   A) Yes, but I couldn't succeed
   B) No, I have never considered or tried to stop smoking cigarette

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C) No, I have never tried, but I many times consider stopping smoking
4. Does any of your parents or guardians use any form of tobacco?
   A) Yes, my father or male guardian
   B) Yes, my mother or female guardian
   C) Both
   D) I do not know

The next question asks about physical attacks. A physical attack occurs when one or more people hit or strike someone, or one or more people hurt someone with a weapon (such as a steak, knife or gun). It is not a physical attack one two students of about the same strength or power choose to fight each other.

1. During the past 12 months, did you experience physical attack?
   A) No, I didn't
   B) Yes, only one time
   C) Yes, I was physically attacked more than one times (Specify how many times _____)

The next question asks about physical fights. A physical fight occurs when two students of about the same power or strength choose to fight each other.

1. During the past 12 months, were you involved in a physical fight?
   A) No, I was not involved in any physical fight
   B) Yes, one or two times
   C) Yes, repeatedly more than two times.

The next 2 questions ask about bullying. Bullying occurs when a student or a group of students say or do bad and unpleasant things to another. It is also teasing when a student is teased a lot in an unpleasant way or when a student is left out of things on purpose. It is not bullying when two students of about the same strength and power argue or fight or when teasing is done in a friendly and fun way.

1. During the past 30 days, were you bullied?
   A) No, I was not bullied during the past 30 days.
   B) Yes, one or two days only
   C) Yes, many days
   D) Yes, almost all the past 30 days.
2. Please specify how were you bullied most often?
   A) I was hit, kicked, pushed, shoved around, or locked indoors
   B) I was made fun of because of my race or color
   C) I was made fun of with sexual jokes, comments or gestures
   D) I was left out of activities on purpose or completely ignored
   E) I was made fun of because of how my body or face looks
   F) I was bullied in some other way

APPENDIX III

The Strengths and Difficulties Questionnaire P [4-10]

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of your child's behavior over the last six months.

Your child's name .... Male/Female

Date of birth..

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	□	□	□
Restless, overactive, cannot stay still for long	□	□	□
Often complains of headaches, stomach-aches or sickness	□	□	□
Shares readily with other children, for example toys, treats, pencils	□	□	□
Often loses temper	□	□	□
Rather solitary, prefers to play alone	□	□	□
Generally well behaved, usually does what adults request	□	□	□
Many worries or often seems worried	□	□	□
Helpful if someone is hurt, upset or feeling ill	□	□	□
Constantly fidgeting or squirming	□	□	□

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	Not True	Somewhat True	Certainly True
Has at least one good friend	□	□	□

	Not True	Somewhat True	Certainly True
Often fights with other children or bullies them	□	□	□
Often unhappy, depressed or tearful	□	□	□
Generally liked by other children	□	□	□
Easily distracted, concentration wanders	□	□	□
Nervous or clingy in new situations, easily loses confidence	□	□	□
Kind to younger children	□	□	□
Often lies or cheats	□	□	□
Picked on or bullied by other children	□	□	□
Often offers to help others (parents, teachers, other children)	□	□	□
Thinks things out before acting	□	□	□
Steals from home, school or elsewhere	□	□	□
Gets along better with adults than with other children	□	□	□
Many fears, easily scared	□	□	□
Good attention span, sees chores or homework through to the end	□	□	□

Do you have any other comments or concerns?

Please turn over - there are a few more questions on the other side.

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Overall, do you think that your child has difficulties in one or more of the following areas: emotions, concentration, behavior or being able to get on with other people?

No	Yes- minor difficulties	Yes- definite difficulties	Yes- severe difficulties
☐	☐	☐	☐

If you have answered "Yes", please answer the following questions about these difficulties:

• How long have these difficulties been present?

Less than a month	1-5 months	6-12 months	Over a year
☐	☐	☐	☐

• Do the difficulties upset or distress your child?

Not at all	Only a little	A medium amount	A great deal
☐	☐	☐	☐

• Do the difficulties interfere with your child's everyday life in the following areas?

	Not at all	Only a little	A medium amount	A great deal
HOME LIFE	☐	☐	☐	☐
FRIENDSHIPS	☐	☐	☐	☐
CLASSROOM LEARNING	☐	☐	☐	☐
LEISURE ACTIVITIES	☐	☐	☐	☐

• Do the difficulties put a burden on you or the family as a whole?

Not at all	Only a little	A medium amount	A great deal
☐	☐	☐	☐

Signature .... Date ....

Mother/Father/Other (please specify:)

Thank you very much for your help   © Robert Goodman, 2005

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PPENDIX IV

The Strengths and Difficulties Questionnaire P [11-17]

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of your child's behavior over the last six months.

Your child's name .... Male/Female

Date of birth...

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	□	□	□
Restless, overactive, cannot stay still for long	□	□	□
Often complains of headaches, stomach-aches or sickness	□	□	□
Shares readily with other youth, for example CD's, Games, food	□	□	□
Often loses temper	□	□	□
Would rather be alone than with other youth	□	□	□
Generally well behaved, usually does what adults request	□	□	□
Many worries or often seems worried	□	□	□
Helpful if someone is hurt, upset or feeling ill	□	□	□
Constantly fidgeting or squirming	□	□	□

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	Not True	Somewhat True	Certainly True
Has at least one good friend	□	□	□
Often fights with other youth or bullies them	□	□	□
Often unhappy, depressed or tearful	□	□	□
Generally liked by other youth	□	□	□
Easily distracted, concentration wanders	□	□	□
Nervous in new situations, easily loses confidence	□	□	□
Kind to younger children	□	□	□
Often lies or cheats	□	□	□
Picked on or bullied by other youth	□	□	□
Often offers to help others (parents, teachers, children)	□	□	□
Thinks things out before acting	□	□	□
Steals from home, school or elsewhere	□	□	□
Gets along better with adults than with other youth	□	□	□
Many fears, easily scared	□	□	□
Good attention span, sees chores or homework through to the end	□	□	□

Do you have any other comments or concerns?

Please turn over - there are a few more questions on the other side.

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Overall, do you think that your child has difficulties in one or more of the following areas: emotions, concentration, behavior or being able to get on with other people?

No	Yes- minor difficulties	Yes- definite difficulties	Yes- severe difficulties
☐	☐	☐	☐

If you have answered "Yes", please answer the following questions about these difficulties:

• How long have these difficulties been present?

Less than a month	1-5 months	6-12 months	Over a year
☐	☐	☐	☐

• Do the difficulties upset or distress your child?

Not at all	Only a little	A medium amount	A great deal
☐	☐	☐	☐

• Do the difficulties interfere with your child's everyday life in the following areas?

	Not at all	Only a little	A medium amount	A great deal
HOME LIFE	☐	☐	☐	☐
FRIENDSHIPS	☐	☐	☐	☐
CLASSROOM LEARNING	☐	☐	☐	☐
LEISURE ACTIVITIES	☐	☐	☐	☐

• Do the difficulties put a burden on you or the family as a whole?

Not at all	Only a little	A medium amount	A great deal
☐	☐	☐	☐

Signature .... Date ....

Mother/Father/Other (please specify:)

Thank you very much for your help © Robert Goodman, 2005

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APPENDIX V

Strengths and Difficulties Questionnaire S [11-17]

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of your child's behavior over the last six months.

Your name .... Male/Female

Date of birth..

	Not True	Somewhat True	Certainly True
I try to be nice to other people, I care about their feelings	□	□	□
I am restless, I cannot stay still for long	□	□	□
I get a lot of headaches, stomach-aches or sickness	□	□	□
I usually share with others, for example CD's, games, food	□	□	□
I get very angry and often lose my temper	□	□	□
I would rather be alone than with people of my age	□	□	□
I usually do as I am told	□	□	□
I worry a lot	□	□	□
I am helpful if someone is hurt, upset or feeling ill	□	□	□
I am constantly fidgeting or squirming	□	□	□

	Not True	Somewhat True	Certainly True
I have one good friend or more	□	□	□

	Not True	Somewhat True	Certainly True
I fight a lot, I can make other people do what I want	□	□	□
I am often unhappy, depressed or tearful	□	□	□
Other people my age generally like me	□	□	□
I am easily distracted, I find it difficult to concentrate	□	□	□
I am nervous in new situations, I easily loses confidence	□	□	□
I am kind to younger children	□	□	□
I am often accused of lying or cheating	□	□	□
Other children or young people pick on me or bully me	□	□	□
I often offer to help others (parents, teachers, other children)	□	□	□
I think before I do things	□	□	□
I take things that are not mine from home, school or elsewhere	□	□	□
I get along better with adults than with people my own age	□	□	□
I have many fears, I am easily scared	□	□	□
I finish the work I am doing. My attention is good	□	□	□

Do you have any other comments or concerns?

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Overall, do you think that you have difficulties in any of the following areas:
emotions, concentration, behavior or being able to get on with other people?

	Yes- minor difficulties	Yes- definite difficulties	Yes- severe difficulties
No			
☐	☐	☐	☐

If you have answered "Yes", please answer the following questions about these difficulties:

• How long have these difficulties been present?

Less than a month	1-5 months	6-12 months	Over a year
☐	☐	☐	☐

• Do the difficulties upset or distress you?

Not at all	Only a little	A medium amount	A great deal
☐	☐	☐	☐

• Do the difficulties interfere with your everyday life in the following areas?

	Not at all	Only a little	A medium amount	A great deal
HOME LIFE	☐	☐	☐	☐
FRIENDSHIPS	☐	☐	☐	☐
CLASSROOM LEARNING	☐	☐	☐	☐
LEISURE ACTIVITIES	☐	☐	☐	☐

• Do the difficulties make it harder for those around you (family, friends, teachers, etc.)?

Not at all	Only a little	A medium amount	A great deal
☐	☐	☐	☐

Signature .... Date ....

Mother/Father/Other (please specify:)

Thank you very much for your help   © Robert Goodman, 2005

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PPENDIX VI

LETTER OF ETHICAL APPROVAL

<u>Health Research Proposal Review and Ethical Clearance Result</u>

Name of researchers: Dr. ESTIFANOS HAILE ZERU

Address: Centre for Child and Adolescent Mental Health- University of Ibadan,
            Nigeria

Title of Research: Prevalence and Correlates of Mnetal Disorders in Children and
                      Adolescents in Mendefera Community, Eritrea

Sponsor: University of Ibadan, Nigeria

Letter of Reference: 18/12/2016

The Health Research Proposal Review and Ethical Committees have reviewed your paper
for its research relevance and ethical soundness and come up with the following
conclusion. Based on their deliberations.

1. The research proposal is accepted ✓
2. The research proposal is not accepted

Signed and approved on date 02/01//2017

1. Dr. Berhane Debru
2. Mr Salih Gemam
3. Mr. Mehari Woldu

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APPENDIX VIIa

INFORMED CONSENT LETTER

(PARENT/ADULT CAREGIVER)

Research Title: Prevalence and Correlates of Mental Disorders in Children and Adolescents in Mendefera Community, Eritrea

Investigator: Dr. Estifanos Haile Zeru

Center for Child and Adolescent Mental Health

University of Ibadan

Ibadan, Nigeria

Dear Sir/Madam,

Mental disorders, globally affect one in every five children and adolescents. These disorders severely compromise the quality of life of children and adolescent and cause a great burden and death in them. Establishing the prevalence, sociodemographic correlates and patterns of these disorders is of paramount importance to rational services provision. However, nothing is known about the prevalence and correlates of mental disorders in the child and adolescent population of Eritrea. This research project is trying to fill in this gap by determining the prevalence of the disorders and their patterns, and identifying the sociodemographic factors that put children and adolescents at higher risk of developing these disorders in your community.

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The study is being conducted as part of a Masters Degree program at the University of Ibadan, where I am a student, with approval from the Health Research Proposal Review and Ethical Committee of the Ministry of Health, State of Eritrea.

The study will involve interviewing you and your son/daughter using structured questionnaires by a research assistant, estimated to take between 40 and 50 minutes to complete, which may or may not lead to an additional interview by the investigator depending its findings of your child's mental health. If we find that your child has a mental problem for which he would benefit from seeing a physician, we will write you a referral letter to Mendefera Paediatric Hospital.

Your son/daughter's participation is voluntary and you are free to decline participation at any stage of the interviews. Please let us know if you have any questions or need clarification. If you agree for your son/daughter to participate, please read and sign the consent form attached.

I would like to thank you for reading this letter and considering your child's participation in this study.

Dr. Estifanos.

APPENDIX VIIb

INFORMED CONSENT LETTER IN TIGRIGNA

ደብዳቤ ቅጥዒ ስምምዕ (ንወላዲ/ሞግዚት)

ብዝሕን ኣቃላዕቲ ረቋሒታትን ጸገማት ጥዕና ኣእምሮ ህጻናትን በጽሕታትን ኣብ ማሕበረሰብ መንደፈራ፣ ኤርትራ

ተማራማሪ፡ ዶ/ር እስጢፋኖስ ሃይለ ዘርኡ

       ማእከል ጥዕና ኣእምሮ ህጻናትን በጽሕታትን

       ዩኒቨርስቲ ኢባዳን፣ ናይጀርያ

ናብ ኣቶ/ወይዘሮ፣

ብዓለም ደረጃ፣ ሓደ ካብ ነፍስወከፍ ሓሙሽተ ህጻናትን በጽሕታትን ጸገማት ጥዕና ኣእምሮ ኣለዎ። እዞም ጸገማት፣ ንዓይነት ህይወት ህጻናትን በጽሕታትን ኣጸቢቖም ብኣሉታ ይጸልዉዎ ጥራሕ ዘይኮነስ፣ ከቢድ ጾርን ጭንቀትን ኣብ ህጻናትን በጽሕታትን ብምኽታል፣ ክሳብ ናይ ሞት ስጉምቲ ናብ ምውሳድ የብጽሑዎም። ነዚ ዝገትእ ርትዓዊ ኣገልግሎት ንምቅራብ እምበኣር፣ ብዝሕን ዓይነትን ናይዞም ጸገማትን ናብኣም ዘቃልው ማሕበራዊ ረቛሒታትን ምፍላጥ ኣዝዩ ልዑል ኣገዳስነት ኣለዎ። ይኹን እምበር፣ ኣብ ሃገርና ኤርትራ ብዛዕባ እዚ ዝኾነ ዝተፈልጠ የለን። እዚ መጽናዕቲ እምበኣር፣ ብዝሕን ዓይነትን ጸገማት ጥዕና ኣእምሮ ህጻናትን በጽሕታትን ናብኣቶም ዘቃልው ማሕበራዊ ረቛሒታትን ብምልላይ ነዚ ናይ ሓበሬታ ሕጽረት ንክፍውስ ዝዓለመ ኢዩ።

እዚ መጽናዕቲ፣ ከም ኣካል ናይቲ ኣብ ዩኒቨርስቲ ኢባዳን ዝማሃሮ ዘለኹ ናይ ማስተርስ ዲግሪ ፕሮግራም ኮይኑ፣ ብኮሚተ ስነምግባር ጥዕናዊ መጽናዕታት ናይ ሚኒስትሪ ጥዕና ሃገረ ኤርትራ ፍቓድ ተዋሂቡኒ እየ ዘካይዶ ዘለኹ።

እዚ መጽናዕቲ፣ ንዓኻን ንወድኻ/ንልካን ቃለ-መሕትት ብምግባር ኢዩ ዝካየድ። ቀዳማይ ቃለ-መሕትት ብተሓጋጊዚ መጽናዕቲ ዝካየድ፣ ብገምጋም ካብ 40 ክሳብ 50 ደቓይቕ ዝወስድ ኮይኑ፣ ኣብ ወድኻ/ንልካ ጸገም ጥዕና ኣእምሮ ምስ ዝርከብ፣ ተወሳኺ ቃለ-መሕትት ምስ ተማራማሪ ክካየድ ከድሊ ኢዩ። ወድኻ/ንልካ ጸገማት ጥዕና ኣእምሮ ምስ ዝህልዎም፣ ናብ መወከሲ ሆስፒታል ህጻናት መንደፈራ ክንሰድኻ ኢና።

ሱታፈኻን ሱታፈ ወድኻ/ንልካን ወለንታዊ ኢዩ። ዘይክትሳተፍ ክትመርጽ ወይ ኣብ ዝኾነ ደረጃ ናይዚ መጽናዕቲ ከተቋርጽ ክትውስን ነጻ መሰል ኣለካ። ዝኾነ ሕቶ ምስ ዝህልወካ ወይ መብርሂ ምስ ትደሊ፣ ብኽብረትካ ሓብረና። ወድኻ/ንልካ ንኽሳተፍ/ከትሳተፍ ፍቓደኛ እንተኾነ፣ ብኽብረትካ ነዚ ምስዚ ደብዳብ ተታሓሒዙ ዘሎ ቅጥዒ ስምምዕ ኣንቢብካ ክታምካ ኣንብረሉ።

ነዚ ደብዳቤ ግዜኻ ሰዊእካ ብምንባብካ፣ ንሱታፈ ወድኻ/ንልካ ኣብዚ መጽናዕቲ ውን ግምት ስለዝሃብካየን ከመስግነካ እፈቱ።

ዶ/ር እስጢፋኖስ።

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APPENDIX VIIIa

CONSENT FORM (PARENT/ADULT CAREGIVER)

I have been fully informed about this study titled "**Prevalence and Correlates of Mental Disorders in Children and Adolescents in Mendefera Community, Eritrea".** I am also informed that my son/daughter will not be negatively affected if I do not wish for him to participate in this study at all. I have also been informed that I retain the right to decline further participation at any stage of the study for my son/daughter.

I am willing to allow my son/daughter to participate in this study.

_____ -   _____

Parent/adult caregiver's signature/thumbprint   Date

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APPENDIX VIII b

CONSENT FORM (PARENT/ADULT CAREGIVER) IN

TIGRIGNA

ቅጥዒ ስምምዕ (ንወላዲ/ሞግዚት)

ብዛዕባ እዚ "ብዝሒ ጸገማት ጥዕና ኣእምሮን ኣቃላዕቲ ረቛሒታትን ኣብ ህጻናትን በጽሕታትን ማሕበረሰብ መንደፈራ፣ ኤርትራ" ብዝብል ኣርእስቲ ዝካየድ ዘሎ መጽናዕቲ ምሉእ ሓበሬታን መብርህን ተዋሂበ እየ። ወደይ/ጓለይ ኣብዚ መጽናዕቲ ክስተፍ/ክትሳተፍ ፍቓደኛ እንተዘይኮንኩ፣ ንወደይ/ጓለይ ዝኾነ ኣሉታዊ ሳዕቤን ከምዘየምጽኣሉ/ላ ውን ፈሊጠ ኣለኹ። ተሳትፎ ናይ ወደይ/ጓለይ ኣብ ዝኾነ ደረጃ ናይዚ መጽናዕቲ ደው ንኽብል ምሉእ መሰል ከምዘለኒ ውን ተሓቢረ ኣለኹ።

ወደይ/ጓለይ ኣብዚ መጽናዕቲ ንኽሳተፍ/ንኽትሳተፍ ፍቓደኛ እየ።

_____   _____

ክታም (ወላዲ/ሞግዚት)   ዕለት

APPENDIX IXa

ASSENT FORM (ADOLESCENTS)

I have been fully informed about this study, which is trying to determine the prevalence, correlates and patterns of mental disorders among children and adolescents in my community, Mendefera, Eritrea. I understand that I will not be punished/treated badly if I decide to not participate in this study at all. I also understand that I have the full right to decide to halt my participation at any stage of the interviews.

I am willing to participate in this study.

_____   _____

Adolescent's signature/thumbprint   Date

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APPENDIX IXb

ASSENT FORM (ADOLESCENTS) IN TIGRIGNA

ቅጥዒ ስምምዕ (ንበጽሕታት)

ብዛዕባ እዚ ብዝሒ ጸገማት ጥዕና ኣእምሮን ናብኦም ዘቅልዑ ነገራትን ኣብ ህጻናትን በጽሕታትን ኣብ'ዚ ኣነ ዝነበረሉ ማሕበረሰብ መንደፈራ ንምልላይ ዝካየድ ዘሎ መጽናዕቲ ምሉእ ሓበሬታን መብርሆን ተዋሂበኒ እዩ። ክሳተፍ ፍቓደኛ እንተዘይኮንኩ ገ'ኾነ ኣሉታዊ ሳዕቤን ወይ መቅጻዕቲ ከምዘየስዕበለይ ውን ተረዲኡኒ ኣሎ። ሱታፈይ ኣብ ዝኾነ ደረጃ ናይቲ ዝካየደለይ መሕትት ደው ከብል ምሉእ መስል ከምዘለኒ ውን ፈሊጠ ኣለኹ።

ኣብዚ መጽናዕቲ ንኽሳተፍ ፍቓደኛ እየ።

_____   _____

ክታም   ዕለት