PREVALENCE, PATTERNS AND PERCEPTION OF EATING AND SLEEPING DISORDERS AMONG IN-SCHOOL ADOLESCENTS IN ILORIN, NIGERIA

BY

AYOTUNDE OMOTOSO

MBBS ILORIN; FWACP

211158

A PROJECT SUBMITTED TO THE CENTRE FOR CHILD AND ADOLESCENT MENTAL HEALTH, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE OF THE UNIVERSITY OF IBADAN,

2019

DECLARATION

It is hereby declared that this work is original. It has not been presented in part or whole to any other college for a fellowship or diploma award nor has it been submitted elsewhere for publication.

Dr. Ayotunde Bolatito Omotoso

Signature: ….....

CERTIFICATION

I certify that this work was carried out by **DR. AYOTUNDE BOLATITO OMOTOSO** of the Department of Behavioural Sciences, University of Ilorin Teaching Hospital, Ilorin Nigeria under my supervision.

FIRST SUPERVISOR:

Prof. Olayinka O. Omigbodun (FMCPsych).

Professor of Psychiatry and Consultant Psychiatrist,

Department of Psychiatry,

University of Ibadan / University College Hospital,

Ibadan, Nigeria.

Signature ----------

Date ----------

SECOND SUPERVISOR:

Dr. J.O. Abdumalik (FWACP).

Consultant Psychiatrist, Senior Lecturer

Department of Psychiatry,

University of Ibadan / University College Hospital,

Ibadan, Nigeria.

Signature ----------

Date ----------

THIRD SUPERVISOR:

Dr. Kofoworola. I. Adediran.

Consultant Paediatrician / Research Fellow

Institute of Child Health,

University of Ibadan / University College Hospital,

Ibadan, Nigeria.

Signature ----------

Date ----------

DEDICATION

To my Fruitful Vine, Asake, for the force of your fortitude.

ACKNOWLEDGEMENTS

This project has been completed, many thanks to moments with my mentors and favour with friends, who are hereby acknowledged. Prof Olayinka O. Omigbodun supervised this work and taught me, through her life, love and leadership, to embrace excellence. Dr. Jibril O. Abdumalik and Dr. Kofoworola. I. Adediran co-supervised this work. I thank them for inspiring me with the power of their encouraging words.This work took shape from their rich perspectives.

I am grateful to all faculty members of the Centre for Child and Adolescent Mental Health (CCAMH). The CCAMH staff were kind enough to provide technical and professional support.

I am indebted to the University of Ilorin and my Head of Department, Prof. M.F. Ayinmode, for the permission granted. I am also thankful to all staff of the Department of Behavioural Sciences for their support and understanding.

Family is integral to mental health. I know this, because I have been blessed with an amazing family. My parents (Prof. and Mrs. A.B.O. Omotoso and Mr. and Mrs. L.O. Salako) continue to be role models of excellence. My siblings, Dimeji Salako, Funto and Ayokunmi Omotoso showed love, even when work competed for my attention. I thank my siblings Ayotade and Tobi Ojuawo, for reading through this project.

My church family has also been tremendously supportive. I celebrate Rev. Biodun Fatoyinbo, Pastor (Dr.) Kenneth Habuh-Rajan and the COZA workforce for the constant inspiration and incredible support with this work. Virtually all research assistants (Temitope Fatunbi, Mary Komolafe, Luke Ibrahim, Uzo Onyenanu) and statisticians (Ayeni Philips and James Ayodele) are professionals I met in COZA. I thank Dr. Sunmolu Adio, for his resourcefulness.

I can't thank my wife enough. She was pregnant with twins during this project, and despite my absence, held the family together with strength and sweetness.

Of the words that acknowledge God's support, I probably like these best: God is faithful.

TABLE OF CONTENTS

LIST OF TABLES

TABLE **TITLE** **PAGE**

LIST OF BOXES

BOX **TITLE** **PAGE**

LIST OF FIGURES

FIGURE **TITLE** **PAGE**

KEY TO ABBREVIATIONS

AASM-	American Association of Sleep Medicine
BMI-	Body Mass Index
CI-	Confidence Interval
DSM-	Diagnostic and Statistical Manual of Mental Disorders
FGD-	Focused group discussion
ICD-	International Statistical Classification of Diseases and Related Health Problems
ICSD-	International Classification of Sleep Disorders
JSS-	Junior Secondary School
K-SADS-	Kiddies Schedule for Affective Disorders and Schizophrenia
OR-	Odds Ratio
PSQI-	Pittsburgh Sleep Quality Index
SSA-	sub-Saharan Africa
SSS-	Senior Secondary School
USA-	United States of America
WHO-	World Health Organization

ABSTRACT

BACKGROUND

Adolescence is a period of transition in which there are unique nutritional and sleep requirements. Unhealthy dietary habits and inadequate sleep are common among adolescents around the world. Eating disorders are increasingly seen in non-western climes. However, there is a dearth of information about these behavioural patterns among adolescents in Nigeria. Therefore, this study aimed to determine the prevalence of eating and sleeping disorders among in-school adolescents in Ilorin East, the adolescents' nutritional status and perception about their eating and sleeping habits.

METHODOLOGY

A cross-sectional study was conducted, with a mixed-methods approach, among 512 in-school adolescents in north-central Nigeria. A quantitative approach helped to determine the prevalence of eating and sleeping disorders and nutritional status, while the perception about their eating and sleeping habits was explored using qualitative methods.

Data collection and focused group discussions were completed between February and April 2019. Screening and diagnoses of eating disorders was done using the Kiddies Schedule for Affective Disorders and Schizophrenia (K-SADS) and sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI).

The quantitative data was analysed with the Statistical Package for Social Sciences (SPSS) version 22. The frequency distribution of variables was generated. The association between categorical variables was tested with Chi square statistics, with the level of statistical significance set at less than 0.05. Binary logistic regression analysis determined the predictors

of quality of sleep. Analysis of anthropometric data was done with the WHO Anthro software (Version 3.1.0), using the WHO growth reference for adolescents.

Qualitative data was analysed from audio recordings of focused group discussions, which were converted into text. Recurring ideas in the text were coded till a point of saturation was reached. Similar codes were organised into emerging themes. Refined themes provided a summary of the sleeping and eating habits of adolescents in the study.

RESULTS

A total of 512 students from eight public schools were interviewed. Six of the schools were mixed, while two were same-sex schools, namely one boys-only and one girls-only school, respectively.They were mostly late adolescents (62.7%) with 53.5% being female.

Three out of every five adolescents were poor sleepers (PSQI global score > 5), even though they had mostly reported good subjective sleep quality. Only a few respondents (19%) had optimal sleep (≥ 9 hours), and more than half had inadequate sleep (< 7 hours).

Poor sleep was associated with male gender, being the first born, residence at home, and being in a class with <40 pupils. Logistic regression analysis showed that living at home, as against hostel living, was predictive of poor sleep.

Only 4.1% of respondents met the threshold for eating disorders and none fulfilled the diagnostic criteria. Of the adolescents, 21% were underweight while 20% were overweight. Only 0.1% was obese. The dietary pattern was starchy, with rice and yam being the common meals, and meat being rather uncommon (9.3%).

One in five respondents was overweight. Overweight was associated with early adolescence, Christianity, junior class, residence at home and prior visit to the school counsellor. Of all respondents, 21% were underweight. Underweight was significantly associated with older

adolescence, Islam, senior class, living at home and having not gone to see the school counsellor before.

Sixty-two adolescents (12.1%) of all adolescents were stunted. Stunting was significantly associated with being in the senior class, living in the hostel, late adolescence, being male, from a polygamous family and being raised by an unmarried parent. Being in the senior class and being raised in a polygamous family setting were predictive of stunting.

Common dietary habits included meal skipping and snacking. These were perceived to be unavoidable, and indeed desirable. Negative perceptions about overweight were prevalent. Social media was perceived to be a major deterrent to sleep and chatting late into the night was perceived to affect academic performance.

Despite these psychosocial challenges, some students (6.8%) did not know there was a guidance counsellor in their school. Even more disturbingly, one out of every four students was not willing to see the school guidance counsellor.

CONCLUSION

The two faces of malnutrition were common among the adolescent students. Poor sleep was markedly prevalent but not perceived to be a problem. Eating disorders remain rare among adolescents in north central Nigeria. There is a need for mental health promotion and effective school mental health policies in Nigeria and across Africa. Good nutrition and adequate sleep among adolescents have an impact on mental health and education – two promising pillars to support the demographic dividend of Africa's youthful population.

KEY WORDS

Sleep disorder, nutritional status, eating disorders, adolescent, school mental health

Abstract Word Count: 759

Recommended Word Count: 500 - 1000

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

In his classic 1943 paper dubbed "A Theory of Human Motivation", Abraham Maslow (an American psychologist) described the hierarchy of human needs (Maslow, 1943). The most basic of these needs are physiological needs, namely food, water, warmth and rest. In other words, before meeting psychological needs and then transcending to self-actualisation, every human being has need for the simple biological activities of eating and sleeping.

At the dawning of a new millennium, the United Nations crafted eight Millennium Development Goals, the first of which was to eradicate extreme poverty and hunger. When these global goals gave way to the Sustainable Development Goals, the first two goals remained as "no poverty" and "zero hunger" (Sachs, 2012). These examples unwittingly represent a modern documentation of a prehistoric need – the need to eat.

Eating and sleeping are biological functions required for physiological and psychological well-being. There are comparable qualities of eating and sleeping, one of which is that they are both needed for survival. These activities are carried out on a regular, recurrent and rhythmic fashion, and are expressed differently in various life forms.

The food chain is replete with animals having various food requirements. For instance, brown bats need an average of 20 hours of sleep in a 24-hour day, while giraffes and elephants do well on 3 to 4 hours/day(Herculano-Houzel, 2015). Humans also express variability in habits of eating and sleeping.

Eating habits are affected by personal, social, environmental, and dietary factors (Jodhun et al., 2016). Personal factors include physiologic factors such as hunger, appetite and satiety;

psychological factors like body image; pathological states of poor physical health; and cognitive factors, such as the level of nutrition education.

Culture and religion are social factors that may modulate frequency of eating and type of food consumed, such as having a vegetarian diet. The media also plays a social role in eating by encouraging a sedentary lifestyle, eating unhealthy snacks while watching television, and exposing adolescents to advertisements that make them conscious about their body image. Environmental factors include low levels of physical activity, high intake of fatty diet, as well as availability of and accessibility to fast food. Dietary factors, on the other hand, describe amount of meal ingested as well as dietary habits such as meal skipping and snacking (Jodhun et al., 2016).

Sleeping habits in adolescents are influenced by academic/vocational responsibilities, emotional engagements, substance use and internet use. Indices of good sleep include the duration, timing, continuity and quality of sleep.

Some eating/ sleeping habits are healthy while others are not. Unhealthy eating/ sleeping habits may predispose to, or be indicative of, pathology. This pathology may be physical or mental in nature, or both. Eating or sleeping problems may precede physical health conditions, or may exist as part of the manifestation of those disease conditions.

Eating and sleeping patterns become problems when they impair the functioning of individuals. Some of these problems meet the criteria for diagnoses, thus, giving rise to the concepts of eating disorders, as well as sleeping disorders. Some of these disorders are particularly prevalent in adolescence, a unique phase of biopsychosocial changes (George and Engel, 1980).

Adolescence is a remarkable phase in the life cycle of humans, being a transition between childhood and adulthood, as well as a period of rapid (and sometimes dramatic) physical,

cognitive, emotional and behavioural changes. The nutritional and sleep requirements are different in this phase of increased metabolism.

The hallmark of adolescence is puberty. Nutritional needs increase in the pubertal period, due to increased metabolism and a growth spurt. Sleep requirements in adolescence are often unmet due to psychosocial demands and consequent changes in the bioregulatory mechanisms influencing sleep. Many adolescents have unhealthy eating and sleeping habits (Carskadon et al., 1998). Eating habits in adolescents are captured in the frequency, type and timing of meals, presence of meal skipping and speed of eating.

In Nigeria, many adolescents take street foods. In a group of adolescents, this accounted for 25% and 52% of the energy and protein intake, respectively (Oguntona and Kanye, 1995). Street food consumption, as opposed to home-prepared foods, is also quite common among adolescents in socially deprived parts of Nairobi, Kenya (Mwangi et al., 2001). Poor sleep is prevalent among adolescents and Nigerian adolescents are no exception to this.

Addressing these biological needs in adolescents may serve as a gateway to preserving their wellbeing, thus providing an instrumental path to health promotion and prevention of disorders.Understanding the patterns of eating and sleeping among adolescents may be fundamental to health promotion and prevention of illness in this age group.

1.2 PROBLEM STATEMENT

Many sleep problems are either undetected or mismanaged (Lewandowski et al., 2011). Night-time sleep deprivation in adolescents can cause daytime sleepiness, which in turn can cause impaired concentration, memory lapses, mood changes and even behavioural problems. These can ultimately affect productivity and cause injuries, including road traffic injuries among these

adolescents(Carskadon et al., 1998). Adolescents commonly have sleep problems (Gradisar et al., 2011, Carskadon et al., 1998, Hayley et al., 2015). In a previous study, sleep difficulties were found in 76% of adolescents (Ipsiroglu et al., 2002).

Eating disorders are uncommon among African populations, and none was found in a Ghanaian study (Bennett et al., 2004). However, some cases may be found in the context of religious fasting. Little is known about eating disorders among Nigerian adolescents. Where present, these disorders can cause significant morbidity and mortality.

These previous findings reinforce the current need for further studies on eating and sleeping habits.

1.3 JUSTIFICATION

Most of the studies done in this regard were conducted in high-income countries. There is a need for more African-based studies to understand the local content and context of these disorders, given the especial situations and perceptions of adolescents living in Africa. Therefore, this study explored common perceptions about eating and sleeping habits, in addition to determining the prevalence of associated disorders.

Previous studies have limited eating and sleeping problems to categorised disorders in the diagnostic manuals. However, the problems may be broader than these. Also approaching these topical issues through the lens of *habits* may help to capture positive aspects of eating and sleeping behaviours.

Adolescents have their own peculiar nutritional and sleep requirements. Studying these biological functions in the community would provide a relatively representative picture of the true community patterns. The school is one of the most important environments for children

and adolescents, and serves as a possible pool for exploring patterns of eating and sleeping among adolescents.

Therefore, it is expected that this study would fill gaps in knowledge about the eating and sleeping habits of adolescents in north-central Nigeria.

1.4 RESEARCH QUESTIONS

1. How common are eating disorders among school-going adolescents in Ilorin, Nigeria?
2. Is poor sleep quality prevalent among adolescent students in Ilorin?
3. What is the nutritional status of adolescent students in Ilorin?
4. How do in-school adolescents perceive their own eating and sleeping habits?

1.5 AIM AND SPECIFIC OBJECTIVES

1.5.1 Aim

To determine the prevalence of eating and sleeping disorders among adolescents and to determine the patterns, as well as to explore the perception of adolescent students in Ilorin, Nigeria, about eating and sleeping habits.

1.5.2 Specific objectives

1. To determine the pattern of eating and sleeping habits among in-school adolescents in Ilorin East.
2. To determine the prevalence of eating and sleeping disorders among adolescent students in Ilorin East.
3. To determine the nutritional status of the adolescents in the study.

4. To explore the perception of adolescents regarding eating and sleeping habits.

1.6 HYPOTHESES

The hypotheses of the study are stated in the null form as follows:

$H0_1$: Socio-demographic characteristics of in-school adolescents do not determine presence of eating disorder.

$H0_2$: Socio- demographic characteristics of in-school adolescents do not affect their sleep quality.

$H0_3$: Socio- demographic characteristics of in-school adolescents do not affect their nutritional status.

1.7 PRIMARY OUTCOME MEASURES

1. Presence of eating disorder
2. Sleep quality
3. Nutritional status
4. Perception about eating and sleeping habits

Word Count: 1,330

Recommended Word Count: 1,000 - 2000

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 EATING AND SLEEPING DISORDERS

In recognition of the similarities between the disorders of eating and sleeping, they are grouped together in the same section in the Tenth Version of the International Classification of Diseases and Related Health Problems (ICD 10), where they are listed in F50-F59(WHO, 2007). This document was formulated by the World Health Organisation and published in Geneva, Switzerland in 1994. In ICD 10, eating disorders, sleeping disorders and non-organic sexual dysfunction are described as behavioural syndromes and mental disorders associated with physiological dysfunction and hormonal changes.

There is another internationally recognised manual for classifying mental disorders, designed by the American Psychiatric Association (APA), known as the Diagnostic and Statistical Manual for Mental Disorders (DSM). In 2013, the fifth edition (DSM 5) was published(APA, 2013). Interestingly, it adopts a similar arrangement to ICD 10 by grouping eating and sleeping disorders close to each other. DSM 5 lists eating disorders first, followed by elimination disorders (both of which are largely disorders of alimentary activities), then sleep and wake disorders.

In addition to these two classificatory systems, there is an International Classification of Sleep Disorders by the American Academy of Sleep Medicine (AASM), Chicago, the third edition of which was published in 2014 (AASM, 2014).

2.2 EATING DISORDERS

Clearly, eating disorders represent patterns of eating that are problematic. However, there are eating problems that may not necessarily be classified as eating disorders, such as unhealthy eating habits. Obesity is often viewed as a medical disorder, and substance use is classified elsewhere in the ICD. Eating disorders are classified herein.

2.2.1 Classification of eating disorders

The DSM 5 categories of feeding and eating disorders have been rearranged in the table below to show similarities/differences with the corresponding ICD 10 categories. To begin with, there are notable differences between DSM IV and DSM 5 in classifying eating disorders. Unlike the preceding DSM-IV, DSM 5 removed the presence of amenorrhoea as a requirement for diagnosis of anorexia nervosa. The DSM 5 nomenclature of avoidant/restrictive food intake disorder is the replacement for the DSM-IV terminology called feeding disorder of infancy or early childhood.

There are also differences between DSM 5 and ICD 10 classifications of eating disorders. Avoidant/restrictive food intake disorder and binge-eating disorder in DSM 5 correspond to the ICD 10 category F50.8, which refers to “Other eating disorders”. While the DSM classifies all feeding and eating disorders in the same section, the ICD classifies some of these disorders with other disorders that begin in childhood.

Table 1 Classification of Eating Disorders

ICD 10	**DSM 5**
F50-F59 Behavioural syndromes associated with physiological disturbances and physical factors	**Feeding and Eating Disorders**
F50 Eating disorders	
F50.0 Anorexia nervosa	Anorexia Nervosa
F50.1 Atypical anorexia nervosa	Restricting type Binge-eating/purging type
F50.2 Bulimia nervosa	Bulimia Nervosa
F50.3 Atypical bulimia nervosa	
F50.4 Overeating associated with other psychological disturbances	
F50.5 Vomiting associated with other psychological disturbances	
F50.8 Other eating disorders	Avoidant/Restrictive Food Intake Disorder Binge-Eating Disorder Other Specified Feeding or Eating Disorder
F50.9 Eating disorder, unspecified	Unspecified Feeding or Eating Disorder
F98 Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence	Rumination Disorder
F98.2Feeding disorder of infancy and childhood	
F98.3 Pica of infancy and childhood	Pica in children

2.2.2 Eating disorders across the ages

The history of eating disorders can be discussed from social and medical perspectives. This is addressed in the following sections.

2.2.2.1 Social history of eating problems

Eating disorders have been in existence for thousands of years(Kaplan and Sadock, 2007). In no historical clime of the world have they been as well described as in the West. There are antique Chinese scrolls describing eating problems; there are also African oral traditions that depict starvation in the face of real or anticipated scarcity(Engel et al., 2007). However, eating disorders (in the manner in which they are described today) appear to have been circumscribed to European cultures in historical times.

In 1st Century Rome, purging behaviour was observed among the elite, who gourmandised at opulent parties, only to deliberately induce vomiting, so that they could return to their merriment and eat some more. By the 4th Century, self-starvation took on a religious tone, with the influence of gnostic asceticism – a philosophy that relied on self-denial of pleasures such as sex and food. Saint Jerome, who translated the Bible from Hebrew to Latin, lived in these times and upheld such views(Bemporad, 1997).

The Dark Ages (5th Century to 10th Century) were quiescent times for many things, and coincidently for eating disorders as well. Only a few notable cases of self-starvation were reported in those mediaeval times. However, between the 13th and 17th Centuries, self-starvation became remarkably significant among religious faithfuls, for which reason it was called “holy anorexia”. In the 19th Century, there was a shift in societal perceptions of feminine beauty, away from voluptuous women to suave and slim figures. This contributed in no small

way to the eating behaviour of young women in the Victorian Era (Bemporad, 1997). By this time, eating disorders had come to the attention of medical science.

2.2.2.2 Medical history of eating disorders: tracking terminologies

Ancient scientific descriptions of some of the commoner eating disorders intersect with the history of hysteria (which is from *hystera*, the Greek word for uterus). For about two thousand years, theorists attributed a number of behavioural abnormalities in women to the presence of the uterus (Gomes & Engelhardt 2014). At first, it was thought that the uterus was a migratory organ that travelled in the body of the host, accounting for various ailments. This viewpoint was embraced in the ancient civilisation of Egypt, with Babylonian and Assyrian texts also adducing evidence of the early thoughts about the uterus (Trimble & Reynolds 2016).These ideas persevered through progenies into the philosophies of Greece.

Following the rise of the Roman Empire, Galen of Pergamon, who was one of the most important figures in the history of modern Medicine, theorised that a nomadic uterus was an irrational concept to endorse. However, the term 'hysteria' continued to be in use by English physicians well into the 19th century.

The 19th century witnessed the rise of French dominance in the world of Medicine.Jean-Martin Charcot while working at the overcrowded La Salpêtrière hospital had elaborate descriptions of behavioural symptoms that were seen in women (Gomes & Engelhardt2014). It was commonplace among physicians in France, and elsewhere in Europe, to classify these disorders as forms of hysteria. Pierre Janet, one of the founding fathers of Psychology, thought self-starvation often occurred in the context of hysteria (Van der Hart& Friedman 1989). Little wonder then, that when an eating disorder became prevalent among women on the streets of nineteenth-century Paris, it was thought to be a form of hysteria.

The term “anorexia nervosa” dates back to an imposing figure in scientific circles who lived in the 19th century. This French scientist was one of the two authors who described folie a deux (shared delusions) in 1877, and ten years later, described/defined exhibitionism (a disorder of sexual preference). Perhaps the best remembered work of Ernest-Charles Lasegue, however, was his formal publication about anorexia nervosa, which he called *de l’anorexie hysterique*, and his description of the clinical presentation of eight patients whom he managed with the condition (Soh et al. 2010).

Close in chronology to the classic work of Charles Lasegue was the description of the English physician, Sir William Gull. In fact, Gull claimed to have described anorexia nervosa before Lasegue, but his reference was rather obscure (Soh et al. 2010). At first, Gull called it ‘apepsia hysterica’, on the assumption that it was a hysterical condition of gastric origin. He modified it to ‘anorexia hysterica’, still in tandem with the uterine concepts of his day. Later, it was evident that men could also have the disorder and the name was changed to what it is called today. William Gull is credited with the coinage ‘anorexia nervosa’. The name itself may be a misnomer, as it suggests that there is loss of appetite, which is not the case in the disorder.

The 1950s are often remembered as the Golden Era of Psychiatry. Interestingly, the prevalence of eating disorders also rose steeply in those years(Semple and Smyth, 2013). In 1978, Hilda Bruch published what is now seen as the classic book on anorexia (Bruch, 1978). She titled it *The Golden Cage*, and described three psychological features of anorexia: body image disturbance; interoceptive disturbance (difficulty with identification of and reaction to sensations within, such as hunger, fullness, emotions and sexual arousal); pervasive feelings of ineffectiveness.

Bulimia nervosa, is linguistically translated as “ox hunger with nervous involvement”. The terminology was first described by Gerald Russell in 1979 (Russell, 1979). Contemporary

diagnostic manuals continue to modify the nosology of eating disorders, as the evidence becomes clearer. In today's world, eating disorders are common across cultures, due to westernisation.

2.2.3 Eating disorders across age groups

In childhood, some children are picky eaters. This is not considered to be a disorder and many of them outgrow it. There is no known correlation between picky eating and eating disorders later in life. Eating disorders are most prevalent in adolescence, especially among girls. The male:female ratio is 1:10, with a mean age of 16 to 17 years. The onset is rarely seen after 30 years of age (Semple and Smyth, 2013).

2.2.4 Eating disorders in different cultures

2.2.4.1 Eating disorders around the world

Initially, it was suggested that eating disorders be viewed as culture-bound syndromes, since they are clearly more prevalent in the West. However, they are increasingly recognised in various social environments, including the low- and middle-income countries of Africa, Asia and the Middle East (Al-Subaie et al., 1996). They are more prevalent in cultures in which beauty is measured in the frame of slim figures.

2.2.4.2Eating disorders in Africa

Until recently, Africa did not witness a lot of eating disorders. Rather, the problem was that there was simply not enough for the African child to eat, due to factors such as extreme poverty, inadequate maternal education, and lack of progressive governmental policies (Nyakurwa et

al., 2017). Studies suggest that eating disorders are commoner among the affluent that have more than enough to eat. This is buttressed by the observation that even in European history, times of famine were associated with a significant decline in the incidence of eating disorders (Bemporad, 1997).

When present among African adolescents, eating disorders are often seen in the high socioeconomic class. It is thought that westernisation plays a role in the prevalence of eating disorders in Africa. Additionally, there are culture-bound syndromes of abnormal eating patterns in the African context that are not present in the international classificatory systems. For instance, in Senegal, there is a syndrome comprising sand eating, pallor, depression and social withdrawal, which affects 5 out of every 1000 Serer people (Beiser et al., 1974). It is thought that these cases may meet the criteria for pica in the DSM (Osemwenkha, 1997, Aina and Morakinyo, 2011).

The clinical features of eating disorders may be different among adolescents in Africa. Americans, dating back to Hilde Bruch, have emphasised a strong desire for thinness, while British investigators have stressed the morbid fear of fatness. In either case, body image appears to be a major motivation in the West, reflected by the German name for anorexia nervosa, which is *pubertetsmaigresucht*, meaning "thinness seeking of adolescents" (Dubovsky et al., 2005). Interestingly, this may not be as relevant in Africa.

In Africa, eating disorders may be coloured by the religious context of fasting. Bennett hypothesised that anorexia nervosa in Africa would fit a picture of self-starvation, but not necessarily with a preoccupation on weight (Bennett et al., 2004). They carried out a cross-sectional survey among 668 secondary school girls in Ghana, out of whom 10 had a body mass index that met the ICD 10 criteria for anorexia nervosa (i.e. BMI < 17.5 kg/m^2 or 15% less than

expected). None of the 10 girls were overly concerned about their weight. They all attributed the motivation for their dietary restriction to religious fasting.

2.3 NUTRITIONAL STATUS IN ADOLESCENCE

2.3.1 Background

Adolescence is a strategic phase that straddles childhood and adulthood. The World Health Organization defines adolescents as individuals between the ages of 10 and 19 years (WHO, 2005).Through a chronological perspective, there is an overlap of adolescence with childhood. Yet, the biopsychosocial changes of adolescence delineate it as a different phase of growth and development. Adolescents are not quite children, and they are not adults either. Adolescence therefore represents a phase of transition. Consequently, adolescents may no longer enjoy the nutritional support available to children, and may not have the psychosocial protections of adulthood (WHO, 2005).

Nutritional needs are threaded through infancy, childhood and adolescence; however, these needs are at the greatest in adolescence (Lifshitz et al., 1993).This is because appropriate nutrition serves as a drive for the growth spurt of adolescence. Despite these needs, very little attention was given to the period of adolescence, until quite recently (WHO, 2005, Omigbodun et al., 2010, Kurz and Johnson-Welch, 1994).

While the nutritional status in adolescence poses a global health concern, the situation in developing countries, and particularly in sub-Saharan Africa (SSA), is dire. Africa has been described as the only continent where the incidence of undernutrition continues to rise despite a definite decline in poverty levels (Keino et al., 2014).

The stereotype of undernutrition has been associated with SSA for many decades. In the 1960s, most developing countries were battling national food insecurity and in some cases, famine. This doubtless translated to significant calorie deficits and undernourishment. Children and adolescents bore the brunt of undernutrition (Schmidhuber and Shetty, 2005).

Authors in the 1970s argued for the two faces of malnutrition, namely under- and overnutrition (Eckholm and Record, 1976). While the pathways may be different, the end result of undernutrition and overnutrition are similar: shortened life expectancy, vulnerability to disease and on a broader scale, reduced ability to contribute meaningfully to society.

There is mounting evidence that African adolescents in the 21st Century are increasingly fitting into the profile of undernutrition and overnutrition (Keino et al., 2014, Ejike et al., 2010, Tzioumis and Adair, 2014). Implicit in this observation is the reality that undernutrition has lingered, and there is a relatively recent rise in the prevalence of overnutrition.

2.3.2 Definition of some nutritional terms/ concepts

Nutrition: Nutrition is simply defined as the science of nourishing the body, and this field of study deals with foods and their effect on health (Adamu et al., 2012).

Secular trends: These are significant changes observed with successive generations of human populations living in the same territories (Ulijaszek et al., 1998). These may be positive or negative. Positive secular trends provide an explanation for the reducing age of onset of theadolescent growth spurt which has been observed in European populations (Ulijaszek, 2001). Negative secular trends have been incriminated in the emergence of obesity in developing countries (Ulijaszek, 2006).

Nutrition transition: A social change in urban societies marked by shifts in dietary habits, particularly towards increased consumption of high-calorie meals (WHO, 2003).

Junk food: This is an informal term that describes food with little or no nutritional value, usually containing high levels of saturated fats and refined sugar, but little or no fruits and vegetables. These are generally the snacks taken by adolescents, such as cookies, soft drinks, doughnuts, pizza, French fries, hamburgers etc (Abdulmumeen, Risikat & Sururah, 2012).

Adolescents: They are individuals aged between 10 and 19 years (WHO, 2005). Some authors have divided the period of adolescence into early, middle and late adolescence (Reeves, Nicholls & McKenna, 2009). Others have simply described it as early and late adolescence (Campbell et al., 2017, Mond et al., 2011).Adolescents can be classified as early adolescents

(aged 10 to 14 years) and late adolescents aged between 15 and 19 years (Das et al., 2017), and this is the classification used in this study.

2.3.3 Measuring nutritional status

Nutritional status can be measured using anthropometric indicators, dietary data or biochemical assays that determine micronutrient deficiencies.

2.3.3.1 Anthropometric Indicators

Anthropometric indicators provide information about the nutritional status of adolescents (Ulijaszek, 2006). The commonly used anthropometric indicators in children are underweight (low weight-for-age), stunting (low height-for-age), wasting (low weight-for-height) and overweight (high weight-for-height). In children less than 5 years, mid-arm circumference may also be used, while the body mass index is used in adults (De Onis and Blössner, 2003).

In adolescents aged 10 to 19 years, there are some differences in the computation of anthropometric indicators. While stunting is still defined as low height-for-age, the definitions of underweight and overweight are low- and high- BMI for age, respectively. Thus, BMI-for-age is important in adolescents.

It is noteworthy that reference data is not available for weight-for-age beyond the age of 10 years, because this indicator does not factor in the growth spurt that occurs in puberty. Weight-for-age cannot differentiate between weight and total body mass. In practical terms, if weight-for-age were to be used in pubertal adolescents, it could present the erroneous impression of excessive weight in adolescents who are simply tall.

Similarly, weight-for-height median charts/ tables are available only for children aged between 2 and 5 years (World Health Organization n.d.). Weight-for-height is useful in measuring

nutritional status when the age is not known. It is premised upon the assumption that children of a given height have the same weight, irrespective of age.This is not applicable in infancy and adolescence where the relationship between height and weight is age-dependent. For instance, in late adolescence, when height has stopped increasing, weight continues to increase. Therefore, weight-for-height measurements are not applicable in adolescence (Cole, 1985, Cole, 2007).Table 2 below shows how the common anthropometric indicators are defined.

There is a lot of literature on underweight because it is relatively easy to measure weight. Underweight describes a nutritional status where the weight is much less than is expected for the age of the child or adolescent. Underweight is commonly used for growth monitoring. When severe, underweight is associated with mortality (WHO, 2010).

Stunting could also be associated with lower immunity, more infections and mortality. In addition, stunting has been linked with lower cognition and poor school performance (WHO, 2010). Stunted children may be at risk of obesity when they eventually have access to more food (Hoffman, 2001).

Stunting also has reproductive implications. If stunting persists into the reproductive years, a stunted woman may give birth to a baby with low birth weight, leading to a vicious cycle of undernutrition (WHO, 2010). On the other hand, there is a relationship between overweight mothers and stunted children (Garrett and Ruel, 2005).

Wasting occurs when a child or adolescent falls short of the expected weight for the height attained. It is observed when there is severe disease or starvation, such as in periods of famine. As long as there is no severe shortage of food, the prevalence of wasting is very low, even in the most economically deprived countries (De Onis and Blössner, 2003).

Overweight occurs when the weight is more than expected for the height. It is usually a pointer to obesity. However, some people with high weight-for-height simply have a greater lean body

mass (De Onis and Blössner, 2003). The rising prevalence of obesity in developing countries has been attributed to improvements in economic standards and westernization (Ulijaszek, 2006).

The BMI is an anthropometric measure of nutritional status (Ulijaszek, 2006). It is calculated using the weight divided by the height in metre square of the respondents.BMI measurement in children and adolescents is unique because the cut-off points are dependent on age and sexgender (Must & Anderson 2006). Therefore, in order to properly interpret BMI in children and adolescents, reference values have to be used, which would take into cognizance the age and sex genderof the person.

BMI is one of the most widely used anthropometric indices (WHO 1995). It is easy to calculate, and serves as the primary measure for relative weight (Must & Anderson 2006). However, its limitation lies in its inability to directly measure fat and the consequent tendency to underestimate fatness in a child (Wells et al. 2002).

Table 2 Anthropometric Indicators in Adolescence

INDICATOR	DEFINITION	
	CHILDREN (>10 YEARS)	ADOLESCENTS (10 TO 19 YEARS)
STUNTING	Height-for-Age < -2SD	Height-for-Age < -2SD
WASTING	Weight-for-Height < -2 SD	Not applicable
UNDERWEIGHT	Weight-for-Age < -2SD	BMI-for-Age < -2 SD
OVERWEIGHT	Weight-for-Height > +1SD	BMI-for-Age > +1 SD
OBESE	Weight-for-Height > +2 SD	BMI-for-Age > +2 SD

Source: Author, 2019

2.3.3.2 Reference Data for Anthropometry

Interpretation of anthropometric information relies on reference data. There are various national and international reference standards for anthropometry. The United States (Kuczmarski 2000) and the United Kingdom (Cole, Freeman & Preece 1995) have their national standards based on nationally representative data in their respective countries. There is no national reference standard for BMI in Nigeria (Adesina et al. 2012).

International reference standards include that produced by the International Obesity Task Force (IOTF). The IOTF standards are premised on data from North and South America, as well as South East Asia (Cole et al. 2000).Reference standards from the World Health Organization are also an example of international reference standards, and its history is worthy of mention. For many decades, nutritional research relied on data from various reference populations in order to stratify child nutrition. Adolescent nutrition was particularly challenging to assess in the 20th Century because comparable reference data was largely unavailable at the time (Delisle et al., 2001).To add to the quagmire, the only available international references were those of National Centre for Health Statistics (NCHS) and the Centre for Disease Control (CDC), both of which were based on data from children in North America (Hamill et al., 1979, Dibley et al., 1987).In 1993, the World Health Organization reviewed the NCHS/WHO growth references (WHO Multicentre, 2006).

By the turn of the 21st Century, the concerted efforts of researchers all over the world provided useful reference data for the anthropometric measurement of nutrition among preschool children (De Onis and Blössner, 2003, WHO Multicentre, 2006). In 2007, the WHO published reference values for measuring the nutritional status of school-aged children and adolescents with an age range of 5 to 19 years (De Onis et al., 2007).

2.3.3.3 Other Methods of Measuring Nutritional Status

Nutritional status can also be measured using dietary intake data or with a biochemical assessment. The dietary intake data can be a 24-hour dietary recall, 72-hour dietary recall, or longer. It has the advantage of providing information about dietary habits. However, it is limited by its dependence on self-report and the power of recall. Biochemical assays forestall the limitation of dietary data by providing an objective measure of micronutrient levels. However, there are other factors asides nutrition that can affect the biomarkers, such as inflammation and infection (Potischman, 2003).

2.3.4 Global prevalence of nutritional status

Obesity is prevalent in the West, especially in North America. According to the Centre for Disease Control and Prevention (CDC), the prevalence of obesity in the United States has doubled in the last two decades, with the prevalence among adolescents rising to 17.1% (Menifield et al., 2008). Underweight BMI is a major public health issue in Africa, as the children in the continent constitute one-quarter of the estimated 148 million underweight children worldwide (Gollogly, 2009). Overweight BMI is also becoming a concern in SSA due to nutrition transition.

The prevalence of malnutrition according to regions is summarised in the table below:

Table 3Global Studies of Nutritional Status among In-school Adolescents

Country	Authors/Year	Sample Size	Age range (years)	Prevalence under-weight (%)	Prevalence overweight (%)	Prevalence obesity (%)
Nigeria, southeast	Ogechi, Akhakhia & Ugwunna (2007)	190	15 to 18	>20	Male: 4 Female: 2	-----
Nigeria, southwest	Omigbodun *et al.* (2010)	1799	10 to 19	18.9	2.3	-----
Nigeria, south-south	Onyiriuka, Umoru & Ibeawuchi (2013)	2,097 (all girls)	12 to 19	Meal skippers: 6.5 Non-skippers: 11.2	Meal skippers: 24.5 Non-meal skippers: 13.2	Meal skippers: 2.5 Non-meal skippers: 1.1
Nigeria, southern	Obong *et al.* (2012)	1,599	5 to 18	13.0	11.4	2.8
Nigeria, north-central	Jimoh (2016)	515	10 to 19	29.1	24.7	0.2
Nigeria, north-central	Ejike *et al.* (2010)	625	10 to 19	19.36	17.28 (overnutrition)	
Ghana	Adamu, Adjei & Kubuga (2012)	100	9 to ≥ 12	10	4	----
Ghana	Mogre *et al.* (2013)	218	5 to 14	Male: 38.5	Male: 15.4	

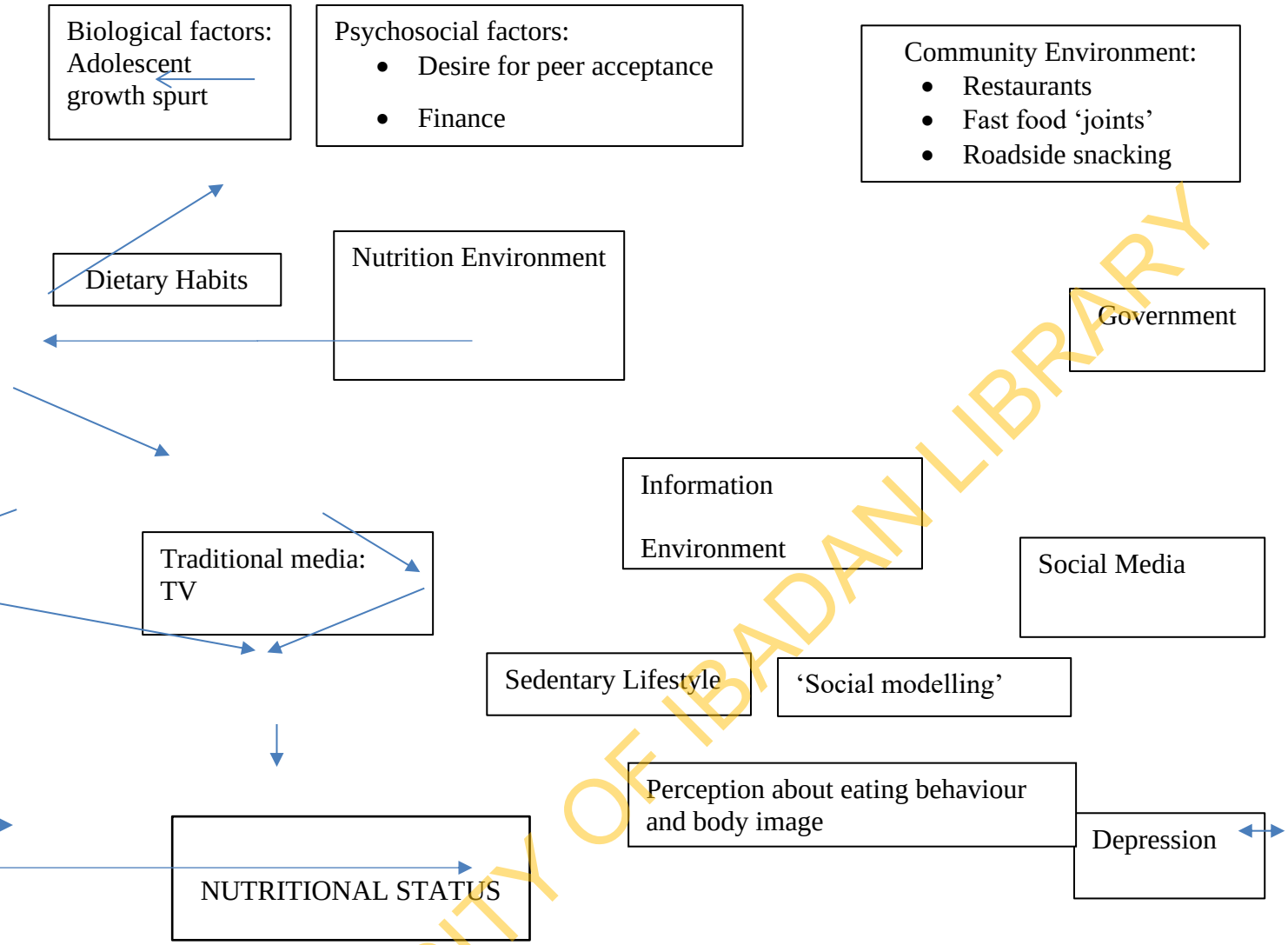
				Female: 23.6	Female: 18.9 (overweight/obese)	
Ghana and Uganda	Peltzer and Pengpid (2011)	5,613	13 to 15	-----	Male: 3.2 Female: 10.4	Male: 0.5 Female: 0.9
Kenya	Wachira (2014)	563	9 to 11	6.7	9.4	10.8
Kenya	Okoth (2013)		15 to 19	-----	Male: 10.3 Female: 18.7	Male: 0 Female: 2.1
South Africa	Monyeki *et al.* (2008)	1282 (primary pupils)	9.1 to 14.9	8 to 47.6	Male: 0.3 to 4.9 Female: 1.6 to 15.5	-----
Jamaica	Jackson, Vaughan & Ashley (2001)	1,698	11 to 12	Boys: 10.6 Girls: 7.1	19.3	-----
China	Shi (2005)	824	12 to 14	5.2	Boys: 17.9 Girls: 8.9 (obesity inclusive)	
USA	CDC	(National demographics)	10 to 19	-----	-----	17.1
Australia	Olds *et al.* (2010)	264 905	2 to 18	-----	21 to 25 (obesity inclusive)	5 to 6

Source: Author, 2019

2.3.5 Factors affecting nutritional status

Dietary habits largely account for the nutritional status of adolescents (WHO, 2005). Biopsychosocial factors are responsible for the dietary habits of adolescents. The nutrition environment has significant influence on dietary habits (Glanz et al., 2005). This may either be the information environment or the community environment. Exposure to the media forms the information environment, and can affect the perception of adolescents about eating habits and body image. Traditional media, such as television watching has the added disadvantage of predisposing to a sedentary lifestyle (Andersen et al., 1998). Social media, particularly problematic internet use, has been linked with adolescent depression (Young and Rogers, 1998). The multidirectional relationship between nutritional status and various factors are shown in a schematic diagram below:

Figure 1:Conceptual Framework of Factors associated with Nutritional Status



2.4SLEEP

2.4.1 Definition of sleep

Sleep refers to a regular, recurrent, easily reversible state of an organism that is characterised by relative quiescence and by a large increase in the threshold of response to external stimuli relative to the waking state (Kaplan and Sadock, 1988).

2.4.2 Classification of sleep disorders

2.4.2.1 ICD 10 and DSM 5

ICD 10 and DSM 5 adopt different approaches to the classification of sleep disorders, with the latter manual classifying sleep-wake disorders in the same section, whether they are organic in origin or not.DSM 5 disorders have been rearranged in the table below, in order to exemplify the differences with the corresponding ICD 10 diagnoses.

Table 4: Classification of Sleep Disorders

ICD 10	***DSM 5***
F51 Nonorganic sleep disorders	***Sleep-wake Disorders***
F51.0 Nonorganic insomnia	Insomnia disorder
F51.1 Nonorganic hypersomnia	Hypersomnolence disorder
F51.2 Nonorganic disorder of the sleep-wake schedule	*Circadian rhythm sleep disorders, such as* o Delayed sleep phase type o Advanced sleep phase type o Irregular sleep-wake type o Non-24-hour sleep-wake type o Shift-work type
F51.3 Sleepwalking [somnambulism]	Parasomnias:
F51.4 Sleep terrors [night terrors]	-Non Rapid Eye Movement (Non REM) sleep arousal disorders: sleepwalking, sleep terrors -REM Sleep Behaviour Disorder
F51.5 Nightmares	*Nightmare Disorder*
F51.8 Other nonorganic sleep disorders	Other Specified Insomnia Disorder
F51.9 Nonorganic sleep disorder, unspecified	---
G47 Sleep Disorders	Breathing-related sleep disorders, including:
G47.3 Sleep apnoea	- Obstructive sleep apnoea hypopnea - Central sleep apnoea - Sleep-related hypoventilation
G47.4 Narcolepsy and cataplexy	*Narcolepsy*
G25- Other extrapyramidal and movement disorders	*Restless Leg Syndrome*
Restless Leg Syndrome	
----	*Substance/Medication-Induced Sleep Disorder*

2.4.2.2 ICSD-3

There are three standard classificatory systems for sleep disorders. In addition to the well-known ICD 10 and DSM 5, there is a third classificatory system for sleep disorders, namely the *International Classification of Sleep Disorders, Third Edition (ICSD-3), published by the American Academy of Sleep Medicine, Chicago, 2014(AASM, 2014). It is an international document compiled in conjunction with the Latin American Sleep Society, the European Sleep Research Society, as well as the Japanese Society of Sleep Research. It lists seven categories of sleep disorders, summarised as follows:*

1. *Insomnia*
2. *Sleep Related Breathing Disorders*
3. *Central Disorders of Hypersomnolence*
4. *Circadian Rhythm Sleep-Wake Disorders*
5. *Parasomnias*
6. *Sleep-Related Movement Disorders*
7. *Other sleep disorders.*

2.5.2.3 Comparison of classificatory systems

DSM 5 and ICD 10

DSM 5 lists 10 "sleep-wake disorders" which are characterised by disturbed sleep that causes distress and impaired functioning during the daytime. On the other hand, *ICD-10 classifies non-organic sleep disorders in F51, while organic sleep disorders are categorised elsewhere, mainly theG47 Block.*

DSM 5 and ICSD 3

Authors of DSM 5, being a 2013 document, compare its categories with ICSD-2 within the manual. However, in 2014, ICSD-3 was released. Unlike preceding versions, ICSD-3 is more similar to the DSM 5 in classifying sleep-related breathing disorders, listing distinct categories of sleep-related hypoxaemia disorders and sleep-related hypoventilation disorders.

There are differences between both manuals. ICSD-3 generally has more categories than DSM 5. For instance, in the ICSD, there is a subcategory of confusional arousal as a type of NREM sleep arousal disorder; this is absent from DSM 5. ICSD-3 has seven categories for circadian rhythm sleep-wake disorders, including jet lag which used to be present in DSM-IV but has been removed from DSM 5.

2.5RELEVANCE OF EATING AND SLEEPING HABITS TO CAMH IN NIGERIA

There is a treatment gap in low- and middle-income-countries in addressing neurological, mental and substance use (NMS) disorders in all age groups. The situation is even more critical among children and adolescents. This is because child and adolescent mental health is yet to receive the needed attention in sub-Saharan Africa. Eating and sleeping disorders, which may be a manifestation or consequence of NMS disorders, need to be treated.

Eating disorders are predominantly seen among adolescents and only rarely after the age of 30 years. They are associated with psychiatric comorbidities. About 14 out of every 100 people with bipolar II disorder have at least one lifetime eating disorder, particularly binge-eating disorder (Semple and Smyth, 2013).

Eating and sleeping disorders affect the physical and mental health of adolescents, and cause significant caregiver burden. The accompanying impairment of functioning leads to a reduction in productivity, with national economic implications. While most mental illnesses only cause

morbidity, eating disorders are known to lead to mortality. Of all mental illnesses they are associated with the highest fatal outcomes.

Healthy eating and sleeping habits are health-promoting activities. The perception of African adolescents concerning phenomena of eating and sleeping can worsen psychological consequences of disordered states.

Word Count: 5,091

Recommended Word Count: 3,000 – 6,000

CHAPTER THREE

3.0 METHODOLOGY

3.1 STUDY SETTING

Thestudy was conducted in Ilorin East Local Government of Kwara State. Kwara State has an estimated population of 2,591,555, based on 2006 population census and an annual growth rate of 3.2%.This north-central state is one of the 36 states that make up the Federal Republic of Nigeria. Kwara State was created on May 27, 1967 and it covers an area of about 36,825km (Kwara State Government, 2019, National Population Commission 2007).

The name 'Kwara' is the local name for River Niger and Kwara State is bordered by Niger State on the North. Other boundaries include Kogi State to the East, Oyo, Ekiti and Osun States to the south and an international boundary with Republic of Benin to the West (Kwara State Government, 2019).

Ilorin is the capital of Kwara State, North Central Nigeria. It is located between latitude $08^0$30'N and longitude $04^0$33'E. Ilorin is situated 261km inland from the coastal city of Lagos and about 500km from Abuja, the Federal Capital Territory (FCT).The climate in Ilorin is tropical with an average annual temperature of 26.5^0C and rainfall of 1217mm. The predominant tribes in Ilorin include Yoruba, Hausa, Fulani, Nupe and Kanuri. Ilorin is divided into three Local Government Areas, namely: Ilorin East, Ilorin West and Ilorin South.

There are sixteen Local Government Areas in the state, with Ilorin East spanning an area of 486 km^2.The most recent census (in 2006) suggests that Ilorin East is home to 204,310 inhabitants, with a ten-year population projection of 280,000. It comprises 12 wards, with various cultures represented, particularly Yoruba, Nupe, Fulani and Hausa(NationalPopulationCommission, 2006, KwaraStateGovernment, 2014).

Crop farming is quite common in Kwara and cultivation often occurs across River Niger. The staple meals in Ilorin are made from maize, cassava, rice and yam, eaten with leafy vegetables(Babatunde, Omotesho & Sholotan, 2007).Meals such as the maize-based eko (boiled fermented maize meal) have been common in Ilorin for a long time (Watts 1984).There is some modest dietary diversity, with the ethnicities representing a transitory zone between the dry cereal-based food systems of northern Nigeria and the wet root-based meals of southern Nigeria. Nonetheless, undernutrition is common, due to the high prevalence of poverty (Kuku-Shittu et al., 2016).

Adolescents in Ilorin mostly depend on their parents for basic needs, including food (Gannicott, 2008). There are slight peculiarities with the nutritional behaviour of children and adolescents in Ilorin. This group of people commonly eat snacks and skip breakfast (Lateef et al., 2016).Ilorin has many primary, secondary and tertiary educational institutions, including one of the aviation schools in Nigeria. Adolescents in Ilorin are typically in the secondary schools with a gross secondary school enrollment rate of 74% (Gannicott, 2008). Many secondary schools in Ilorin have drug clubs which exist to discourage psychoactive substance use.

3.2 STUDY DESIGN

This was a mixed-method study with quantitative and qualitative aspects. The quantitative aspect determined the pattern of eating and sleeping habits, the prevalence of eating and sleeping disorders, and the nutritional status of adolescent students, while the qualitative aspect explored the perception of adolescents regarding their eating and sleeping habits.

These objectives were met using a descriptive cross sectional study design.

3.3STUDY POPULATION

The study population comprised adolescents aged between 10 and 19 years who were attending junior and senior secondary schools in Ilorin East.Ilorin East local government has a total of 37 junior and 26 senior secondary schools. The junior secondary schools are made up of 7,138 male students and 5,870 female students, giving a total of 13,008 junior secondary school students. The senior secondary school students consist of 5,840 males and 4,635 females, giving a total of 10,475 students. The total student population is 23,483(KwaraStateGovernment, 2013).

3.3.1 Inclusion criteria

1. Secondary school students in Ilorin East.
2. In-school adolescents aged 10 to 19 years.

3.3.2 Exclusion criteria

1. Illness severe enough to interfere with the participants' ability to communicate.
2. Failure to give consent/ assent.

3.3.3 Sample size estimation

Sample size for populations > 10, 000 is calculated using the Fisher's formula(Fisher, 1992)

$n=z^2pq/d^2$

where n = the desired sample size

z = the standard normal deviate set at 1.96 [95% confidence level]

p= the estimated lifetime prevalence of 50% was used, as no prevalence data for eating disorders is present in the study area(Macfarlane, 1997).

q=1-p Therefore, q= 1- 0.5= 0.5

d= absolute precision or sampling error tolerated =5%

n= $(1.96)^2$ x 0.5 x 0.5/ $(0.05)^2$

n= 0.9604/0.0025 = 384.16 approximately 384, and this is the minimum sample size.

Attrition rate- 10% was set. 10% of 384 is 38.4, approximately 38, giving a final minimum sample size (sample size plus attrition rate) of 422.

3.3.4Sampling technique

3.3.4.1 Sampling technique for quantitative data

To obtain the quantitative data, three-stage sampling technique was used. The step-wise selection is described in this section.

STAGE 1: SELECTING WARDS: With simple random technique by balloting, 4 of the 12 wards was selected.

STAGE 2: SELECTING SCHOOLS: From each of the four selected wards, a senior secondary school and a junior secondary school was picked by simple random technique.

STAGE 3: CALCULATING TOTAL NUMBER OF STUDENTS NEEDED:

This was done by proportionate allocation, where the sample size of each stratum is proportionate to the population size of the stratum, using the following equation:

$n_h = \frac{Nh}{N}$ x n (Johnston and O'Malley, 1985)

where n_h is the sample size for stratum *h*, N_h is the population size for stratum *h*, N is total population size, and n is total sample size.

The stratum refers to the category of respondents in question, such as senior secondary school students in Ilorin East, senior secondary school students of a balloted school in Ilorin East, students of a secondary school set within the balloted school, students of a particular class within the school set, girls or boys within the class.

In a stepwise manner shown below, calculations were done to determine how many respondents to interview in each stratum based on the total sample size.

A. SENIOR SECONDARY SCHOOL STUDENTS:

Sample size for senior secondary schools = $\frac{\text{population size of senior secondary school students in Ilorin East}}{\text{total population of secondary school students in Ilorin East}}$ x total sample size

$\frac{10,475}{23,483}$ x 520 = 231.95, approximately 232 senior students

B. JUNIOR SECONDARY SCHOOL STUDENTS

Sample size for junior secondary schools = $\frac{\text{total number of junior secondary school students in Ilorin East}}{\text{total number of secondary school students in Ilorin East}}$ x total sample size

$\frac{13,008}{23,483}$ x 520 = 288.04, approximately 288 junior students

STAGE 4: TOTAL NUMBER OF STUDENTS FROM EACH CHOSEN SCHOOL:

E.g. The sample size for senior secondary school S = $\frac{\text{population size of senior secondary school S}}{\text{population size of balloted senior secondary schools}}$ X sample size for senior secondary schools

STAGE 5: NUMBER OF STUDENTS FROM EACH SET OF THE CHOSEN SCHOOL:

Sample size for senior secondary set St =

$$\frac{\text{population size of the senior secondary set}}{\text{population size of senior secondary school S}} \text{ x sample size for senior secondary school S}$$

STAGE 6: SELECTING CLASSES FROM EACH SET:

Sample size for class C = $\frac{\text{class population}}{\text{population size of the set}}$ x sample size for the set

STAGE 7: In each class, stratification by gender was done to ensure proportionate representation of males and females.

E.g. Sample size for females in a class: $\frac{\text{female population}}{\text{class population of (male + female)}}$ x sample size for the class

STAGE 8: Finally, males and females to participate in each class werechosen by balloting.

3.3.4.2 Sampling technique for qualitative data

A qualitative aspect to the study was explored. The sampling in this case was purposive, and the selection of participants was based on their availability and willingness to participate.A sample of students was interviewed for their perception about eating and sleeping patterns, as well as body image.

To obtain this data, focused group discussions (FGDs) were conducted among adolescents in the junior and senior secondary schools. A total of six FGDs wereheld in the selected schools, namely two groups among junior secondary school students, two among senior secondary schoolstudents, and the final two groups were in same sex secondary schools (one in a boys-only school and another in a girls-only secondary school). Each FGD comprised 8 to 12 students, with a boy: girl ratio of 1:1.

3.4 INSTRUMENTS FOR THE STUDY

3.4.1 Sociodemographic Questionnaire

The sociodemographic questionnaire designed by Omigbodun in 2004 was used to obtain the biodata and other relevant background information about respondents. It comprises 40 questions, which are grouped into three categories, namely personal information, family information and school-related questions. It has been used in previous Nigerian studies (Omigbodun et al., 2010).

3.4.2 Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a standardised self-rated questionnaire developed by Daniel Buysse. By measuring sleep quality over a one-month period, it serves as a useful psychiatric tool applicable to clinical practice and research. The instrument generates information about seven aspects of sleep, namely sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications and daytime dysfunction. These are addressed by a total of 24 questions. Of these, 19 questions are self-rated. The remaining 5 questions, which are answered by a bedpartner or roommate, are meant for clinical use and are not computed in the scoring (Buysse et al., 1989).

For the scoring, the seven component scores are added to derive a global score of subjective sleep quality. This final score ranges from 0 to 21, and a higher score is indicative of poorer subjective sleep quality. A global score of >5 yielded a diagnostic sensitivity of 89.6% and specificity of 86.5% in determining respondents who were poor sleepers (Buysse et al., 1989). The PSQI merges the advantages of different models of sleep questionnaires, by including questions about the recent experience of sleep (post-sleep inventory) and the remote experience

(survey-type questionnaires). It includes both qualitative and quantitative data, which provide information about the number and severity of sleep problems.

The PSQI was validated in Nigeria by Aloba et al among Nigerian university students in 2007. The psychometric value in screening young people in Nigeria was comparable to Western findings. The best cut-off score was set at 5 (Aloba et al., 2007). The cut-off of 5 was used in this study. Respondents with a PSQI score of five or less had "good sleep quality", while those who scored six or more had "poor sleep quality" (Buysse et al., 1989, Balogun et al., 2017).

3.4.3 Kiddies Schedule for Affective Disorders and Schizophrenia (Section on Eating Disorders)

The Kiddies Schedule for Affective Disorders and Schizophrenia (K-SADS) is a semi-structured interview which provides information about various psychopathologies in children and adolescents. The first version was K-SADS-P (Present Episode Version) which was developed by William Chambers and Joaquim Puig-Antich in 1978 (Puig-Antich and Chambers, 1978). Other versions have been developed since then (Ambrosini, 2000). The most recent version, K-SADS-PL (Present and Lifetime Version), was published in November 2016 (Kaufman et al., 2016). It is based on the DSM 5 diagnoses and it is validated for use in children aged between 6 and 18 years.

The section on eating disorders has four groups of screening questions which address the fear of becoming obese, emaciation, weight loss methods and binge-eating, respectively. These questions serve as a guide and are not expected to be used verbatim. There are questions for parents and children. The scoring is on a three-point rating scale. Scores of 0,1, and 2 represent 'no information available', 'symptom is absent', and 'symptom is present', respectively. These scores are subthreshold scores. Respondents who score 3 on the current rating have a threshold

score, and they are further interviewed with the diagnostic supplementto establish the presence of an eating disorder.

The instrument has good psychometric properties. The interrater reliability was quite high for both the screening and diagnostic interviews, falling within a range of 93% to 100%. Test-retest reliability κ coefficients were also good (Kaufman et al., 1997). It has been used previously among children and adolescents in Ilorin, Nigeria (Tunde-Ayinmode et al., 2012).

3.4.4 Anthropometric Instrument

Weight and height measurements are used to determine the anthropometric indicators of adolescents, according to their age and sex. These indicators include BMI-for-age, stunting, underweight and overweight, and they have been described in Sub-section 2.3.3.1.

The 2007 WHO reference values are z-scores which are presented as tables or charts. These z-scores also correspond to the growth chart percentiles. The height-for-age (HA) of a data set is compared with the WHO reference values to determine stunting (HA < –2SD), while BMI-for-age of adolescents is compared with the corresponding reference values to determineunderweight (BMI < –2SD), overweight (BMI > +1SD) and obesity (BMI > +2SD). The 2007 WHO reference values have been extensively used in Nigeria (Omigbodun et. al 2010,Kuku-Shittu et al., 2016). It is the standard that was used in this study to categorize participants as stunted, underweight, overweight or obese.

3.4.5 24-hour dietary recall

Nutritional assessment was also done using a24-hour dietary recall. This was in the form of a questionnaire that provided data about dietary intake, snacking and meal skipping. The students were asked to recall all they ate in the previous day. All the food ingested in the previous 24

hour period was recorded. This was detailed in order to assess the food classes that were being ingested and those that were been neglected.

Snacks and beverages consumed were also recorded.A snack was defined as a light meal and/or a drink apart from the major diets of breakfast, lunch and dinner. This included junk food (a cheap low-nutrient alternative to home-cooked meals) and non-alcoholic carbonated drinks (Onyiriuka, Umoru & Ibeawuchi 2013).

Breakfast was defined as the meal eaten from 06.00 am to 11.59 hours; lunch was defined as the meal eaten from 12.00 to 17.59 hours, while dinner was considered to be meals eaten between 18.00 hours and 23.59 hours. Similar operational definitions have been used in other studies (Abiola 2017, Nago et al. 2010).

3.5ETHICAL CONSIDERATION

Ethical clearance wasobtained from the Ethical Review Board in UITH Ilorin before commencing the study (Appendix VIII). Permission wasobtained from the Kwara State Ministry of Education and Human Capital Development, as well as from the school principals. Consent was obtained from participants who are 18 years and above. This also applied to emancipated minors. For younger participants, assent was obtained from them and informed consent forms were sent through the balloted students to their parents before commencement of the study.

In line with recommendations of the Nigerian National Code of Health Research Ethics, the information provided in the consent form was easy to comprehend, with the choice of words being no higher than what any individual with only 9 years of educationcould grasp. The recommended paper size, font style and size, as well as spacing was adhered to (NHREC, 2007).

Participation was voluntary and respondents were free to disengage from the study at any time, without any negative consequence. The information obtainedwas regarded as confidential and used solely for research purposes.

Additionally, this study took into cognizance the ethical principles of beneficence and non-maleficence. In line with this, the survey may broaden the understanding of mental health of children and adolescents in Nigerian secondary schools. It may also help to improve the school mental health services in Ilorin. There was no harm inflicted on participants in this study.

3.6PRETEST

A pretest test was conducted among 20 secondary school students in Ilorin South Local Government Area to know the time needed for administering the questionnaires and to identify questions that needed to be rephrased for better comprehension.

3.7 PROCEDURE FOR THE STUDY

The researcher traineduniversity graduates who served as research assistants. The researcher and his team were introduced to the students on the assembly ground in each of the selected schools. The purpose of the study was explained clearly before the interviews.

3.7.1 Quantitative Study

3.7.1.1 Sociodemographic Information

Questionnaires were distributed to all selected students. It was clarified that the questions did not constitute an examination, and students were encouraged to answer the questions

honestly.The students were not allowed to discuss their responses while completing the questionnaires.

3.7.1.2 Eating and Sleeping Disorders

Questionnaires were distributed to respondents, alongside the sociodemographic questionnaires. The sleep questionnaire was self-administered and following distribution, the researcher checked randomly to ensure that they were being properly filled.

Semi-structured interviews were conducted to screen for eating disorders. All respondents who met the threshold for eating disorders, as well as 20% of those who did not meet the threshold during screening, were interviewed by the researcher to establish a diagnosis.

Respondents with a score of 3 (threshold score) on Eating Disorders section of the KSADS questionnaire proceeded to the diagnostic supplement. Additionally, 20% of respondents who scored less than 3 (sub-threshold scores) on the screen interview were randomly selected for the second stage thus: Every third respondent who scored less than 3 was selected till 20% of them were selected. This was done to reduce type II error.

The trained research assistants notified the researcher and presented respondents who scored 3 on KSADS in addition to 20% of participants with sub-threshold scores. This was done without knowledge of the KSADS scores of second stage respondents by the researcher.

3.7.1.3 Anthropometry

Anthropometric measurements were obtained from the measurement of weight and height. A flat weighing scale was standardised with metal weights from the Physics laboratory of the University of Ilorin. Before each measurement, the scale was crosschecked for zero error.

Participants were instructed to remove shoes and jackets before weight measurement. The weight was estimated to the nearest 0.1kg.

A measuring tape was fixed to the wall and the participants stood with their backs against the wall, with their feet, buttocks and occiput touching the tape. They stood upright, their feet apposed with their head facing forward. Specifically, the head was placed in Frankfurt horizontal plane which aligns the left tragus and the inferior margin of the left orbit in the same transverse plane. An inflexible ruler was placed on the vertex to read the height on the tape, which was estimated to the nearest 1.0cm (Omigbodun et al., 2010).

For cultural considerations, male and female research assistants measured male and female participants, respectively. The weight and height were recorded on a section of the questionnaires (Waterlow et al., 1977, Omigbodun et al., 2010).

3.7.1.4 24-hour Dietary Recall

In conducting the 24-hour recall, standard guidelines were followed in the consecutive steps of preparing respondents for the recall, recalling the food and drinks consumed and describing the food and drinks consumed (Gibson and Ferguson, 2008). Respondents were prepared through establishment of rapport and explanation of food types using the local terms. They then recalled what they ate throughout the previous day, stating the time they ate and describing the meal. This was documented by research assistants.

3.7.2 Qualitative Study

The procedure for the qualitative aspect began with the composition of twointerview guides, one on eating habits and the other, on sleeping habits. These guides comprised questions about eating and sleeping, with probes in each section to advance the discussion.

The FGDs held in a classroom. In attendance were the researcher, research assistants and the participants. School teachers and other students who were not participants were not in the room during the sessions. The sitting arrangement was circular to allow every participant to see one another.

Before the discussion, the researcher explained the purpose and scope of the interview and encouraged every participant to freely share their views. Verbal permission was gotten from the participants to record the session. The recording was done on two smart phones which were operated by research assistants. A transcriber took notes during the discussion.

3.8DATA ANALYSIS

3.8.1 Quantitative Data Analysis

The quantitative data was analysed with the Statistical Package for Social Sciences (SPSS) version 22 (IBM, 2013). With this software, the frequency distribution of variables was generated. The data was presented as tables and charts, where appropriate. The association between categorical variables was tested with Chi square statistics. The level of statistical significance was set at less than 0.05 (i.e. $p< 0.05$). Binary logistic regression analysis was used to determine the predictors of quality of sleep.

Analysis of anthropometric data was done with the WHO Anthro software (Version 3.1.0), using the WHO growth reference for adolescents (De Onis et al., 2007). The median values of anthropometric data by age and sex were calculated. Distribution graphs were computed for comparison of the adolescents' nutritional status with the WHO reference population. The nutritional indices were expressed in z-scores, which are standard deviation (SD) units from the mean of the WHO reference population. Interpretation of the z-scores of BMI was as

follows: -2 SD: underweight, >-2 to +1 SD: normal BMI, > +1 SD: overweight, and > +2 SD: obese. Stunting was interpreted to be height-for-age < -2 SD.

3.8.2 Qualitative Data Analysis

Two research assistants who were at the meetings listened again to the audio files and converted them into text.Recurring ideas in the text wereseverally teased out, and these were recorded as codes. This process was terminated at the point of saturation, when there were no additional ideas in the text. Similar codes were organised into emerging themes. The themes were refined by the researcher. All research assistants who had been present at the interviews read the themes to confirm that they were reflective of the group discussions (Kumar et al., 2018).

Some direct quotes from the discussions were used as corresponding quoteswithin the themes.To analyse the qualitative data, a grounded theory approach was employed (Corbin and Strauss, 1990). Using the framework of inductive reasoning, theories were formed from information given by participants about their sleeping and eating habits. Data analysis and data collation proceeded simultaneously in a process of constant comparative analysis and theoretical sampling. Recurrent themes were identified from the theories through theoretical sensitivity. The point of theoretical saturation, when all possible theories had been milked from the data, marked the end of the research.

Word count: 3,694 (Recommended Word Count: 2000-5000 without counting tables)

CHAPTER FOUR

4.0 RESULTS

4.1 PRESENTATION OF SURVEY DATA

A total of 520 copies of the questionnaire were administered and 512 copies were returned in a usable condition. Eight public schools were visited for data collection. Six of them were mixed schools, while two were same-sex schools; a boys' only school and a girls' only school (Table 5).

Table 5: Distribution of respondents according to school

(N= 512)

NAME OF SCHOOLS	FREQUENCY	PERCENTAGES (%)
St. John Secondary school	84	16
C & S Secondary school	83	16
Bishop Smith Memorial secondary school	78	15
St. Barnabas Secondary school	68	14
St. Anthony Senior Secondary school	62	12
Government Girls' secondary school	61	12
Government Boys' secondary school	45	9
St. Anthony Junior Secondary school	31	6
TOTAL	512	100

4.2 DESCRIPTIVE PRESENTATION OF THE SOCIO-DEMOGRAPHIC DATA

The characteristics of the respondents are presented in three (3) categories below: selected sociodemographic characteristics, family characteristics and school characteristics. Adolescence has been operationally divided into early adolescence (those aged between 10 and 14 years) and late adolescence (15 to 19 years of age) (Das et al., 2017, Omigbodun et al., 2010). Table 6 shows that 62.7% of respondents were late adolescents between 15 and 19 years. The majority of the respondents were from monogamous families (n=430, 84.0%). Most parents were married (n=438, 85.5%); others were separated, divorced or deceased (Table 7). School factors were also described (Table 8). A total of 332 students (64.8%) were in senior secondary schools. Only 29 of the students (5.7%) lived in hostels; all others were day students who lived at home. Some students (n=37, 7.2%) had no awareness of the presence of a guidance counsellor in their school, and 127 students (28.4%) were not willing to see a school guidance counsellor.

Table 6: Frequency distribution of selected sociodemographic characteristics of respondents

(N=512)

Characteristics	Categories	Frequency	Percentage (%)
Age (in years)	Early adolescence (10-14)	191	37.3
	Late adolescence (15-19)	321	62.7
Gender	Male	238	46.5
	Female	274	53.5
Religion	Islam	227	44.3
	Christianity	285	55.7
Impact of religion on personal behaviour	Much	485	94.7
	Not much	27	5.3
Impact of religion on family life	Much	442	86.3
	Not much	70	13.7

Table 7: Family characteristics of the respondents

(N=512)

Characteristics	Categories	Frequency	Percentage (%)
Family type	Monogamous	430	84.0
	Polygamous	82	16.0
Marital status of parent	Married	438	85.5
	Others	74	14.5
Person respondent lives with	Parent	406	79.3
	Others	106	20.7
Person who brought up respondent	Parent	428	83.6
	Others	84	16.4
Respondent lived with other people	Yes	211	41.2
	No	301	58.8
Extra work to earn money	Yes	142	27.7
	No	370	72.3
Father's educational status	Educated	475	92.8
	Not educated	37	7.2
Mother's educational status	Educated	463	90.4
	Not educated	49	9.6
Father's occupation	Employed	483	94.3
	Unemployed	29	5.7
Mother's occupation	Employed	480	93.8
	Unemployed	32	6.3
Satisfaction with family	Yes	509	99.4
	No	3	0.6

Table 8: School characteristics of the respondents

(N=512)

Characteristics	Categories	Frequency	Percentage (%)
Class	Junior Class	180	35.2
	Senior Class	332	64.8
Residence	Hostel	29	5.7
	Home	483	94.3
Satisfaction with school	Yes	504	98.4
	No	8	1.6
Number in class	10 – 40	173	33.8
	>40	339	66.2
Reported academic performance	Good	499	97.5
	Poor	13	2.5
History of difficulties with teacher	Yes	90	17.6
	No	422	82.4
Awareness of presence of school guidance counsellor	Yes	475	92.8
	No	37	7.2
Prior visit to school counsellor	Yes	234	45.7
	No	278	54.3
Willingness to see counsellor	Yes	385	75.2
	No	127	24.8

4.3 SLEEP PATTERN OF RESPONDENTS

Participants reported their sleep patterns and sleep problems (Table 9). A total of 224 respondents (43.8%) had a sleeping partner, who was usually their mother or a sibling. Sleep problems reported included snoring (n=162, 31.6%), breathing irregularities (n=157, 30.7%), leg jerks (n=122, 23.8%) and disorientation during sleep (n=173, 33.8%).

Table 10 shows the self-reported Pittsburgh sleep quality. There were 321 poor sleepers (62.7%). Only 98 respondents (19.0%) had sleep duration of 9 hours and above, and 51.0% of respondents had sleep duration ≤7 hours. Nonetheless, only 3.5% of respondents reported bad subjective sleep quality.

Table 9: Sleep Pattern of the Respondents

(N= 512)

Pattern	Frequency	Percentage (%)
Sleeping partner		
No	288	56.3
Yes	224	43.8
Loud snoring		
No	350	68.4
Yes	162	31.6
Long pauses between breath while sleeping		
No	355	69.3
Yes	157	30.7
Legs twitching or jerking while sleeping		
No	390	76.2
Yes	122	23.8
Episodes of disorientation or confusion during sleep		
No	339	66.2
Yes	173	33.8
Other restlessness during sleep		
No	355	69.3
Yes	157	30.7

Table 10: Pittsburgh Sleep Quality

(N=512)

Components	Characteristics	Frequency	Percentages (%)
Subjective sleep quality	Very good	298	58.2
	Fairly good	296	38.3
	Fairly bad	17	3.3
	Very bad	1	0.2
Sleep latency	0	159	31.1
	1 – 2	219	42.8
	3 -4	119	23.2
	5 – 6	15	2.9
Sleep duration	>7 hours	251	49.0
	6 – 7 hours	120	23.4
	5 – 6 hours	92	18.0
	< 5 hours	49	9.6
Habitual sleep efficiency	>85%	366	71.5
	75 – 84%	55	10.7
	65 – 74%	34	6.6
	<65%	57	11.1
Sleep disturbances	0	36	7.0
	1 – 9	234	45.7
	10 – 18	219	42.8
	19 – 27	23	4.5

Use of sleeping medication	Not during the past month	349	68.2
	Less than once a week	84	16.4
	Once or twice a week	63	12.3
	Three or more times a week	16	3.1
Daytime dysfunction	0	201	39.3
	1 – 2	221	43.2
	3 – 4	77	15.0
	5 – 6	13	2.5
Global sleep quality (PSQI score ≤5)	Good sleep	191	37.3
(PSQI score >5)	Poor sleep	321	62.7

4.4 EATING DISORDERS

This section presents data gotten from the K-SADS questionnaire in assessing eating disorders amongst secondary school students (Figure 2).

During screening, the threshold for the fear of becoming obese was met by 4.1% of respondents, while 0.2% of respondents met the threshold for eating binges. The threshold for emaciation or weight loss methods was not met by any of the respondents.

Respondents who met the threshold, as well as 20% of those who did not, proceeded to a diagnostic interview, but none met the criteria for diagnosis of an eating disorder, such as anorexia nervosa, bulimia nervosa or binge-eating disorder.

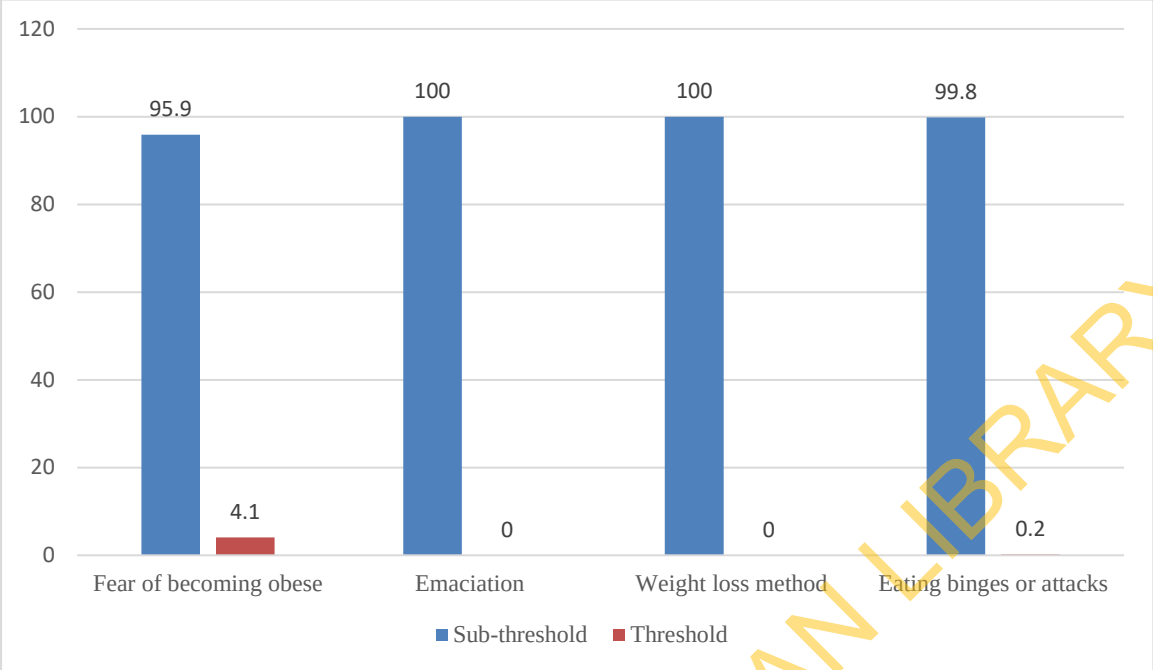


Figure 2: Screening for Eating Disorders

4.5 NUTRITIONAL STATUS OF THE RESPONDENTS

4.5.1 Body Mass Index

Table 11 shows the BMI distribution, while Figures 3 and 4 show the comparison of the BMI of respondents with the WHO reference population. Underweight and overweight BMI were observed among 21% and 20% of the respondents, respectively and obesity was found among 0.1% of the sample.

Figure 3 is a chart showingthe BMI distribution of the total sample in comparison with the WHO standard. It reveals that underweight and overweight are found within the sample, with similar prevalence. Figure 4 shows the BMI distribution according to gender and reveals that overweight and underweight BMI were found among both male and female ssubjects.

Table 11: BMI status of the respondents

STATUS	FREQUENCY	PERCENTAGE
Underweight	107	21.0
Normal	301	58.9
Overweight	103	20.0
Obese	1	0.1
Total	512	100.0

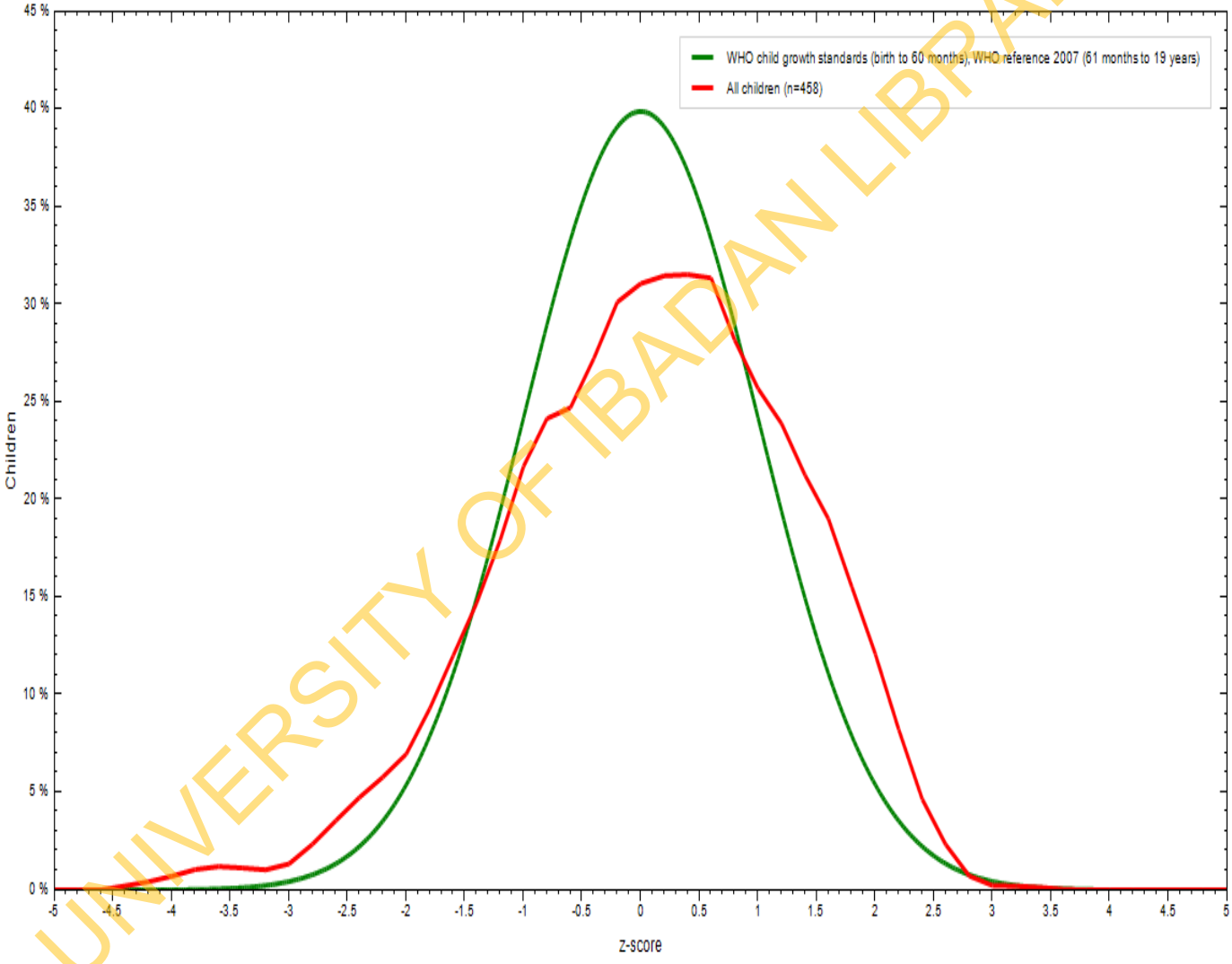


Figure 3: All participants (BMI) for age compared with WHO (2007) standard

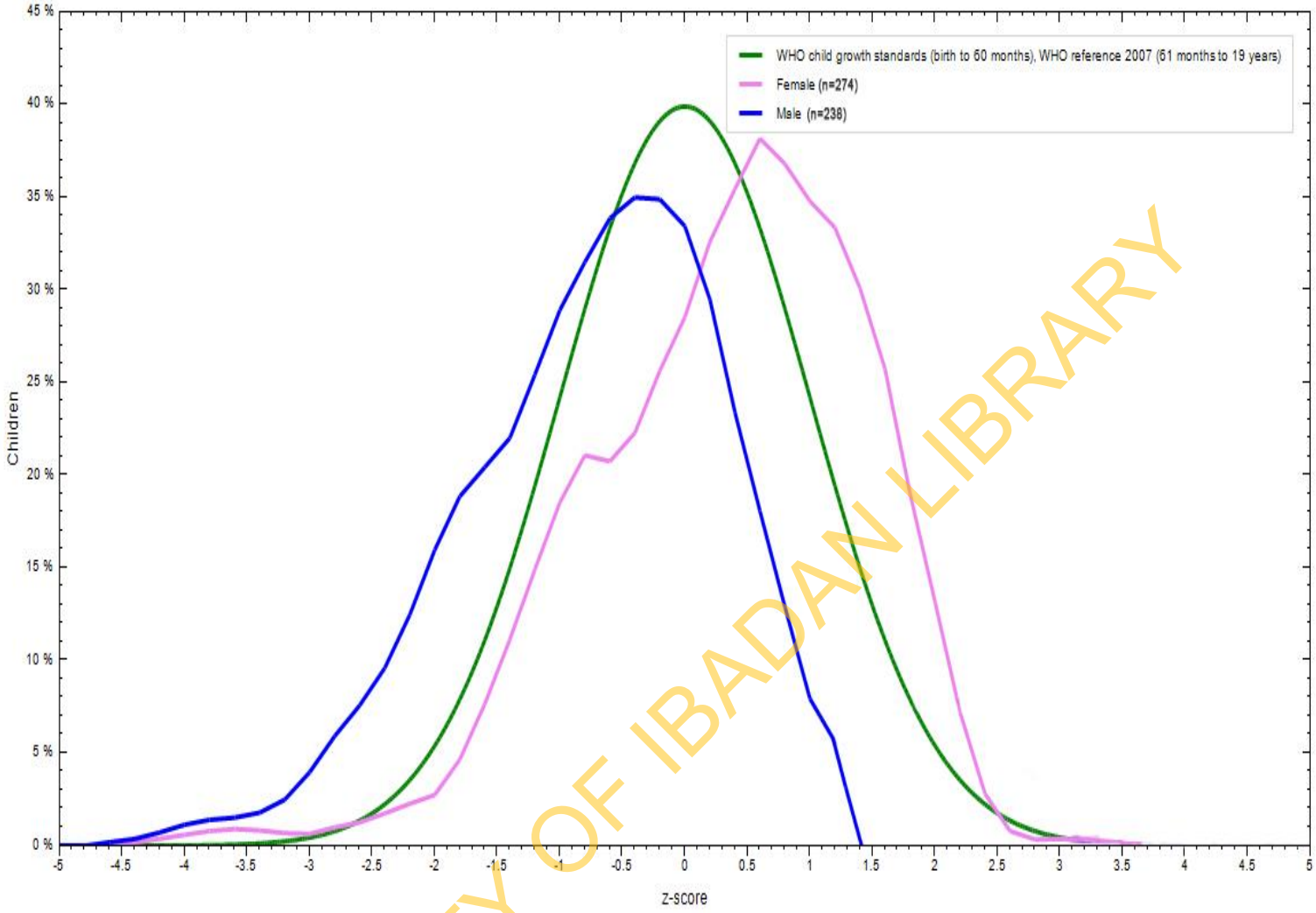


Figure 4: Participants (BMI) for age by sex compared with WHO (2007) standard

4.5.2 Low height for age (Stunting)

Sixty-two adolescents (12.1%) of all adolescents were stunted. They were all late adolescents, aged between 17 and 19 years (Table 12). Comparison of the heights of all participants with the 2007 WHO references depicts stunting (Figure 5).

Furthermore, the median height-by-age of male and female adolescents was compared with the median height-by-age of the WHO references, and presented in Figure 6. This chart revealedthat both males and females became increasingly taller with age. The median height-by-age of both genders was comparable. No stunting was observed in early adolescence for both genders. However, male adolescents in the latter years were stunted.

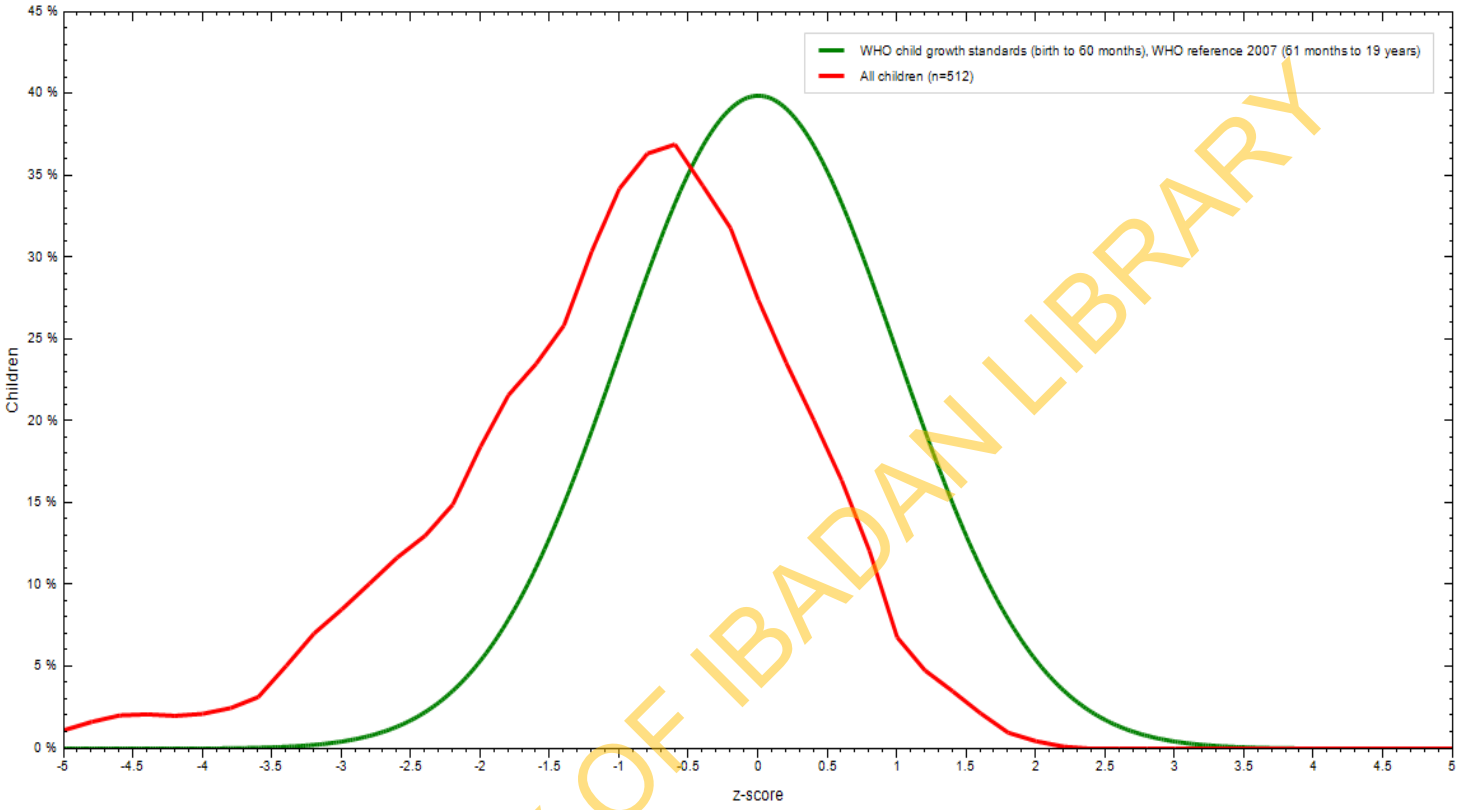


Figure 5: Height for age

Table 12: Percentage of Respondents with Stunting

Age Category	Age (years)	Number of Respondents (n)	Stunting (percentage)
Early	10	22	0 (0%)
Adolescents	11	16	0 (0%)
10 to 14 years	12	43	0 (0%)
(n_1= 191)	13	42	0 (0%)
	14	68	0 (0%)
Late Adolescents	15	58	0 (0%)
15 to 19 years	16	56	0 (0%)
(n_2= 321)	17	73	26 (35.6%)
	18	55	11(20.0%)
	19	79	25 (31.6%)
Total	Total	512	62 (12.1%)

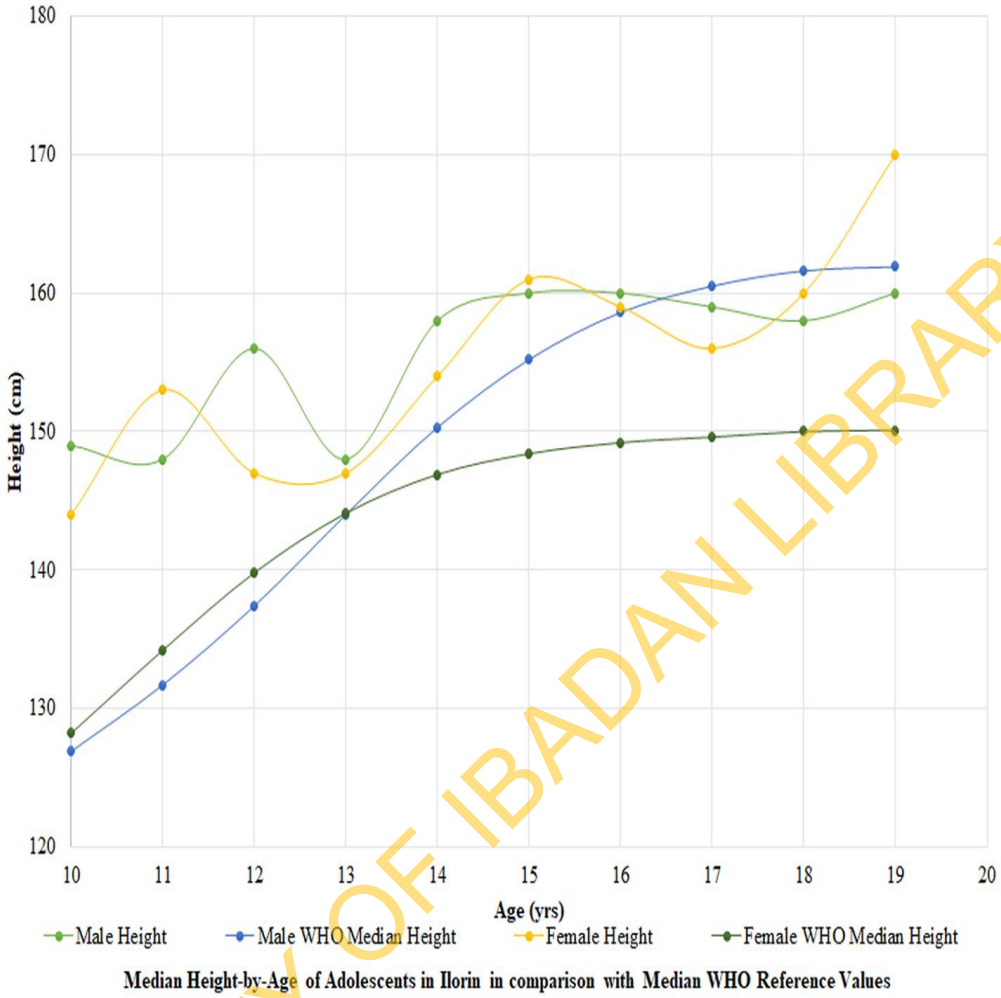


Figure 6: Median Height-by-Age of Adolescents in Ilorin in comparison with Median WHO Reference Values

4.5.3 24-Hour Dietary Recall

A 24-hour dietary recall obtained information from the students about their eating pattern the previous day. This was grouped into the various food classes and presented in Table 13. Information about meal skipping was also gotten (Table 14). Lunch was the most frequently skipped meal (56.8%), and 33.4% of respondents skipped breakfast.

Table 13: 24-hour dietary recall of the respondents

(N= 512)

DIETARY RECALL		FREQUENCY	PERCENTAGES
STARCHY FOOD (n=512)	YAM	122	23.8
	CASSAVA	51	10
	RICE	211	41.2
	BREAD	57	11.1
	MILLET	71	13.9
LEGUMES (n=512)	COWPEA	9	1.8
	MELON SEED	47	9.2
	GROUNDNUT	143	27.9
	KULI-KULI	229	44.8
	SOYA BEAN	84	16.4
MEAT/MILK (n = 410)	FISH	155	37.8
	MILK	52	12.7
	BEEF	38	9.3
	EGG	44	10.7
	CHEESE	121	29.5
VEGETABLES (n=512)	OKRO	170	33.2
	EFO	97	18.9
	EWEDU	120	23.4
	GARDEN EGG	96	18.8
	UGU LEAF	29	5.7
BEVERAGES (n= 371)	COCO DRINK	94	25.3
	TEA	216	58.2
	COCACOLA	61	16.4
FATS & OIL (n=512)	VEGETABLE OIL	205	39.5
	PALM OIL	307	60.5
SNACKING (n=458)	Buns	131	28.6
	Doughnut	67	14.6
	Egg roll	55	12.0
	Puff-puff	98	21.4
	Soya bean cake (“beske”)	107	23.4

Table 14: Table showing the meal skipping of the respondents

N= 512

Skipped Meal	Frequency	Percentage (%)
Breakfast	171	33.4
Lunch	291	56.8
Dinner	33	6.4

4.6 ASSOCIATION BETWEEN NUTRITIONAL STATUS AND SOCIODEMOGRAPHIC FACTORS

The sociodemographic factors associated with overweight, underweightand stunting were determined.The following sections describe these associated factors as well as the factors that are predictive of these nutritional indicators.

4.6.1 Factors associated with Overweight BMI

Overweight BMI was associated with early adolescence (χ^2=68.054, p=0.000[y]), Christianity (χ^2=11.739, p=0.008*[y]), junior class (χ^2=139.550, p=0.000*[y]), residence at home (χ^2=21.549, p=0.000*[y]) and prior visit to the school counsellor (χ^2=22.749, p=0.000*[y]) (Table 15).

Table 15:Overweight and Characteristics of the Respondents

Characteristics	BMI		χ^2	*p*
	Normal (%) n_1=301	Overweight (%) n_2=103		
Age				
Early adolescence	78(25.9)	74(71.8)		
Late adolescence	223(74.1)	29(28.2)	68.723	**.000***y
Gender				
Male	148(49)	45(43.7)		
Female	153(51)	58(56.3)	2.908	.405
Religion				
Christianity	168(55.8)	45(43.7)		
Islam	133(44.2)	58(56.3)	11.739	**.008***y
Position in family				
First	90(30)	27(26.2)		
Others	211(70)	76(73.8)	0.948	.814
Doing extra work				
Yes	84(28)	37(36)		
No	217(72)	66(64)	7.343	.062
Class				
Junior	58(19.3)	86(83.5)		
Senior	243(80.7)	17(16.5)	139.550	**.000***y
Place of living				
Home	272(90.4)	103(100)		
Hostel	29(9.6)	-	21.549	**.000***y
Difficulties with teachers				
Yes	60(20)	12(11.7)		
No	241(80)	91(88.3)	3.906	.272
Prior visit to G. C				
Yes	126(42)	68(63.6)		
No	175(58)	35(36.4)	22.749	**.000***y

χ^2: Chi square; *: Statistically significant (i.e. p value < 0.05), Y: Yates Test.

4.6.2 Predictors of Overweight BMI

All variables that were significantly associated with overweight BMI were subjected to logistic regression (Table 16). None of the variables was predictive of overweight nutritional status among the respondents.

Table 16:Predictors of Overweight BMI

Predictors	Adjusted odds ratio	95% C.I	P-value
Age (Early vs. Late adolescence)	9.61	0.00-[b]	0.98
Religion (Christianity vs. Islam)	-12.64	1.77-5.88	0.97
Class (Junior vs. Senior)	12.99	0.89-0.21	0.97
Place of living (Home vs. Hostel)	0.17	1.18-1.18	0.96
Prior visit to Guidance counsellor (Yes vs. No)	12.09	0.94-0.34	0.91
Family type (Monogamous vs. Polygamous)	-11.71	0.82-0.00	0.99
Brought up by (Parent vs. Others)	-12.32	0.04-0.00	0.99

4.6.3 Factors associated with Underweight BMI

Factors associated with underweight BMI were determined (Table 17).Underweight BMI was significantly associated with older adolescence (χ^2=68.054, p=0.000[y]), Islam (χ^2=11.739, p=0.008[y]), senior class (χ^2=139.550, p=0.000[y]), living at home (χ^2=21.549, p=0.000 [y]) and having not gone to see the school counsellor before (χ^2=22.749, p=0.000 [y]).

Table 17: Factors associated with underweight BMI

Characteristics	BMI Normal (%) n_1=301	 Underweight (%) n_2= 107	χ^2	*p*
Age				
Early adolescence	78(25.9)	38(35.5)		
Late adolescence	223(74.1)	69(64.5)	68.723	**.000***y
Gender				
Male	148(49)	45(42)		
Female	153(51)	62(58)	2.908	.405
Religion				
Christianity	168(55.8)	71(66.4)		
Islam	133(44.2)	36(33.6)	11.739	**.008***y
Position in family				
First	90(30)	30(28)		
Others	211(70)	77(72)	0.948	.814
Doing extra work				
Yes	84(28)	21(19.6)		
No	217(72)	86(80.4)	7.343	.062
Class				
Junior	58(19.3)	36(33.6)		
Senior	243(80.7)	71(66.4)	139.550	**.000***y
Place of living				
Home	272(90.4)	107(100)		
Hostel	29(9.6)	-	21.549	**.000***y
Difficulties with teachers				
Yes	60(20)	18(16.8)		
No	241(80)	89(83.2)	3.906	.272
Gone to see G & C				
Yes	126(42)	40(37.4)		
No	175(58)	67(62.6)	22.749	**.000***y

4.6.4 Predictors of Underweight BMI

All the positively correlated variables were subjected to logistic regression, but none was predictive of the underweight nutritional status (Table 18).

Table 18: Logistic Regression on the Associated Factors of Underweight BMI

Predictors	Adjusted odds ratio	95% C.I	P-value
Age (Early vs. Late adolescent)	9.61	0.00-[b]	0.98
Religion (Christianity vs. Islam)	-12.64	1.77-5.88	0.97
Class (Junior vs. Senior)	12.99	0.89-0.21	0.97
Place of living (Home vs. Hostel)	0.17	1.18-1.18	0.96
Prior visit to Guidance counsellor (Yes vs. No)	12.09	0.94-0.34	0.91
Family type (Monogamous vs. Polygamous)	-11.71	0.82-0.00	0.99
Brought up by (Parent vs. Others)	-12.32	0.04-0.00	0.99

4.6.5Factors associated with Stunting

Stunting was significantly associated with being in the senior class ($p< 0.0001$, $\chi^2 = 25.497$), living in the hostel ($p< 0.0001$, $\chi^2 =72.093$), late adolescence ($p< 0.0001$, $\chi^2 = 45.592$), being male ($p< 0.0001$, $\chi^2 = 81.212$), from a polygamous family ($p<0.003$, $\chi^2 = 8.886$) and being raised by an unmarried parent ($p< 0.0001$ $\chi^2 = 47.748$) (Table 19).

Table 19: Association of Stunting with Sociodemographic Variables

		Stunting			p-Value
		No Stunting in Growth	**Stunting in Growth**	**Total**	**χ 2 df**
Class	Junior	176 (97.8%)	4 (2.2%)	180 (100%)	< 0.0001
	Senior	274 (82.5%)	58 (17.5%)	332 (100%)	25.497 df=1
Place of living	Home	439 (90.9%)	44 (9.1%)	483 (100%)	< 0.0001
	Hostel	11 (37.9%)	18 (62.1%)	29 (100%)	72.093 df=1
Age	Early Adolescents	191 (100.0%)	0 (0%)	191 (100.0%)	< 0.0001
	Late Adolescent	259 (80.7%)	62 (19.3%)	321 (100.0%)	45.592 df=1
Gender	Female	274 (100.0%)	0 (00.0%)	274 (100.0%)	< 0.0001
	Male	176 (73.9%)	62 (26.1%)	238 (100.0%)	81.212 df=1
Religion	Christianity	250 (87.7%)	35 (12.3%)	285 (100.0%)	0.894
	Islam	200 (88.1%)	27 (11.9%)	227 (100.0%)	0.018 df=1
Family Type	Monogamous	386 (89.8%)	44 (10.2%)	430 (100%)	0.003
	Polygamous	64 (78.0%)	18 (22.0%)	82 (100%)	8.886 df=1

Marital Status of parent	Married	398 (90.9%)	40 (9.1%)	438 (100%)	
	Not Married	10 (43.5%)	13 (56.5%)	23 (100%)	< 0.0001
	Others	42 (82.4)	9 (17.6)	51 (100%)	47.748 df=1
Father's Education	Educated	417 (87.2%)	58 (12.2%)	475 (100%)	0.802
	Not educated	33 (89.2%)	4 (10.8%)	37 (100%)	0.063 df=1
Mother's Education	Educated	408 (88.1%)	55 (11.9%)	463 (100%)	0.623
	Not educated	42 (85.7%)	7 (14.3%)	49 (100%)	0.241 df=1
Father's Employment Status	Employed	423 (87.6%)	60 (12.4%)	483 (100%)	0.376
	Unemployed	27 (93.1%)	2 (6.9%)	29 (100%)	0.785 df=1
Mother's Employment Status	Employed	422 (87.9%)	58 (12.1%)	480 (100%)	0.944
	Unemployed	28 (87.5%)	4 (12.5%)	32 (100%)	0.005 df=1

4.6.6 Predictors of Stunting

All variables significantly associated with stunting were subjected to logistic regression, which revealed senior class and a polygamous family setting as being predictive of stunting. This is shown in Table 20.

Table 20: Predictors of Stunting

Predictors	Adjusted odds ratio	95% C.I	P-value
Age (Early vs. Late adolescence)	19.81	0.00-[b]	0.99
Class (Junior vs. Senior)	-2.23	0.38-0.301	0.00*
Place of living (Home vs. Hostel)	-2.79	0.27-0.14	0.19
Gender (Male or Female)	20.16	0.00-[b]	0.99
Family type (Monogamous vs. Polygamous)	-0.90	0.22-0.75	0.04*

4.7 ASSOCIATION OF POOR SLEEP AND SOCIODEMOGRAPHIC FACTORS

The association of sleep quality with socio-demographic variables was determined, as presented in the following tables.

4.7.1 Poor Sleep and Biodata

Poor sleep was associated with male gender (χ^2=6.379, p=0.013) (Table 21).

4.7.2 Poor Sleep and Family Factors

Poor sleep was associated with being the first born (χ^2=6.724, p=0.011) (Table 22).

4.7.3 Poor Sleep and School Factors

Poor sleep was associated with living at home, rather than in the hostel (χ^2=7.266, p=0.006), being in a class with <40 pupils (χ^2=5.867, p=0.016) (Table 23).

Table 21:Sleep Quality and Bio-data of the Respondents

N = 512

Bio-Data	Sleep Quality		X^2	*ρ*-value
	Good Sleep (%)	**Poor Sleep (%)**		
	n_1=191	**n_2=321**		
Age				
Early Adolescence	77 (40.3)	114 (35.5)	3.968	0.052
Late Adolescence	114 (59.7)	207 (64.5)		
Gender				
Male	75 (39.3)	163 (50.8)	6.379	**0.013**
Female	116 (60.7)	158 (49.2)		
Religion				
Christianity	101 (52.9)	184 (57.3)	0.957	0.538
Islam	90(47.1)	137 (42.7)		
Impact of Religion				
Much	180 (94.2)	305 (95.0)	0.144	0.688
Not at all	11 (5.76)	16 (4.9)		

Table 22:Sleep Quality and Family Characteristics of the Respondents

N=512

Family characteristics	Sleep Quality		X^2	ρ-value
	Good Sleep (%)	Poor Sleep (%)		
Family type				
Monogamous	159 (83.2)	271 (84.4)	0.123	0.803
Polygamous	32 (16.8)	50 (15.6)		
Position in family				
First	42 (21.9)	105 (32.7)	6.724	**0.011**
Others	149 (78.0)	216 (67.3)		
Marital status of Parent				
Married	164 (85.9)	274 (85.4)	0.025	0.897
Others	27 (14.1)	47 (14.6)		
Living with				
Parents	153 (80.1)	253 (78.8)	0.121	0.822
Others	38 (19.9)	68 (21.2)		
Brought up by				
Parent	162 (84.8)	266 (82.9)	0.332	0.622
Others	29 (15.1)	55 (17.1)		
Lived with other people				
Yes	80 (41.9)	131 (40.8)	0.057	0.853

No	111 (58.1)	190 (59.2)		
Doing extra work				
Yes	44 (23.0)	98 (30.5)	3.354	0.082
No	147 (76.9)	223 (69.5)		
Father's education				
Educated	172 (90.1)	303 (94.4)	3.365	0.078
Not educated	19 (9.9)	18 (5.6)		
Mother's education				
Educated	170 (89.0)	293 (91.3)	0.714	0.438
Not educated	21 (10.9)	28 (8.7)		
Father's occupation				
Employed	179 (93.7)	304 (94.7)	0.218	0.694
Unemployed	12 (6.3)	17 (5.3)		
Mother's occupation				
Employed	176 (92.1)	304 (94.7)	0.714	0.438
Unemployed	15 (7.8)	17 (5.3)		
Like family				
Yes	191 (100)	318 (99.1)	1.796	0.297
No	0 (0)	3 (0.9)		

Table 23:Sleep Quality and School Characteristics of the Respondents

N=512

School characteristics	Global Sleep Quality		X^2	ρ-value
	Good Sleep (%)	Poor Sleep (%)		
Class				
Junior	71 (37.2)	109 (33.9)	0.543	0.503
Senior	120 (62.8)	212 (66.0)		
Place of living				
Home	187 (97.9)	296 (92.2)	7.266	**0.006**
Hostel	4 (2.1)	25 (7.8)		
Like school				
Yes	188 (98.4)	316 (98.4)	0.000	1.000
No	3 (1.6)	5 (1.6)		
Number in class				
< 40	52 (27.2)	121 (37.7)	5.867	**0.016**
> 40	139 (72.8)	200 (62.3)		
Reported academic performance				
Good	188 (98.4)	311	1.154	0.388
Poor	3 (1.6)	10 (3.1)		
Difficulties with teachers				

Yes	33 (17.3)	57 (17.8)	0.019	1.000
No	158 (83.0)	264 (82.2)		
Awareness of guidance and counsellors				
Yes	173 (90.6)	302 (94.1)	2.194	0.159
No	18 (9.4)	19 (5.9)		
Gone to see G & C				
Yes	84 (43.9)	150 (46.7)	0.365	0.582
No	107 (56.0)	171 (53.3)		
Willingness of go see G & C				
Yes	142 (74.3)	243 (75.7)	0.118	0.752
No	49 (25.7)	78 (24.3)		

4.7.4 Predictors of Sleep Quality

All the variables significantly associated with poor sleep quality were subjected to logistic regression (Table 24). Logistic regression analysis showed that living at home, as against hostel living, was predictive of poor sleep (OR=1.16, 95% CI=1.06-9.55, p=0.04).

Table 24: Predictors of Sleep Quality

Predictors	Adjusted odds ratio	95% C.I	P-value
Gender (Male vs. Female)	-0.29	0.51-1.09	0.13
Position in family (First vs. Others)	-0.51	0.39-0.92	0.18
Place of living (Home vs. Hostel)	1.16	1.06-9.55	0.04*
Number in class (<40 vs. >40)	-0.42	0.44-0.98	0.03*

4.8 PERCEPTION OF ADOLESCENTS ABOUT EATING HABITS

The respondents expressed their views about the eating habits of adolescents with respect to how fast they eat, how much they eat and where. While the speed often depended on the context, many adolescents perceived that they ate a lot, due to their nutritional requirements. They generally did not have a family culture of eating at the dining table, and rather preferred to eat alone.

"A person may have bad habit of eating, so they may want to stay inside the room."

– Female, 11-year-old; St. John school.

Food preference differed for the sexes, with males eating heavy meals which they perceived to give energy, while females preferred light meals in order to stay slim. Frequent snacking was common to both sexes (Box 1).

Box 1: Snacking among Adolescents

INTERVIEW SECTION	CORE THEME	CORRESPONDING QUOTES
FOOD PREFERENCE	**SNACKING AMONG ADOLESCENTS**	**Affordable** **Male, Government day secondary school: "Adolescent e** **Female, Government day secondary school: "With the m and take water, and be satisfied."** **Available** **Female, Bishop Smith memorial high school: "Snacks a food."** **Accessible** **Female, C&S school: "Snacks *is* our food in school."** **Acceptable** **MALE, Government day "Adults feel like they're too ol snacks".** **Female 15 years old Saint Anthony student "Some like s** **Female, Bishop Smith student "Snacks is not healthy existence (but we still take them)."**

Perceived influenceson adolescents' eating habits were media (traditional/social), religion and academics.

"Leaving home early in the morning to go to school leaves us with buying junks in school." – Male; C&S school.

Males wanted to have muscular abdomens which they generally described as "six pack" and girls wanted to be slim. Likewise, the boys wanted the girls to be slim and the girls wanted the boys to be muscular. Some of the adolescents got their ideal shape from models, who were mostly western. Both boys and girls did not want to be fat (Box 2).

Box 2: Perception about Body Image and Size

CORE THEME	CORRESPONDING QUOTES
PERCEPTION ABOUT THE FEMALE FRAME: 'We want to have flat tummy.'	Female C&S Secondary school "Girls eat light because we want to have flat tumm FEMALE Bishop smith memorial high school "Some girls like to have flat tummy be robust. When you eat too much you won't have flat tummy and you won't mak
PERCEIVED IDEAL WEIGHT	FEMALE Bishop smith memorial high school "Not too slim and not too robust… with big stature unattractive" Male C&S Secondary school "For a lady to be considered beautiful, she must not not too skinny like the models and celebrities. The fat ladies try to lose weight in society expectation"
NEGATIVE PERCEPTION ABOUT PLUS SIZE: 'It's irritating to be fat'	FEMALE Bishop smith memorial high school "It's irritating to be fat." Female C&S Secondary school "Being fat is irritating." Female St. John "Fat people… will feel too ashamed of themselves." FEMALE Bishop smith memorial high school "Girls try to avoid body shaming. robust, people will body shame her."
OBESITY HINDERS AGILITY	Female (St. John) "There some things they will able to do when they're slim but th to do it when they're fat." Female (St. John) "Because most of them when they're too fat, they won't be able exercise, so they need to slim down for the game they want to play." Female (St. John) "Fat people will not be able to carry their body."

4.9 PERCEPTION OF ADOLESCENTS ABOUT SLEEPING HABITS

Core themes emanating from FGDs were identified, namely the perception of normal sleep, the role of social media in sleep, the relationship between sleep and school activities, and the perception of respondents about dreams and nightmares.

4.9.1 Perception of Normal Sleep

Perception of normal sleep was described in terms of the quantity and quality of sleep. The perceived duration of normal adolescent sleep was between 8 and 10 hours. Respondents' view about snoring was that it could be due to tiredness or stress, the sleeping posture and obesity. While some perceived snoring to indicate better sleep, others thought it was an attribute of poor sleep.

4.9.2 Adolescents Sleep Late

Respondents reported that adolescents sleep late at night. This sleep pattern was perceived to be a peculiarity of adolescence. The main reason for sleeping late was identified as the use of social media. Other reasons given include watching movies and doing school assignments.

"My point of view, adolescent sleep late because they chat and stay on the internet for long hours and it affects them in the next day work. Like sleeping when in class and when they're expected to be active." – Female; C&S school.

4.9.3 Social Media, a perceived deterrent to sleep

The respondents use social media for a variety of reasons, including perceived positive pursuits such as academic knowledge and reported negative things such as pornography. Chatting stood out as a major social media activity among adolescents. FGDs at the single-sex schools showed

that the students were fond of chatting with the opposite gender at night, thus delaying their onset of sleep. Sometimes, these adolescents chatted with strangers at night. Such conversations were often initiated with comments by the stranger about the respondent's profile picture.

"Most of *adolescent,* we have a girlfriend we talk to or toast on social media…(we) chat more with girls, if you chat with boys you feel bored." – Male, Government Boys' Secondary School.

"We chat more with boys. Some of them are in the neighbourhood and some of them are outsiders. We don't even know some of them." – Female, Government Girls' Secondary School.

4.9.4 Sleep and School Activities

Respondents reported that sleepiness in school is detrimental. They also said that staying awake at night affects performance the morning after. Watching television late into the night was perceived to cause headaches. School work done at night was thought to affect night sleep and cause daytime drowsiness, which in turn could affect school performance.

4.9.5 Religion and Sleep

Praying was the religious activity most frequently perceived to potentially affect sleep. Some adolescents also expressed religious beliefs about sleeping without clothes on.

4.10 PERCEPTION ABOUT DREAMS

4.10.1 Themes of Dreams

Respondents reported that adolescents have happy as well as scary dreams. Some of the themes described were persecutory sexual fantasies; others reflected their ambition and desires for the future.

4.10.2 Perceived Meaning of Dreams

Respondents interpreted dreams to be in two categories, namely dreams that occur because of the activities during the day (which they perceived had no significance) and dreams which were 'spiritual' in nature. The perceived significance of the latter was that such dreams could come to pass.

Perceived natural dreams were thought to be due thoughts just before sleeping:

"We think about different things like our coming exams." – Female, C&S secondary school

"We think about trendy things and fashion." – Female, C&S secondary school

Examples of perceived 'spiritual' dreams include hawking and eating in dreams.

Word Count: 4,661

CHAPTER FIVE

5.0 DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 DISCUSSION

5.1.1 Socio-Demographic Findings

The sample size was the same as that used in another nutritional study among in-school adolescents in south-west Nigeria, and comparable with other studies from north-central Nigeria and south-south Nigeria (Adesina et al., 2012). A Ghanaian study had a similar sample size (Bennett et al., 2004).The study setting mirrored other studies conducted in public schools (Ogunkunle and Oludele, 2013). Single-sex schools were also surveyed, as was done in a Port Harcourt study (Adesina et al., 2012).

All respondents were mostly late adolescents. This was congruent with a previous sleep study in the same setting (Sanya et al., 2015). In Maiduguri, north-east Nigeria, the adolescents were mostly middle adolescents (Oyeyemi et al., 2016). In some other sleep studies among adolescents, the subjects were mostly early adolescents (Balogun et al., 2017, Pagel et al., 2007). Many respondents were in senior secondary school, and this was not surprising, considering the mean age.

All adolescents interviewed were either Moslems or Christians. This is much like the description from other studies, and is in line with the religious affiliations of the study setting (Omigbodun et al., 2010). Most respondents reported a significant impact of religion on their personal and family lives. Thus, religion may be resourceful in developing adolescent programmes that promote good eating and sleeping habits.

Most adolescents hailed from monogamous families. They were mostly raised by their parents, with whom they lived, and they did not work to earn money. The proportion of respondents from a polygamous family settingagreed with 15.8% in Ibadan (Balogun et al., 2017) but is

less than 27% found in an older Ibadan study (Omigbodun et al., 2010). This difference may have been due to the sampling frame, with the Balogun study sampling Ibadan North, and the Omigbodun study surveying all 11 districts of Ibadan.

5.1.2 Sleep Quality and its Correlates

5.1.2.1 Sleep Quality

Respondents described their sleeping conditions and experience. Close to half of the respondents had a sleeping partner, who was usually their mother or a sibling. In a previous Ilorin study among adolescents, the findings were similar (Sanya et al., 2015).

Majority of the adolescents had a global PSQI score > 5, indicating poor sleep. Poor sleep, as measured by the PSQI score, was less prevalent in an Ibadan adolescent study (Balogun et al., 2017). Sleep problems are prevalent among adolescents (Gradisar et al., 2011, Carskadon et al., 1998, Hayley et al., 2015); Ipsiroglu found sleep difficulties among most young adolescents(Ipsiroglu et al., 2002).

More than half of the students had inadequate sleep, even though they mostly reported subjective good sleep quality. Optimal sleep, which is operationally defined as a sleep duration of 9 hours and above (Gradisar et al., 2011, Iglowstein et al., 2003), was achieved by 98 respondents (19%). This prevalence was much less than that reported by Sanya (2015).

Optimal sleep is rarely achieved by most adolescents the world over, as noted in the West (Wolfson and Carskadon, 1998), East Asia (Chung and Cheung, 2008), and other parts of Africa(Doku et al., 2013). Nigeria is no exception: authors in southeast(Maduabuchi et al., 2014) and southwest Nigeria (Balogun et al., 2017) have also made this observation. Doubtless, adolescents in Ilorin share similarities with those in other climes.

5.1.2.2 Factors associated with Poor Sleep

This study did not replicate the previous finding that poor sleep becomes more prevalent with increasing age (John et al., 2017, Hayley et al., 2015), or that poor sleep is commoner among adolescent students in the senior class (Fukuda and Ishihara, 2001, Balogun et al., 2017).This may suggest that there are other factors asides from age or class that mediate poor sleep among in-school adolescents.

Poor sleep was commoner among boys. This was quite surprising, given the observation from global literature that poor sleep is more prevalent among girls (Doku et al., 2013, Megdal and Schernhammer, 2007). Nonetheless, recent local studies by Sanya *et al.* (2015) and Balogun (2017) found no association of sleep pattern with gender among adolescents. It is possible that boys stay up late into the night using the internet. Future studies are required to establish the relationship between gender and sleep quality.

Poor sleep was associated with being the first born. This stands to reason, as first-born children often have responsibilities conferred on them. Furthermore, in this study, adolescents living at home had poor sleep compared with those living in hostels. The regimented sleep-wake routine in hostels may have helped adolescents there to achieve good sleep. In contrast, adolescents living at home have more freedom to sleep late.

5.1.3 Perception of Adolescents about Sleeping Habits

The perceived duration of normal sleep of adolescents was between 8 and 10 hours at night. However, this did not seem to influence their sleep habits, as many adolescents had inadequate sleep. Snoring was reported among some of the adolescents. The FGDs revealed that their perception about snoring was mixed. Some adolescents thought it was a reflection of good sleep. Misperception about sleep behaviour may influence help-seeking behaviour.

A core theme was the perception that adolescents sleep late because they are chatting with their phones. The linear relationship between mobile phone use and poor sleep among young people has been described(Owusu-Marfo, 2017, Akbari et al., 2016, Sanya et al., 2015). Similarly, a positive correlation between PSQI scores and the Problematic Internet Use Scale has been described in a recent study (Evcılı and Yurtsever, 2018). These studies underscore the modern influence of information technology and communication on sleep parameters of adolescents. The perceived effect of this common behaviour was daytime somnolence and inattention in school the day after. This agrees with studies that have shown the resultant negative effect of delayed night sleep(Gradisar et al., 2011). Late-night reading was also perceived to be associated with consequent daytime drowsiness and poor academic performance. This perceived association aligned with the observation of Gillen-O'Neel*et al.* (2013).

Some paranoid cultural/ religious beliefs about sleep mirrored those described in a similar African setting (Aina and Famuyiwa, 2007). Another study found significant differences between the perception of Caucasians and that of black immigrants in Australia about sleep difficulties (Clever and Bruck, 2013). Those of African descent were less likely to attribute sleep problems to psychological phenomena. Dysfunctional perception about sleep may affect the solutions sought, should sleep problems arise.

5.1.4 Eating Disorders

Very few adolescents met the threshold for eating disorders and none of these respondents met the criteria for diagnosis of an eating disorder, such as anorexia nervosa, bulimia nervosa or binge-eating disorder. This is not surprising, given the findings in sub-Saharan Africa. An African investigator in Liberia observed in the 1980s that these disorders were uncommon in individuals of African extraction (Nwaefuna, 1981).

More recently, in a survey of 668 secondary school girls in Ghana, none met the criteria for bulimia nervosa using the Bulimic Investigatory Test, Edinburgh. Likewise, those with BMI ≤ 17.5kg/m^2 mostly had a physical illness such as malaria which explained their weight, while the rest had morbid self-starvation due to religious fasting. No respondent had amenorrhoea, and none had the fear of becoming obese (Bennett et al., 2004).

Authors in East Africa have argued in favour of the rarity of anorexia nervosa in Africa and other non-western climes. The cumulative clinical experience of 320 years among Kenyan psychiatrists revealed no more than 16 cases of anorexia among Africans, only one of which was male (Njenga and Kangethe, 2004).

In South Africa, a case series of three African females with anorexia was reported(Szabo et al., 1995). None of these patients was adolescent; they were all in their twenties. The authors admitted that prior to their study, there were no more 3 case reports of eating disorders in African literature, which detailed the experience of a Zimbabwean (Buchan and Gregory, 1984)and 3 Nigerians (Nwaefuna, 1981, Famuyiwa, 1988).

Eating disorders are rare in India. Thinness in India is traditionally associated with poverty and so it is not socially desirable. An old Indian study (King and Bhugra, 1989) which gave the prevalence of eating disorders as 29% using the EAT-26 instrument has been criticised (Bhola and Kapur, 2003). Bhola and Kapur argued that the prevalence was inflated because the questions may have been readily misunderstood by South Indian rural communities.

Findings from these studies are congruent with the present study. The relative western circumscription of eating disorders have led West African authors to posit that these disorders should perhaps be viewed as culture-bound syndromes (Aina and Morakinyo, 2011).

5.1.5 Nutritional Status of the Respondents

Both undernutrition (underweight, stunting) and overnutrition (overweight) were observed among the respondents, with similar prevalence of both nutritional indicators. This reflects the concept of "two faces of malnutrition" (Eckholm and Record, 1976). It is unsurprising, as this pattern has been described as the trend in sub-Saharan Africa, since a nutrition transition began (Ulijaszek, 2006, WHO, 2003). Similar findings have been reported in other studies (Omigbodun et al., 2010).

5.1.5.1 Overweight/Obesity

Most respondents had normal BMI. Only one respondent was obese; one in five respondents was overweight. This was higher than values obtained insouthwest (Omigbodun et al., 2010) as well as southeast Nigerian study (Ogechi et al., 2007). However, it was comparable to findings from similar settings in other parts ofnorth-central Nigeria, specifically in Kwaraand Kogi States(Ejike et al., 2010).

Overweight was more prevalent in south-south Nigeria. In Benin City, the prevalence of overweight and obesity were significantly high in adolescent girls, especially those who skipped meals (Onyiriuka, Umoru & Ibeawuchi 2013). The BMI figures were even higher among the university students in that geopolitical zone and the southern fattening diet was suggested as a cultural explanation (Nmor et al., 2013). Another plausible consideration is that these weight differences may also have genetic underpinnings.

Anthropometric measurements among Nigerian samples are known to vary with tribal and ethnic differences (Kuku-Shittu et al., 2016).A child and adolescent study done in four southern Nigerian cities appears to confirm this observation (Obong et al., 2012).

The prevalence of overweight among adolescents in Ghana was also low (Peltzer and Pengpid, 2011). Another Ghanaian study revealed similar findings, while a more recent Ghanaian study showed higher prevalence of overweight (Adamu et al., 2012; Mogre and Kanyiri, 2013). Overnutrition was also uncommon among Ugandan adolescents (Peltzer and Pengpid, 2011).In Jamaica, however, many overweight adolescents were found, and the prevalence there was closer to western figures(Menifield et al., 2008).

5.1.5.2 Underweight

Underweight was prevalent in this study. This confirmed previous findings from north-central Nigeria (Jimoh, 2016). Another study in northwest Nigeria has indicated a similarly high prevalence of underweight among adolescents (Hafiz et al., 2012).

In northeast Nigeria, the prevalence was much higher (Oyeyemi et al., 2016). The authors contextualised the nutritional status in light of physical activity levels of the underweight adolescents who were reportedly more active than their counterparts with normal weight or obesity. However, there are other possible reasons for the high prevalence of underweight, notably genetic influences. Many of the adolescents in the far north are Hausa or Fulani, who are often relatively tall and slim. Environmental factors may include dietary habits. Broader considerations may include poverty and the political unrest brought about by terrorist actions in that region, both of which may affect nutrition.

Accordingly, the prevalence of underweight was higher than the observation from south-south Nigeria (Onyiriuka, Umoru & Ibeawuchi 2013; Obong et al., 2012).

5.1.5.3 Factors associated with Overweight/ Underweight

Being overweight had no association with gender. This was surprising because it contrasted many studies which have shown overweight BMI to be prevalent among girls. Such studies include those carried out in Nigeria (Ojofeitimi et al.,2011; Omigbodun et al., 2010; Onyiriuka et al., 2013), elsewhere in West Africa (Mogre and Kanyiri,2013), East Africa (Okoth, 2013), South Africa (Monyeki et al.,2008) and around the world (Dekelbaum and Williams, 2001; Olds et al. 2010).

Overweight was more prevalent among those who had gone to see the school counsellor. This may be an opportunity for counsellors to address nutritional issues among students. This observation underscores the need to train school counsellors on the subject of adolescent nutrition.

The present study did not replicate the association of mother's educational level with adolescents' nutritional habits (Datar and Nicosia, 2012; Salvy et al., 2012) and nutritional status (Wamani et al., 2004, Omigbodunet al.,2010).Nonetheless, the observed association with the family type and rearing environment emphasize the role of parents in encouraging good dietary habits among adolescents.

5.1.5.4 Stunting

The prevalence of stunting in this study was lower than what was reported in a similar setting a decade ago (Omigbodun et al., 2010), and much lower than observations from two decades ago in Nigeria and other developing countries (Mukuddem-Petersen and Kruger, 2004, Venkaiah et al., 2002). This stands to reason, as economic gains could have led to better nutritional status in that period of time.

Stunting was prevalent among males. This is consistent with observations among African adolescents in West, East and South Africa (Omigbodun et al., 2010, Kabubo-Mariara, Ndenge & Mwabu, 2009, Kruger, Pretorius & Schutte, 2010). There is strong evidence to suggest that the nutritional status of male adolescents in developing countries tends to be poorer than that of females (WHO, 2000).

Stunting was prevalent in late adolescence and this agrees findings from an Ibadan study (Omigbodun et al., 2010). Stunting was also prevalent in the senior class, and the age distribution may explain this.

Respondents whose parents were unmarried and those in polygamous family settings had a higher prevalence of stunting. This is congruent with the previous Ibadan study (Omigbodun et al., 2010). These family characteristics may represent disadvantaged situations in which adolescents' nutrition is compromised.

This study did not find an association between stunting and indicators of socioeconomic status such as mother's education and occupation, as described by other authors (Kruger, Pretorius & Schutte, 2010). Family factors appeared to be more prominent in the present study.

Previous studies have linked stunting with a risk for overweight (Keino et al., 2014), and this further underscores the importance of the present findings on stunting and the need to institute preventive measures against stunting and poor nutritional status among school-going adolescents.

5.1.6 Dietary Habits

Very few adolescents had eaten meat the day before they were seen. This was congruent with the meal pattern in an earlier study where 40.2% of adolescents in Kwara had not taken fish or meat in the week before the interview and most of them ate eggs (boiled/fried) only 1 to 2 times

in the week (Jimoh, 2016). Similar findings were described among adolescents in Cameroon, more than half of whom had less than the daily protein requirements (Dapi et al.,2011). This eating pattern may be a contributing factor to undernutrition.

Some adolescents skipped meals. Lunch was the most commonly skipped meal, followed by breakfast. This was somewhat different a previous study which found breakfast as the most commonly skipped meal (Onyiriuka, Umoru & Ibeawuchi 2013). Some students skipped lunch because they were busy with extracurricular academic activities. Some skipped breakfast because they did not want to be late for school. Finance may have been a reason for some skipped meals, preventing some students from being able to purchase a meal in school.

Snacking was common among all adolescents, with buns being the commonest snack taken. Similar findings were described by Afolabi *et al* in 2013. This observation also agrees with a study by Anyika *et al.* (2009) which found snacking to be significantly higher among adolescent girls, when compared with university undergraduates, who were more likely to be young adults.

Previous studies have linked snacking and meal skipping with obesity (Jahns, Siega-Riz & Popkin, 2001, Onyiriuka, Umoru & Ibeawuchi 2013). Further studies are required to confirm this connection in Ilorin.

5.1.7 Perception of Adolescents about Eating Habits

Eating with other family members did not seem to be popular among the adolescents in this study. They perceived that eating alone would make them freer, particularly if they thought their eating etiquette was deficient. This brings to the fore, concerns about the cohesiveness of families, which could have been fostered in part, by the culture of eating a meal together (Maynard and Harding, 2010; Sweeting and West, 2005; Viere, 2001).

Snacking was a favourite habit of many participants. Some adolescents perceived it as age-appropriate behaviour. Others simply viewed snacking in school as a practical solution to skipping breakfast. Meal skipping, eating outside the home environment and snacking are common eating patterns among adolescents (Leeet al., 2016).

Yet others, particularly girls, preferred snacks to food because they perceived the habit to be helpful in maintaining a trim shape. This was unsurprising because meal skipping and snacking are known to be commoner among female adolescents (Musaiger et al.,2011). Furthermore, snacking is commoner among female adolescents who skip meals (Jodhun et al., 2016).

The perceived ideal body shape for girls was to be slender without being overly thin. The perception about overweight/ obesity was negative, and being fat was described in different FGDs are “irritating”. Obese people are commonly teased. Weight-based teasing is associated with mental health sequelae, including depressed mood, feelings of worthlessness and suicidal ideation, even after controlling for the actual body weight (Eisenburg et al., 2003). Therefore, mental health promotion for adolescents should include nutrition education.

5.1.8 Limitations

Discussions of the above findings are best viewed through the lens of limitations. Being a cross-sectional study, interpretation of the observations is limited. Micronutrient analysis may have provided additional information on the nutritional status. Only public schools were surveyed; there may be students in private schools who have eating disorders. There are adolescents in special circumstances who are not students, such as institutionalised adolescents, pregnant adolescents, etc. Further studies would be required to determine their eating and sleeping habits.

Nonetheless, the present study provides some recent information about the behavioural patterns of in-school adolescents in north central Nigeria.

5.2CONCLUSION

The pattern of sleeping habits was determined. Three out of every five adolescents in this study were poor sleepers, using the Pittsburgh Sleep Quality Index. Some of these students had misperceptions about normal sleep behaviour, and chatting late into the night was common. Only a few respondents had optimal sleep (≥ 9 hours), and more than half had inadequate sleep (< 7 hours).

Poor sleep was associated with male gender, being the first born, residence at home, and being in a class with <40 pupils. Living at home, as against hostel living, was predictive of poor sleep. The dietary pattern was starchy, with rice and yam being the common meals, and meat being rather uncommon. Common dietary habits included meal skipping and snacking. Nutritional status was derived from anthropometric indicators. There were 20%, 21% and 12.1% overweight, underweight and stunted respondents, respectively.

Overweight ~~BMI~~ was associated with early adolescence, Christianity, junior class, residence at home and prior visit to the school counsellor. Underweight BMI was significantly associated with older adolescence, Islam, senior class, living at home and having not gone to see the school counsellor before. Stunting was significantly associated with being in the senior class, living in the hostel, late adolescence, being male, from a polygamous family and being raised by an unmarried parent. Being in the senior class and being raised in a polygamous family setting were predictive of stunting.

The qualitative aspect of the study revealed the perception of adolescents about their sleeping and eating habits. Snacking and meal skipping were perceived to be unavoidable, and indeed desirable. Negative perceptions about obesity were prevalent. Staying up late at night was perceived to be common among adolescents, and social media use was a perceived major reason for this.

Despite the psychosocial challenges of eating and sleeping problems, some students did not know there was a guidance counsellor in their school. Even more disturbingly, one out of every four students was not willing to see the school guidance counsellor.

Eating and sleeping habits provide a window into the mental health status of in-school adolescents. Results of this study are consistent with the observation that many adolescents have unhealthy eating habits and inadequate sleep. Bringing these issues to the front burner may well be the needed first step in a journey of good adolescent mental health in northcentral Nigeria.

5.3 RECOMMENDATIONS

1. Students need to maximise their school counsellors, who have the prerogative of promoting school mental health. A healthy relationship between school teachers and in-school adolescents promotes social cognition and allows students to learn about needful healthy habits.

2. Adolescents need to eat balanced diet and reduce their frequency of snacking.

3. Mental health promotion in secondary schools is needful for healthy perceptions about body image, eating and sleeping habits.

4. Integrating mental health into existing active systems in schools: For instance, many schools already have drug-free clubs. These can be expanded to address other mental health needs, such as sleep hygiene and eating habits. Misperception about sleep behaviour and unhealthy views about body image may be modified through the knowledge received at such meetings.

5. School counsellors need to be approachable and accessible in order to be acceptable to in-school adolescents.

6. Part of the orientation for first year junior students should be to provide information about the presence and role of the school counsellor.

7. Findings from this research should be disseminated to schools through the Ministry of Education and Human Capital Development.

8. The Parents-Teachers Association is a rich platform for mental health advocacy. Child and adolescent mental health specialists may address parents and teachers at this forum on eating habits and sleep hygiene. This may be effective if parents are made to see the implication on academic performance. School counsellors may also be trained for this role.

9. State Governments can embrace the responsibility of providing a free meal for students. School feeding programmes have been implemented in different countries. In Nigeria, the

Federal Government launched the programme in September 2005, but it has not been successfully implemented in Kwara State.

10. At the national level, the development of a school mental health policy has been initiated by the Association for Child and Adolescent Psychiatrists and Allied Professionals. The implementation of such a policy will go a long way in ensuring the furtherance of mental health among in-school adolescents.

11. The government should sign the mental health bill, which has now gone through the second public hearing, into Law.

Word Count: 3,736

REFERENCES

Abdulmumeen, H.A., Risikat, A.N. and Sururah, A.R., 2012. Food: Its preservatives, additives and applications. *International Journal of Chemical and Biochemical Sciences, 1*(2012), pp.36-47.

Abiola, O.J., 2017. Evaluating Patterns of Snacks Consumption, Energy Nutrient Intakes Among In-School Adolescent Students in Ibadan, Nigeria. *Technology (IJOSEET), 2*(6), pp.38-44.

Adamu, A., Adjei, G. & Kubuga, C. 2012. Effects of dietary patterns on the nutritional status of upper primary school children in Tamale metropolis.

Adesina, A. F., Peterside, O., Anochie, I. & Akani, N. A. 2012. Weight status of adolescents in secondary schools in Port Harcourt using Body Mass Index (BMI). *Italian Journal of Pediatrics,* 38**,** 31.

Afolabi, W., Towobola, S.K., Oguntona, C.R.B. and Olayiwola, I.O., 2013. Pattern of fast food consumption and contribution to nutrient intakes of Nigerian University students. *International Journal of Educational Research, 1*(5), pp.1-10.

Aina, O. F.&Famuyiwa, O. 2007. Ogun Oru: a traditional explanation for nocturnal neuropsychiatric disturbances among the Yoruba of Southwest Nigeria. *Transcultural Psychiatry,* 44**,** 44-54.

Aina, O. F.& Morakinyo, O. 2011. Culture–bound syndromes and the neglect of cultural factors in psychopathologies among Africans. *African Journal of Psychiatry,* 14**,** 278-285.

Akbari, R., Zarei, E., Dormohammadi, A. & Gholami, A. 2016. Influence of unsafe and excessive use of mobile phone on the sleep quality. *Scientific Journal of Kurdistan University of Medical Sciences,* 21**,** 81-90.

Al Subaie, A., Al Shammari, S., Bamgboye, E., Al-Sabhan, K., Al-Shehri, S. & Bannah, A. R. 1996. Validity of the Arabic version of the Eating Attitude Test. *International Journal of Eating Disorders,* 20**,** 321-324.

Aloba, O. O., Adewuya, A. O., Ola, B. A. & Mapayi, B. M. 2007. Validity of the Pittsburgh sleep quality index (PSQI) among Nigerian university students. *Sleep Medicine,* 8**,** 266-270.

Ambrosini, P. J. 2000. Historical development and present status of the schedule for affective disorders and schizophrenia for school-age children (K-SADS). *Journal of the American Academy of Child & Adolescent Psychiatry,* 39**,** 49-58.

American Academy of Sleep Medicine. 2014. *International Classification of Sleep Disorders*.

American Psychiatric Association 2013. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®),* American Psychiatric Pub.

Andersen, R. E., Crespo, C., Bartlett, S. J. & Pratt, M. 1998. Television Watching and Fatness in Children—Reply. *JAMA,* 280**,** 1230-1232.

Anyika, J.U., Uwaegbute, A.C., Olojede, A.O. and Nwamarah, J.U., 2009. Nutrient intakes of adolescent girls in secondary schools and universities in Abia State of Nigeria. *Pakistan Journal of Nutrition*, *8*(10), pp.1596-1602.

Babatunde, R.O., Omotesho, O.A. and Sholotan, O.S., 2007. Socio-economic characteristics and food security status of farming households in Kwara State, North-Central Nigeria. *Pakistan Journal of Nutrition*, *6*(1), pp.49-58.

Balogun, F. M., Alohan, A. O. & Orimadegun, A. E. 2017. Self-reported sleep pattern, quality, and problems among schooling adolescents in southwestern Nigeria. *Sleep Medicine,* 30**,** 245-250.

Beiser, M., Burr, W., Collomb, H. & Ravel, J.-L. 1974. Pobough Lang in Senegal. *Social Psychiatry,* 9**,** 123-129.

Bemporad, J. R. 1997. Cultural and historical aspects of eating disorders. *Theoretical Medicine,* 18**,** 401-420.

Bennett, D., Sharpe, M., Freeman, C. & Carson, A. 2004. Anorexia nervosa among female secondary school students in Ghana. *The British Journal of Psychiatry,* 185**,** 312-317.

Bhola, P. & Kapur, M. 2003. Child and adolescent psychiatric epidemiology in India. *Indian Journal of Psychiatry,* 45**,** 208.

Bruch, H. 1978. *Anorexia Nervosa: The Golden Cage*, Harvard University Press.

Buchan, T. & Gregory, L. D. 1984. Anorexia nervosa in a black Zimbabwean. *The British Journal of Psychiatry,* 145**,** 326-330.

Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R. & Kupfer, D. J. 1989. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research,* 28**,** 193-213.

Campbell, I.G., Burright, C.S., Kraus, A.M., Grimm, K.J. and Feinberg, I., 2017. Daytime sleepiness increases with age in early adolescence: a sleep restriction dose–response study. *Sleep*, *40*(5), p.zsx046.

Carskadon, M. A., Wolfson, A. R., Acebo, C., Tzischinsky, O. & Seifer, R. 1998. Adolescent sleep patterns, circadian timing, and sleepiness at a transition to early school days. *Sleep,* 21**,** 871-881.

Chung, K. F. & Cheung, M. M. 2008. Sleep-wake patterns and sleep disturbance among Hong Kong Chinese adolescents. *Sleep,* 31**,** 185-194.

Clever, M. N. & Bruck, D. 2013. Comparisons of the sleep quality, daytime sleepiness, and sleep cognitions of Caucasian Australians and Zimbabwean and Ghanaian black immigrants. *South African Journal of Psychology*, 43**,** 81-93.

Cole, T.J., 1985. A critique of the NCHS weight for height standard. *Human Biology*, pp.183-196.

Cole, T.J., Freeman, J.V. and Preece, M.A., 1995. Body mass index reference curves for the UK, 1990. *Archives of Disease in Childhood*, *73*(1), pp.25-29.

Cole, T.J., Bellizzi, M.C., Flegal, K.M. and Dietz, W.H., 2000. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ*, *320*(7244), p.1240.

Corbin, J.M. and Strauss, A., 1990. Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, *13*(1), pp.3-21.

Dapi, L.N., Hörnell, A., Janlert, U., Stenlund, H. and Larsson, C., 2011. Energy and nutrient intakes in relation to sex and socio-economic status among school adolescents in urban Cameroon, Africa. *Public Health Nutrition*, *14*(5), pp.904-913.

Das, J.K., Salam, R.A., Thornburg, K.L., Prentice, A.M., Campisi, S., Lassi, Z.S., Koletzko, B. and Bhutta, Z.A., 2017. Nutrition in adolescents: physiology, metabolism, and nutritional needs. *Annals of the New York Academy of Sciences*, *1393*(1), pp.21-33.

Datar, A. and Nicosia, N., 2012. Junk food in schools and childhood obesity. *Journal of Policy Analysis and Management*, *31*(2), pp.312-337.

De Onis, M. & Blössner, M. 2003. The World Health Organization global database on child growth and malnutrition: methodology and applications. *International Journal of Epidemiology*, 32, 518-526.

De Onis M., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C. & Siekmann, J. 2007. Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization*, 85**,** 660-667.

Deckelbaum, R.J. and Williams, C.L., 2001. Childhood obesity: the health issue. *Obesity Research*, *9*(S11), pp.239S-243S.

Delisle, H., Chandra-Mouli, V. & de Benoist, B. 2001. Should adolescents be specifically targeted for nutrition in developing countries? To address which problems, and how. *Bulletin of the World Health Organization***,** 1-26.

Dibley, M.J., Goldsby, J.B., Staehling, N.W. and Trowbridge, F.L., 1987. Development of normalized curves for the international growth reference: historical and technical considerations. *The American Journal of Clinical Nutrition*, *46*(5), pp.736-748.

Doku, D., Koivusilta, L. &Rimpelä, A. 2013. Sleep and Its Association With Socioeconomic Status, Health, and Risky Behaviors Among G hanaian School Children. *Journal of Research on Adolescence*, 23**,** 706-715.

Dubovsky, S., Sadock, B. & Sadock, V. 2005. Comprehensive textbook of Psychiatry.

Eckholm, E. & Record, F. 1976. *The two faces of malnutrition*, Worldwatch Institute.

Eisenberg, M.E., Neumark-Sztainer, D. and Story, M., 2003. Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatrics &Adolescent Medicine*, *157*(8), pp.733-738.

Ejike, C., Ugwu, C. & Ezeanyika, L. 2010. Physical growth and nutritional status of a cohort of semi-urban Nigerian adolescents. *Pakistan Journal of Nutrition*, 9**,** 392-397.

Ene-Obong, H., Ibeanu, V., Onuoha, N. and Ejekwu, A., 2012. Prevalence of overweight, obesity, and thinness among urban school-aged children and adolescents in southern Nigeria. *Food and Nutrition Bulletin*, *33*(4), pp.242-250.

Engel, B., Reiss, N. S. & Dombeck, M. 2007. Eating disorders. Historical understandings. *Mental Health***,** 17.

Erikson, E. H. 1994. *Identity: Youth and Crisis*, WW Norton & Company.

Evcili, F. & Yurtsever, I. 2018. Problematic Internet Use, Sleep Quality and Academic Achievement In Turkish University Students. *Adolescent Psychiatry*, 8**,** 185-194.

Famuyiwa, O. 1988. Anorexia nervosa in two Nigerians. *Acta Psychiatrica Scandinavica*, 78**,** 550-554.

Fukuda, K. & Ishihara, K. 2001. Age-related changes of sleeping pattern during adolescence. *Psychiatry and Clinical Neurosciences*, 55**,** 231-232.

Gannicott, K., 2008. Kwara State: Education Sector Analysis. *Second Draft, March*.

Garrett, J.L. and Ruel, M.T., 2005. Stunted child–overweight mother pairs: prevalence and association with economic development and urbanization. *Food and Nutrition Bulletin*, *26*(2), pp.209-221.

George, E. & Engel, L. 1980. The clinical application of the biopsychosocial model. *The American Journal of Psychiatry*, 5**,** 535-544.

Gibson, R.S. and Ferguson, E.L., 2008. An interactive 24-hour recall for assessing the adequacy of iron and zinc intakes in developing countries HarvestPlus Technical Monograph 8. *Washington and Cali: IFPRI and, CIAT*.

Gillen O'Neel, C., Huynh, V. W. & Fuligni, A. J. 2013. To study or to sleep? The academic costs of extra studying at the expense of sleep. *Child Development,* 84**,** 133-142.

Glanz, K., Sallis, J. F., Saelens, B. E. & Frank, L. D. 2005. Healthy nutrition environments: concepts and measures. *American Journal of Health Promotion,* 19**,** 330-333.

Gollogly, L. 2009. *World Health Statistics 2009,* World Health Organization.

Gradisar, M., Gardner, G. & Dohnt, H. 2011. Recent worldwide sleep patterns and problems during adolescence: a review and meta-analysis of age, region, and sleep. *Sleep Medicine,* 12**,** 110-118.

Hafiz, A., Ibrahim, A.Y. and Atiku, M.K., 2012. Nutritional and health status of adolescents from selected secondary schools in Katsina State, Nigeria. *Nigerian Journal of Nutritional Sciences*, *33*(2), pp.11-14.

Hamill, P.V., Drizd, T.A., Johnson, C.L., Reed, R.B., Roche, A.F. and Moore, W.M., 1979. Physical growth: national center for health statistics percentiles. *The American Journal of Clinical Nutrition*, *32*(3), pp.607-629.

Hayley, A. C., Skogen, J. C., Øverland, S., Wold, B., Williams, L. J., Kennedy, G. A. & Sivertsen, B. 2015. Trajectories and stability of self reported short sleep duration from adolescence to adulthood. *Journal of Sleep Research,* 24**,** 621-628.

Herculano-Houzel, S. 2015. Decreasing sleep requirement with increasing numbers of neurons as a driver for bigger brains and bodies in mammalian evolution. *Proceedings of the Royal Society B: Biological Sciences,* 282**,** 20151853.

Hoffman, D.J., 2001. Obesity in developing countries: causes and implications. *Food Nutrition and Agriculture*, *28*, pp.35-44.

IBM Corps 2013. IBM SPSS statistics for windows, version 22.0. *Armonk, NY: IBM Corp*.

Iglowstein, I., Jenni, O. G., Molinari, L. & Largo, R. H. 2003. Sleep duration from infancy to adolescence: reference values and generational trends. *Pediatrics-Springfield-,* 111**,** 302-307.

Ipsiroglu, O. S., Fatemi, A., Werner, I., Paditz, E. & Schwarz, B. 2002. Self-reported organic and nonorganic sleep problems in schoolchildren aged 11 to 15 years in Vienna. *Journal of Adolescent Health,* 31**,** 436-442.

Jackson, M., Samms-Vaughan, M. and Ashley, D., 2002. Nutritional status of 11–12-year-old Jamaican children: coexistence of under-and overnutrition in early adolescence. *Public Health Nutrition*, *5*(2), pp.281-288.

Jahns, L., Siega-Riz, A.M. and Popkin, B.M., 2001. The increasing prevalence of snacking among US children from 1977 to 1996. *The Journal of Pediatrics*, *138*(4), pp.493-498.

Jimoh, L. O. 2016. *Food consumption patterns, physical activity and overweight and obesity among secondary school students in Kwara State, Nigeria.* School of Applied Human Sciences, Kenyatta University.

Jodhun, B. M., Pem, D. & Jeewon, R. 2016. A systematic review of factors affecting energy intake of adolescent girls. *African Health Sciences,* 16**,** 910-922.

John, B., Bellipady, S. S. & Bhat, S. U. 2017. Sleep promotion program for improving sleep behaviors among adolescents in selected schools: a randomized controlled trial. *International Journal of Mental Health Promotion,* 19**,** 51-68.

Johnston, L. D. &O'Malley, P. M. 1985. Issues of validity and population coverage in student surveys of drug use. *NIDA Res Monogr,* 57**,** 31-54.

Kabubo-Mariara, J., Ndenge, G.K. and Mwabu, D.K., 2009. Determinants of children's nutritional status in Kenya: evidence from demographic and health surveys. *Journal of African Economies*, *18*(3), pp.363-387.

Kaplan, B. & Sadock, V. 2007. Comprehensive Textbook of Psychiatry. Philadephia. Philadelphia: Lippincott Company.

Kaplan, H. I. & Sadock, B. J. 1988. *Synopsis of Psychiatry: Behavioral Sciences Clinical Psychiatry*, Williams & Wilkins Co.

Kaufman, J., Birmaher, B. & Axelson, D. 2016. Schedule for Affective Disorders and Schizophrenia for School-Aged Children: Present and Lifetime Version (K-SADS-PL) DSM-5 November 2016 Working draft. New Haven, Yale University. *Child and Adolescent Research and Education*.

Kaufman, J., Birmaher, B., Brent, D., Rao, U., Flynn, C., Moreci, P., Williamson, D. & Ryan, N. 1997. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. *Journal of the American Academy of Child & Adolescent Psychiatry,* 36**,** 980-988.

Keino, S., Plasqui, G., Ettyang, G. & van den Borne, B. 2014. Determinants of stunting and overweight among young children and adolescents in sub-Saharan Africa. *Food and Nutrition Bulletin,* 35**,** 167-178.

King, M. B. & Bhugra, D. 1989. Eating disorders: lessons from a cross-cultural study. *Psychological Medicine,* 19**,** 955-958.

Kruger, H.S., Pretorius, R. and Schutte, A.E., 2010. Stunting, adiposity, and low-grade inflammation in African adolescents from a township high school. *Nutrition*, *26*(1), pp.90-99.

Kuczmarski, R.J., 2000. CDC growth charts; United States.

Kuku-Shittu, O., Onabanjo, O., Fadare, O. and Oyeyemi, M., 2016. *Child malnutrition in Nigeria: evidence from Kwara State*(Vol. 33). Intl Food Policy Res Inst.

Kumar, M., Huang, K.Y., Othieno, C., Wamalwa, D., Madeghe, B., Osok, J., Kahonge, S.N., Nato, J. and McKay, M.M., 2018. Adolescent pregnancy and challenges in Kenyan context: Perspectives from multiple community stakeholders. *Global Social Welfare*, *5*(1), pp.11-27.

Kurz, K. M. & Johnson-Welch, C. 1994. The nutrition and lives of adolescents in developing countries: Findings from the nutrition of adolescent girls research program. *International Center for Research on Women. ICRW Reports and Publications*, 1.

KwaraStateGovernment 2013. Kwara State Ministry of Education and Human Capital Development, Annual school census, 2012/2013.

KwaraStateGovernment 2014. Kwara State Government, Ilorin East.

Lateef, O.J., Njogu, E., Kiplamai, F., Haruna, U.S. and Lawal, R.A., 2016. Breakfast, food consumption pattern and nutritional status of students in public secondary schools in Kwara State, Nigeria. *Pakistan Journal of Nutrition*, *15*(2), p.140.

Lee, J.S., Mishra, G., Hayashi, K., Watanabe, E., Mori, K. and Kawakubo, K., 2016. Combined eating behaviors and overweight: Eating quickly, late evening meals, and skipping breakfast. *Eating Behaviors*, *21*, pp.84-88.

Lewandowski, A. S., Ward, T. M. & Palermo, T. M. 2011. Sleep problems in children and adolescents with common medical conditions. *Pediatric Clinics*, 58**,** 699-713.

Lifshitz, F., Tarim, O. & Smith, M. M. 1993. Nutrition in adolescence. *Endocrinology and Metabolism Clinics*, 22**,** 673-683.

Macfarlane, S. B. 1997. Conducting a descriptive survey: 2. Choosing a sampling strategy. *Tropical Doctor*, 27**,** 14-21.

Maduabuchi, J. C., Obu, H. A., Chukwu, B. F., Aronu, A. E., Manyike, P. C. & Chinawa, A. T. 2014. Sleep pattern and practice among adolescents school children in Nigerian secondary schools. *The Pan African Medical Journal*, 19.

Maslow, A. H. 1943. A theory of human motivation. *Psychological Review*, 50**,** 370.

Maynard, M.J. and Harding, S., 2010. Ethnic differences in psychological well-being in adolescence in the context of time spent in family activities. *Social Psychiatry and Psychiatric Epidemiology*, *45*(1), pp.115-123.

Megdal, S. P. & Schernhammer, E. S. 2007. Correlates for poor sleepers in a Los Angeles high school. *Sleep Medicine*, 9**,** 60-63.

Menifield, C. E., Doty, N. & Fletcher, A. 2008. Obesity in America. *ABNF Journal,* 19.

Mukuddem-Petersen, J. and Kruger, H.S., 2004. Association between stunting and overweight among 10–15-y-old children in the North West Province of South Africa: the THUSA BANA Study. *International Journal of Obesity*, *28*(7), pp.842-851.

Mwangi, A. M., Den Hartog, A. P., Foeken, D. W., van't Riet, H., Mwadime, R. K. & van Staveren, W. A. 2001. The ecology of street foods in Nairobi. *Ecology of Food and Nutrition,* 40**,** 497-523.

Mogre, V., Gaa, P.K. and Abukari, R.N.S., 2013. Overweight, obesity and thinness and associated factors among school-aged children (5-14 years) in Tamale, Northern Ghana. *European Scientific Journal, ESJ*, *9*(20).

Mond, J., Van den Berg, P., Boutelle, K., Hannan, P. and Neumark-Sztainer, D., 2011. Obesity, body dissatisfaction, and emotional well-being in early and late adolescence: findings from the project EAT study. *Journal of Adolescent Health*, *48*(4), pp.373-378.

Monyeki, K.D., Monyeki, M.A., Brits, S.J., Kemper, H.C.G. and Makgae, P.J., 2008. Development and tracking of body mass index from preschool age into adolescence in rural South African children: Ellisras Longitudinal Growth and Health Study. *Journal of Health, Population, and Nutrition*, *26*(4), p.405.

Musaiger, A., Bader, Z., Al-Roomi, K. and D'Souza, R., 2011. Dietary and lifestyle habits amongst adolescents in Bahrain. *Food &Nutrition Research*, *55*(1), p.7122.

Must, A. and Anderson, S.E., 2006. Body mass index in children and adolescents: considerations for population-based applications. *International Journal of Obesity*, *30*(4), pp.590-594.

Nago, E.S., Lachat, C.K., Huybregts, L., Roberfroid, D., Dossa, R.A. and Kolsteren, P.W., 2010. Food, energy and macronutrient contribution of out-of-home foods in school-going adolescents in Cotonou, Benin. *British Journal of Nutrition*, *103*(2), pp.281-288.

NationalPopulationCommission 2006. *Official Gazette on the National and State Provisional Totals: 2006 Census.*Lagos, Nigeria, Federal Government Printer.

National Population Commission 2007. Population census data Ilorin,Kwara State provisional total census.

Nigerian National Code of Health Research Ethics 2007. National Code of Health Research Ethics. *In:* Department of Health Planning and Research, F. M. O. H. (ed.). Garki-Abuja.

Njenga, F. & Kangethe, R. 2004. Anorexia nervosa in Kenya. *East African Medical Journal,* 81**,** 188-193.

Nmor, J., Nwaka, K.H. and Nmor, J.C., 2014. Eating behaviours of University students in Southern Nigeria: An evaluation of sex differences. *Science*, *2*(1), pp.23-37.

Nwaefuna, A. 1981. Anorexia nervosa in a developing country. *The British Journal of Psychiatry,* 138**,** 270-271.

Nyakurwa, C., Gasura, E. & Mabasa, S. 2017. Potential for quality protein maize for reducing proteinenergy undernutrition in maize dependent Sub-Saharan African countries: A review. *African Crop Science Journal,* 25**,** 521-537.

Ogechi, U. P., Akhakhia, O. I. & Ugwunna, U. A. 2007. Nutritional status and energy intake of adolescents in Umuahia urban, Nigeria. *Pakistan Journal of Nutrition,* 6**,** 641-646.

Ogunkunle, M. O. & Oludele, A. 2013. Food intake and meal pattern of adolescents in school in Ila Orangun, south-west Nigeria. *South African Journal of Clinical Nutrition,* 26**,** 188-193.

Oguntona, C. R. & Kanye, O. 1995. Contribution of street foods to nutrient intakes by Nigerian adolescents. *Nutrition and Health,* 10**,** 165-171.

Ojofeitimi, E. O., Olugbenga-Bello, A. I., Adekanle, D. A. & Adeomi, A. A. 2011. Pattern and determinants of obesity among adolescent females in private and public schools in the Olorunda Local Government Area of Osun State, Nigeria: a comparative study. *Journal of Public Health in Africa,* 2.

Okoth, A. M. 2013. *Overweight and Obesity In Relation To Dietary Intake and Physical Activity among Adolescents Aged 15-19 Years Attending Day Secondary Schools in Kisumu District.* Masters Thesis of Applied Human Sciences, Kenyatta University; Nairobi, Kenya.

Olds, T.S., Tomkinson, G.R., Ferrar, K.E. and Maher, C.A., 2010. Trends in the prevalence of childhood overweight and obesity in Australia between 1985 and 2008. *International Journal of Obesity,* 34(1), p.57.

Omigbodun, O. O., Adediran, K. I., Akinyemi, J. O., Omigbodun, A. O., Adedokun, B. O. & Esan, O. 2010. Gender and rural–urban differences in the nutritional status of in-school adolescents in south-western Nigeria. *Journal of Biosocial Science,* 42**,** 653-676.

Onyiriuka, A.N., Umoru, D.D. and Ibeawuchi, A.N., 2013. Weight status and eating habits of adolescent Nigerian urban secondary school girls. *South African Journal of Child Health*, *7*(3), pp.108-111.

Osemwenkha, S. 1997. Olokun among the Edo. Case study of a culture bound syndrome. *Nigerian Journal of Psychiatry,* 1**,** 204-208.

Owusu-Marfo, J. 2017. *The Impact of the Use of Smart Mobile Devices on Sleep Quality among Health Trainees at College of Health and Well-Being, Kintampo-Ghana.*

Oyeyemi, A. L., Ishaku, C. M., Oyekola, J., Wakawa, H. D., Lawan, A., Yakubu, S. & Oyeyemi, A. Y. 2016. Patterns and associated factors of physical activity among adolescents in Nigeria. *PloS one,* 11**,** e0150142.

Pagel, J. F., Forister, N. & Kwiatkowki, C. 2007. Adolescent sleep disturbance and school performance: the confounding variable of socioeconomics. *Journal of Clinical Sleep Medicine,* 3**,** 19-23.

Peltzer, K. and Pengpid, S., 2011. Overweight and obesity and associated factors among school-aged adolescents in Ghana and Uganda. *International Journal of Environmental Research and Public Health*, *8*(10), pp.3859-3870.

Potischman, N. 2003. Biologic and Methodologic Issues for Nutritional Biomarkers. *The Journal of Nutrition,* 133**,** 875S-880S.

Puig-Antich, J. & Chambers, W. 1978. The schedule for affective disorders and schizophrenia for school-age children (Kiddie-SADS). *New York: New York State Psychiatric Institute*.

Reeves, C.W., Nicholls, A.R. and McKenna, J., 2009. Stressors and coping strategies among early and middle adolescent premier league academy soccer players: Differences according to age. *Journal of Applied Sport Psychology*, *21*(1), pp.31-48.

Russell, G. 1979. Bulimia nervosa: an ominous variant of anorexia nervosa. *Psychological Medicine,* 9**,** 429-448.

Sachs, J.D., 2012. From millennium development goals to sustainable development goals. *The Lancet*, *379*(9832), pp.2206-2211.

Salvy, S.J., De La Haye, K., Bowker, J.C. and Hermans, R.C., 2012. Influence of peers and friends on children's and adolescents' eating and activity behaviors. *Physiology &Behavior*, *106*(3), pp.369-378.

Sanya, E., Kolo, P., Desalu, O., Bolarinwa, O., Ajiboye, P. & Tunde-Ayinmode, M. 2015. Self-reported sleep parameters among secondary school teenagers in middle-belt Nigeria. *Nigerian Journal of Clinical Practice,* 18**,** 337-341.

Schmidhuber, J. & Shetty, P. 2005. Nutrition transition, obesity and noncommunicable diseases: drivers, outlook and concerns. *SCN News,* 29.

Semple, D. & Smyth, R. 2013. *Oxford Handbook of Psychiatry*, OUP Oxford.

Shi, Z., Lien, N., Kumar, B.N., Dalen, I. and Holmboe-Ottesen, G., 2005. The sociodemographic correlates of nutritional status of school adolescents in Jiangsu Province, China. *Journal of Adolescent Health*, *37*(4), pp.313-322.

Sweeting, H. and West, P., 2005. Dietary habits and children's family lives. *Journal of Human Nutrition and Dietetics*, *18*(2), pp.93-97.

Szabo, C., Berk, M., Tlou, E. & Allwood, C. 1995. Eating disorders in black South African females. *South African Medical Journal*, 85.

Thompson-McCormick, J.J., Thomas, J.J., Bainivualiku, A., Khan, A.N. and Becker, A.E., 2010. Breakfast skipping as a risk correlate of overweight and obesity in school-going ethnic Fijian adolescent girls. *Asia Pacific Journal of Clinical Nutrition*, *19*(3), p.372.

Tunde-Ayinmode, M., Adegunloye, O., Ayinmode, B. & Abiodun, O. 2012. Psychiatric disorders in children attending a Nigerian primary care unit: functional impairment and risk factors. *Child and Adolescent Psychiatry and Mental Health*, 6**,** 28.

Tzioumis, E. & Adair, L. S. 2014. Childhood dual burden of under-and overnutrition in low-and middle-income countries: a critical review. *Food and Nutrition Bulletin*, 35**,** 230-243.

Ulijaszek, S. 2001. Ethnic differences in patterns of human growth in stature.

Ulijaszek, S., Johnston, F. E. & Preece, M. A. 1998. The Cambridge Encyclopedia of Human Growth and Development. *Journal of Applied Nutrition*, 50**,** 134-134.

Ulijaszek, S. J. 2006. The international growth standard for children and adolescents project: environmental influences on preadolescent and adolescent growth in weight and height. *Food and Nutrition Bulletin*, 27**,** S279-S294.

Venkaiah, K., Damayanti, K., Nayak, M.U. and Vijayaraghavan, K., 2002. Diet and nutritional status of rural adolescents in India. *European Journal of Clinical Nutrition*, *56*(11), pp.1119-1125.

Viere, G.M., 2001. Examining family rituals. *The Family Journal*, *9*(3), pp.285-288.

Wamani, H., Tylleskär, T., Åstrøm, A.N., Tumwine, J.K. and Peterson, S., 2004. Mothers' education but not fathers' education, household assets or land ownership is the best predictor of child health inequalities in rural Uganda. *International Journal for Equity in Health*, *3*(1), p.9.

Waterlow, J. C., Buzina, R., Keller, W., Lane, J., Nichaman, M. & Tanner, J. 1977. The presentation and use of height and weight data for comparing the nutritional status of groups of children under the age of 10 years. *Bulletin of the World Health Organization*, 55**,** 489.

Watts, S.J., 1984. Rural women as food processors and traders: eko making in the Ilorin area of Nigeria. *The Journal of Developing Areas*, *19*(1), pp.71-82.

Wells, J.C.K., Coward, W.A., Cole, T.J. and Davies, P.S.W., 2002. The contribution of fat and fat-free tissue to body mass index in contemporary children and the reference child. *International Journal of Obesity*, *26*(10), pp.1323-1328.

World Health Organization n.d., *Growth Reference 5 to 19 years*, World Health Organization, viewed 12 November 2019, <https://www.who.int/growthref/who2007_weight_for_age/en/>.

World Health Organization, 1995. Physical status: The use of and interpretation of anthropometry, Report of a WHO Expert Committee.

World Health Organization, 2000. *What about boys? A literature review on the health and development of adolescent boys* (No. WHO/FCH/CAH/00.7). Geneva: World Health Organization.

World Health Organization 2003. Nutrition in transition: globalization and its impact on nutrition patterns and diet-related diseases. *New York: Author*.

World Health Organization 2005. *Nutrition in adolescence: issues and challenges for the health sector: issues in adolescent health and development*, Citeseer.

WHO Multicentre, 2006. Growth, Reference, Study, Group. *WHO Child Growth Standards: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: Methods and development. Geneva: World Health Organization*, *312*.

World Health Organization 2007. International classification of diseases and related health problems, 10th revision. *http://www. who. int/classifications/apps/icd/icd10online*.

World Health Organization, 2010. Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide.

Wolfson, A. R. & Carskadon, M. A. 1998. Sleep schedules and daytime functioning in adolescents. *Child Development,* 69**,** 875-887.

Young, K. S. & Rogers, R. C. 1998. The relationship between depression and Internet addiction. *Cyberpsychology &Behavior*, 1**,** 25-28.

APPENDICES

APPENDIX I

Serial Number: __ __ __ __

Today's Date: __ __/__ __/__ __

SOCIODEMOGRAPHIC AND SCHOOL HEALTH QUESTIONNAIRE IN ENGLISH

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

SECTION I

Personal Information

1. Name of School:

2. Class:

3. Where do you live?

4. What is your date of birth? Date of Birth: _____ _____ _____

Day Month Year

5. How old are you?

6. Are you a boy or a girl? (a) boy (b) girl

7. Do you practise any religion? No Yes

8. Please write down the exact place you attend for worship

_____

(a) Islam (b) Orthodox Christian (c) Pentecostal Christian (d) Traditional religion (e) Other

9. How much does the teaching of your religion guide your behaviour?

(a) Very much (b) much (c) Just a little (d) Not at all

10. How much does the teaching of your religion guide your family life?

(a) Very much (b) much (c) Just a little (d) Not at all

Family Information

11. Family Type:

(a) Monogamous (b) Polygamous

12. Number of Mother's Children:

13. Number of Father's Children:

14. What is your position among your father's children?

15. What is your position among your mother's children?

16. Marital Status of Parents:

(a) Married (b)Separated/Divorced (c) Father is dead (d) Mother is dead (e) Mother & Father are dead

17. How many husbands has your mother had?

18. Who do you live with presently?

(a) Parents (b) Mother (c) Father (d) Grandparents (e) Grandmother

(f) Grandfather (g) Other [please specify] _____

19. Who brought you up from your childhood?

(a) Parents (b) Mother (c) Father (d) Grandparents (e) Grandmother

(f) Grandfather (g) Other [please specify] _____

20. How many different people have you left your parents to live with from your childhood?____

21. 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)
_____	_____	_____
_____	_____	_____
_____	_____	_____

22. Do you do any kind of work to earn money before or after school? Yes No

23. If yes, please describe what you do _____

24. Level of Father's Education

(a) No Formal Education (b) Koranic School (c) Primary School (d) Secondary School (e) Post-Secondary (Non-University) (f) University Degree and above (e) I do not know

25. Occupation of Father: [Write the exact occupation] _____/ I do not know

26. Level of Mother's Education

(a) No Formal Education (b) Koranic School (c) Primary School (d) Secondary School (e) Post-Secondary (Non-University) (f) University Degree and above (e) I do not know

27. Occupation of Mother: [Write in the exact occupation] _____/ I do not know

28. Do you like your family? Yes No

29a. If Yes, Why? _____

29b. If No, Why? _____

School-Related Questions

30. Do you like your school? Yes/ No

31. How many children are there in your class?

32. Do you do well academically? Yes No

33a. If Yes, explain_____

33b. If No, explain_____

34. Are you having difficulties with your teachers? Yes No

35. If yes, what sort of difficulties?

_____

36. Do you have guidance counsellors in your school? Yes No

37. Have you ever gone to see them? Yes No

38. If yes, what did you go to see them for?

_____

39. If you have a problem at school would you go to the guidance counsellor for help?

Yes No

40a. If yes, why would you go?

_____

40b. If no, why not?

_____

APPENDIX II

The Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual habits during the past month only. Your answers should indicate the most reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night? BED TIME___

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? NUMBER OF MINUTES_____

3. During the past month, what time have you usually gotten up in the morning? GETTING UP TIME_____

4. During the past month, how many hours of ACTUAL SLEEP did you get at night? (This may be different than the number of hours you spent in bed)

HOURS OF SLEEP PER NIGHT_____

For each of the remaining questions, check the one best response. Please answer ALL Questions.

5. During the past month, how often have you had trouble sleeping because you……..

a) **Cannot get to sleep within 30 minutes**

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

b) **Wake up in the middle of the night or early morning**

Not during the	Less than	Once or twice	Three or more

past month_____ once a week_____ a week_____ times a week_____

c) **Have to get up to use bathroom**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

d) **Cannot breathe comfortably**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

e) **Cough or snore loudly**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

f) **Feel too cold**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

g) **Feel too hot**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

h) **Had bad dreams**

Not during the Less than Once or twice Three or more

past month_____ once a week_____ a week_____ times a week_____

i) **Have pain**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

j) Other reason (s), please describe_____

_____

How often during the past month have you had trouble sleeping because of this?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

6. **During the past month, how would you rate your sleep quality overall?**

Very good_____ Fairly good_____ Fairly bad_____ Very bad_____

7. **During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

8. **During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?**

Not during the Less than Once or twice Three or more

past month_____ once a week_____ a week_____ times a week_____

9. **During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?**

No problem at all____ Only a very slight problem___ Somewhat of a problem_____ A very big problem_____

10. **Do you have a bed partner or room mate?**

No bed partner or room mate_____ Partner/room mate in other room_____ Partner in same room, but not same bed_____ Partner in same bed_____

If you have a room mate or bed partner, ask him/her how often in the past month you have had……

a) **Loud snoring**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

b) **Long pauses between breaths while asleep**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

c) **Legs twitching or jerking while you sleep**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

d) **Episodes of disorientation or confusion during sleep**

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

e) **Other restlessness while you sleep; please describe**_____

_____

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

APPENDIX III

The Kiddies schedule for affective disorders and schizophrenia (section on eating disorders).

APPENDIX IV

WHO Growth References for ages 5 to 19 years

APPENDIX V
INFORMATION SHEET

INTRODUCTION

This study is designed to assess the eating and sleeping habits of secondary school students in Ilorin. Some explanation of what the study entails is hereby provided. This will clearly state what you will do if you choose to participate in the study. It will also reveal the risks and benefits to you. Ultimately, the information was sufficient to help you decide whether or not you would like to take part in the study.

The information is provided in this consent form to help you understand the study. If you decide to proceed with the study, you were expected to sign your name or make your mark on this form.

PURPOSE OF THE STUDY

The purpose of this study is to determine the eating and sleeping patterns of adolescent students in Ilorin. As many as 500 students was involved in this study.

STUDY PROCEDURES

Questionnaires was used to gather information from participants. If you are eligible and willing to take part in the study, you were served two questionnaires by the researcher or research assistant.It is expected that you will provide accurate responses, as much as possible. Kindly answer all questions as best as you can.

VOLUNTARY PARTICIPATION

You have a choice to take part in this study or decline at any point of the study. While your participation would be appreciated, it does not confer any advantage(s) on you over those who refuse to participate. There was no negative consequence, disadvantage or punishment for refusing to participate in the study.

RISKS AND/OR DISCOMFORTS

It is not envisaged that this study was harmful to you. However, if there is any potential risk/discomfort you notice, please feel free to share with the researcher. Your concerns were gladly resolved.

BENEFITS

This study may help with the understanding of mental health of children and adolescents in secondary schools. It may also be useful in improving the school mental health services in Ilorin.

FINANCIAL COSTS TO YOU

You will not spend any money to be involved in this study.

CONFIDENTIALITY

Your personal information will not be divulged to anyone. Your name or any otherdetail that can be traced back to you will not be on any form where your responses are recorded. After this research has been conducted, the data reportedwill not include the personal details (such as name and address) of any participant.

SPONSORSHIP

The study was carried out solely with the resources of the researcher (self-sponsorship).

CONFLICT OF INTEREST

Any compromising situation that appears to influence the decisions of the researcher, thus affecting the appropriate manner in which the research is conducted, was avoided.

PROBLEMS OR QUESTIONS

If you ever have any questions about this study, you may contact the researcher Dr. A.B Omotoso, Department of Behavioural Sciences, University of Ilorin Teaching Hospital, Ilorin. Telephone number: 08034340230. E-mail: ayotundeomotoso@gmail.com.

Thank you.

APPENDIX VI

INFORMED CONSENT FORM

I, Dr. A.B. Omotoso, am a mental health specialist from the University of Ilorin Teaching Hospital carrying out a research about eating and sleeping disorders among secondary school students in Ilorin. The information gotten will help with the understanding of the mental health of school children and adolescents, including your child.

Participation is voluntary and there is no consequence for refusing to participate. There was no collection of any samples whatsoever (such as blood or body fluids) from your child. Participants will only be required to answer some questions. Students who participate will have the benefit of free medical consultation in the areas of the questions asked.

If you agree and give permission for your child to answer our questions, please sign below:

_____

Parent's Signature and Date

_____

Researcher's Signature and Date

APPENDIX VII

INFORMED ASSENT FORM

I,_____ hereby give my assent to participate in this study titled 'Prevalence, patterns and perception of eating and sleeping habits among in-school adolescents in Ilorin, Nigeria'. The aim and objectives of this study have been explained to me by the researcher in the presence of a witness. The implication of my participation has also been explained to me. I understand that there is no risk in my participation or refusal and the information divulged in this study will remain confidential and for research purpose only. I also understand that I can opt out of the study at any point. I agree to participate in this study voluntarily without coercion, undue influence or intimidation.

_____

Student's Signature and Date

_____

Witness' name, Signature and Date

_____

Researcher's Signature and Date

APPENDIX VIII

Ethical approval for the study