DIAGNOSTIC AND BIOPSYCHOSOCIAL PROFILES OF CHILDREN AND ADOLESCENTS AT THE CHILD AND ADOLESCENT MENTAL HEALTH CLINIC OF THE UNIVERSITY COLLEGE HOSPITAL, IBADAN

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DECLARATION

I hereby declare that this is my original work and that this dissertation or part of it has not been and will not be submitted to any other institution for any other award.

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SUPERVISORS' CERTIFICATION

This is to certify that this research project was carried out under our supervision by **Dr Alakeji, Isaac Aderibigbe** with **MATRICULATION NUMBER 115138**, a student of the Centre for Child and Adolescent Mental Health (CCAMH), University of Ibadan.

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DEDICATION

This research project is dedicated to God who is my light, my salvation, and the strength of my life. He is the one who teaches my hands to war and to prosper, and without Him I can do nothing.

To 'my little baby girl', my love and my best friend. For your support and exceptional understanding and patience when I was not there for you because I was so busy, mercie beaucoup ma Cherie.

To my parents through whom I came to the world and whose supports and prayers have contributed to my achievements in life so far.

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KEY TO ABBREVIATIONS

CAMH   Child and Adolescent Mental Health

CAMHS   Child and Adolescent Mental Health Services

IACAPAP   International Association for Child and Adolescent Psychiatry and Allied Professions

LAMIC   Low- and Middle-Income Countries

MNS   Mental, Neurological, and Substance use

UNICEF   United Nations International Children's Emergency Fund

WHO   World Health Organization

WHR   World Health Report

ABSTRACT

Background

Recently, a couple of facilities for child and adolescent mental health services have been established across the country, however, little or no attention is being given to documentation of the biological, psychological, and social factors that are associated with the occurrence of mental disorders in this vulnerable population, despite the fact that it is well established that biological, psychological and social factors are involved in the development of mental disorders, especially in childhood and adolescence. Currently, there is a dearth of data on the pattern of mental, neurological, and substance use (MNS) disorders presenting at child and adolescent mental health services in Nigeria. A previous study in this facility examined the prevalence and pattern of psychosocial problems and life events among patients attending the child and adolescent clinic. However, biological factors were not explored. Another study focused specifically on determining the obstetric risk factors in the same child and adolescent population. In the latter study, other forms of biological risk factors were not examined. It is, however, important to document important biological factors such as family history of mental illness, comorbid medical conditions, neonatal complications, early childhood illnesses, and head injury, because of their various roles in the presentation, management, and outcome of mental health problems in children and adolescents.

Methodology

Using a retrospective cross-sectional design, a retrospective audit was carried out on the medical records of new referrals at the Child and Adolescent Mental Health outpatient facility of the University College Hospital, Ibadan who were 19 years old and younger from 1 January 2016 to 31 December 2019. New referrals who underwent detailed assessment, including consultant's review of final diagnosis were included. A total of 267 case notes fulfilled the eligibility criteria and were reviewed in this study. A semi-structured proforma was used to

extract data from the case notes of the patients on various aspects of sociodemographic characteristics, biological and psychosocial factors, diagnoses, management, and other clinical variables. Data was designed and analysed using the statistical package for social sciences (SPSS version 25.0) and significance level was set at 0.05 or less.

Results

The ages of the study patients ranged from 1 to 19 years with a mean age of 11.21 (SD 5.06) years, the majority (62.5%) of whom were adolescents (10-19 years). There were 149 (58.9%) boys and 104 (41.1%) girls. The duration of illness without hospital treatment was greater than 12 months in 77.9% of cases and 37.6% of the patients had received nonorthodox methods of care before presentation. The most common diagnoses during the four years were intellectual disability (34.4%) and autism spectrum disorder (ASD) (14.2%). Psychiatric disorders were comorbid in 43.1% of cases and co-existing chronic medical conditions in 15.8% of cases. The prevalence of biological and psychosocial factors was 68.0% and 75.9% respectively, which were mainly delivery/birth complications (45.5%) and educational problems (78.6%) respectively. There was significant association between diagnostic categories and age group (p<0.001), gender (p=0.014), and educational status of the patients (p<0.001). ASD and ADHD were significantly more likely to be diagnosed among the children (1-9 years); whereas, psychotic disorders and mood disorders occurred more commonly among the adolescents (10-19 years). Similarly, boys were more likely to present with ASD compared to girls; whereas, mood disorders were more common among girls. Children and adolescents with intellectual disability, ASD, psychotic disorders, mood disorders, and 'other' mental disorders were more likely to have a history of a biological risk factor (x2=44.537; p<0.001). A vast majority (80.2%) of the patients with a diagnosis of intellectual disability had biological risk factors. Patients with ASD (56.3%) and intellectual disability (46.9%) were more likely to have

suffered delivery complications (p<0.05), while those with mood disorders (41.7%) were more likely to have a family history of mental illness (p<0.05).

Conclusion

The findings from the current study illustrate that the pattern of psychopathology at the CAMHC is similar to previous findings. Comorbidity is common and several psychosocial factors and biological risk factors such as obstetric complications are usually associated with mental health disorders in children and adolescents. Delayed presentation and prior nonorthodox interventions continue to be common findings in Nigerian CAMH clinics. These findings underscore the importance of using the biopsychosocial model of case formulation in the management of mental health problems in children and adolescents; the necessity of providing quality maternal and child health services in promoting mental health and preventing mental health problems; and the necessity of educational interventions for children with neurodevelopmental disorders and all children with mental health problems such as special school placement.

Key words: Diagnostic, biopsychosocial, CAMH clinic.

Word count: 750

1.1 General Background

The United Nations Convention on the Rights of the Child defines child as "a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier" (Bäckström, 1989). According to the World Health Organization (WHO), adolescents are those people between 10 and 19 years of age (WHO, 2014). However, though age is convenient for the purpose of definition, it is only one characteristic that delineates this period of development (WHO, 2017).

Childhood is the time for children to be in school and at play, to grow strong and confident with the love and encouragement of their family and an extended community of caring adults (UNICEF, 2005). It is a precious time that means much more than just the space between birth and the attainment of adulthood (UNICEF, 2005). This is because the childhood period is a developmental period; it is a critical period because this is the period in life when the brain develops most rapidly, has a high capacity for change, and the foundation is laid for health and wellbeing for the rest of the individual's life (WHO, 2020). This includes mental health, because "talking about health without mental health is a little like tuning an instrument and leaving a few discordant notes" (WHR, 2001).

The World Health Organization (WHO) defines mental health as "a state of wellbeing in which an individual realizes his or her own abilities, can cope with normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (Herrman *et al.*, 2005). The WHO also defines child and adolescent mental health as the capacity to achieve and maintain optimal psychological functioning and wellbeing, and states that it is directly related to the level reached and competence achieved in psychological and

social functioning (WHO, 2005). This implies that mental health problems are associated with psychological and social functional disability with consequent economic losses due to the high disease burden.

Therefore, the mental health of children and adolescents is of paramount global importance. "From both demographic and epidemiological perspectives – as well as from the burden of disease – mental disorders of children and adolescents represent a key area of concern" (WHO, 2003). Mental health problems in the developmental years, if left untreated, has a deleterious impact on the development of the affected individuals, their educational attainment, and potential to live fulfilling and productive, healthy lives. This in turn, is detrimental to the development of the nations.

Studies have shown that biological, psychological and social factors are associated with mental disorders in childhood and adolescence (Omigbodun, 2004; Kieling *et al.*, 2011). The Biopsychosocial model of case formulation was developed and named by Engel, describing it as a "way of thinking that enables the physician to act rationally in areas now excluded from a rational approach" (Engel, 1980). The model is the most common model for formulating a case in mental health circles and has been widely adopted throughout medicine (Rey, 2014). This model insists that all three domains – biological, psychological, and social – must be accounted for in formulating a case. The biological dimension includes factors such as family history, genetics, medical comorbidities, and physical development; while the psychological dimension includes emotional development, personality structure, patterns of cognition, and insight. Likewise, the social dimension includes issues such as peer relationships, family dynamics, socioeconomic issues (Rey, 2014).

1.2 Problem Statement

About 2.2 billion (1 in 3) of the world's population are children and adolescents, and about 90% of them are in low-and-middle-income countries (LAMIC), where they constitute about 50% of the population (UNICEF, 2008). Studies have shown that up to 20% of these children and adolescents suffer from a disabling mental disorder; up to 50% of all mental health disorders start by 14 years of age but most cases are undetected and untreated (WHR, 2001; Belfer, 2008). Furthermore, mental health conditions account for 16% of the global burden of disease and injury in people aged 10-19 years; suicide is the third leading cause of death in people aged 15-19 years old; and depression is the leading cause of disability in adolescents (WHR, 2001; Belfer, 2008). Besides, children and adolescents in LAMIC frequently encounter conflicts, disasters, forced labour, trafficking, and other especially difficult circumstances (Kieling *et al.*, 2011; Cortina *et al.*, 2012; Atilola *et al.*, 2015). In Sub-Saharan Africa, prevalence rates of child and adolescent mental health problems range between 9.5% and 19.8% (Cortina *et al.*, 2012). A recent comparative study in Northern Nigeria reported rates as high as 37.0% and 57.7% among children and adolescents in public schools and street children respectively (Abubakar-Abdullateef *et al.*, 2017).

Generally, mental disorders are associated with severe economic losses due to high cost of treatment and functional disability (Esan *et al.*, 2012). Therefore, given the fact that mental health problems in childhood and adolescence periods usually have long lasting impacts into adult life, the public health implications of failure to address mental, neurological, and substance use (MNS) disorders in children and adolescents in low-resource settings is huge and enduring in nature (Kieling *et al.*, 2011). Furthermore, because a disproportionately high number of children and adolescents live in low resource settings, provision of mental health services targeted at this population in LAMIC right from early development stages is of global health priority (Kieling *et al.*, 2011).

However, "throughout the history of the WHO Mental Health Programme the attention dedicated to children and adolescents has not been commensurate with that dedicated to adults and the elderly" (WHO, 2003). In Nigeria, like in other low-resource countries, there is obvious neglect of child and adolescent mental health, while much attention is being given to their physical health (Kieling *et al.*, 2011; Atilola *et al.*, 2015). In Nigeria, there are very few facilities where child and adolescent mental health services are available (Omigbodun, 2004). In the same vein, little or no attention is being given to documentation of the etiological factors (biological, psychological, and social) associated with the occurrence of mental disorders in this vulnerable population (Omigbodun, 2004), despite the fact that it is well established that biological, psychological and social factors are involved in the development of mental disorders, especially in childhood and adolescence (Omigbodun, 2004; Kieling *et al.*, 2011).

1.3 Justification and Relevance of The Study

Currently, there is a dearth of data on the pattern of mental, neurological, and substance use (MNS) disorders presenting at child and adolescent mental health services (CAMHS) in Nigeria (Omigbodun, 2004; Tunde-Ayinmode, 2010; Chukwujekwu, 2019). In a previous study in this facility, Omigbodun, (2004) examined the prevalence and pattern of psychosocial problems and life events among patients attending the child and adolescent clinic. The study identified problems with primary support group, especially separation from parents, as the most common psychosocial issue among the child and adolescent clinic population. However, biological factors were not considered. Another study by Omigbodun and Bella, (2004) was focused specifically on determining the obstetric risk factors among the same population. In the latter, other forms of biological risk factors were not examined. It is, however, important to document important biological factors such as family history of mental illness, comorbid medical conditions, early childhood illnesses, and head injury, because of their various roles in

the presentation, management, and outcome of mental health problems in children and adolescents.

Therefore, this study provides an update on previous findings in the same clinic population sixteen years earlier. It also provides a more encompassing data on the pattern of MNS disorders and common biological and psychosocial factors that are associated with the disorders. Such data should inform policy for CAMHS development, improvement of existing services, as well as serve as an advocacy tool for child and adolescent health policy initiatives in general.

1.4 Research Questions

The research questions for this study were as follows:

1. What is the pattern of presentations of MNS disorders at the CAMH clinic of University College Hospital, Ibadan from January 2016 to December 2019?

2. Are there associated biological and psychosocial factors of public health importance among the clinic population during the four-year period?

3. Is there any association between the diagnostic categories and the sociodemographic characteristics of the children and adolescents?

4. Is there any association between the diagnostic categories and the biological and psychosocial factors identified in the children and adolescents?

1.5 General and Specific Objectives

1.5.1 General Objective

The main objective of this study was to determine the pattern of MNS disorders and the associated biological and psychosocial factors among children and adolescents attending the CAMH outpatient facility at University College Hospital, Ibadan from January 2016 to December 2019.

1.5.2 Specific Objectives

1. To determine the pattern of presentations of MNS disorders at the CAMH clinic of University College Hospital, Ibadan from January 2016 to December 2019.

2. To identify the biological and psychosocial factors among the children and adolescents who were newly referred to the CAMH clinic of University College Hospital, Ibadan from January 2016 to December 2019.

3. To examine the association between the diagnostic categories and the sociodemographic characteristics of the children and adolescents.

4. To examine the association between the diagnostic categories and the identified biological and psychosocial factors.

Word count: 1529.

2.1 Childhood and Adolescence

According to the United Nations Convention on the Rights of the Child, a child is "a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier" (Bäckström, 1989). In Western history, after infancy children used to be viewed as little adults (Calhoun and deMause, 1974). However, children are not little adults, rather, childhood is a unique developmental stage.

Childhood is the time for children to be in school and at play, to grow strong and confident with the love and encouragement of their family and an extended community of caring adults (UNICEF, 2005). It is a precious time that means much more than just the space between birth and the attainment of adulthood (UNICEF, 2005). The childhood period is a developmental period; a critical period because it is the period in life when the brain develops most rapidly and has, high capacity for change, and the foundation is laid for health and wellbeing for the rest of the individual's life (Fisher *et al.*, 2011; WHO, 2020). This includes the mental health of individuals, families, and societies.

According to the World Health Organization (WHO), adolescents are those people between 10 and 19 years of age (WHO, 2014). Though age is convenient for the purpose of definition, it is only one of the characteristics that delineate this period of development (WHO, 2017). Adolescence is a stage of development that is associated with significant life events. It is a time of remarkable physiological, psychological and social changes. Adolescents take up new roles and are faced with new expectations, which require social and academic adjustments. According to Erik Erikson (Kemph, 1969), adolescence is a time of identity crisis and in his words *"a turning point of increased vulnerability and heightened potential"* (Kemph, 1969).

Most adolescents are free from psychiatric morbidities; however, the development of a mental health problem during this period has significant and enduring impact on morbidity and mortality (Fisher *et al.*, 2011). Therefore, this stage of development requires adequate mental health attention.

About 2.2 billion (1 in 3) of the world's population are children and adolescents, and about 90% of them are in low-and-middle-income countries (LAMIC), where they constitute about 50% of the population (UNICEF, 2008). In other words, most of the world's population of children and adolescents are in low-and-middle-income countries. Therefore, the public health implications of failure to address mental, neurological, and substance use disorders in children and adolescents in low-resource settings is huge and enduring in nature (Kieling *et al.*, 2011).

Normal development in childhood and adolescence is crucial for optimal mental health (Fisher *et al.*, 2011). This in turn influences the development of nations. However, children and adolescents in low-and-middle-income countries frequently encounter conflicts, disasters, forced labour, trafficking, and other especially difficult circumstances (Kieling *et al.*, 2011; Cortina *et al.*, 2012; Atilola *et al.*, 2015) which interfere with normal development.

2.2 Normal Child Development

Normal child development has been defined as average or "on-time" growth based on the attainment of specific physical, cognitive, linguistic, social-emotional, and behavioural milestones across specific stages (Rey, 2012). All of these five milestones of development are essential and should be attained at the appropriate stages of life for optimal mental health of children and adolescents.

Considering the origin of development, there has been an age-long debate about the interplay between nature and nurture, usually referred to as "nature-nurture debate." The main argument is whether our developmental outcomes are predetermined biologically from conception or our

developmental outcomes depend on the influences of environmental factors while growing up. However, recent scientific evidence from behaviour genetics suggests that both nature and nurture determine developmental outcomes (Rey, 2012; Fleming, 2020). Therefore, the actual issue is in what ways and to what extent nature and nurture each contributes to developmental outcomes across multiple characteristics and domains (Plomin *et al.*, 1995).

The most part of research on the role of nature and nurture in children's normal development has focused on temperament and intelligence. Temperament, which is mainly attributed to nature, is defined as stable and early appearing individual differences and is presumed to have strong biological roots (Rey, 2012). Intelligence also has a high heritability factor (Plomin *et al.*, 1995); however, this may vary according to environmental factors such as socioeconomic status (Turkheimer *et al.*, 2003). Some of the environmental differences vary between contexts (Rey, 2012). For example, communities vary in terms of resources and parenting styles vary between families, and parents may treat their children differently within the same family (Rey, 2012).

In addition, there are significant variations in the rates of development of children within and between the various developmental domains, with varying rates of development in cognitive versus social-emotional domains (Holmbeck *et al.*, 2010). For example, a child may demonstrate advanced linguistic development during toddlerhood, while he or she lags behind other children in developing motor coordination at this time, whereas he or she could have verbal abilities that are commensurate with peers during adolescence, while also demonstrating highly advanced motor coordination compared to others (Rey, 2012). Children usually continue to grow and change, and lapses in development and deviations from the norm at different points in time do not necessarily predict subsequent developmental deficits or delays because the concept of plasticity is an important characteristic of normal child development (Rey, 2012).

However, the concepts of **critical periods** and **sensitive periods** for normal development are worthy of note. It is believed that there is a critical period, a limited period of time that begins and ends abruptly during which a specific function develops. Findings reveal that if the conditions for development are not available during that time, it may be very difficult or even impossible to develop these functions later in life (Rey, 2012). For example, the first five years of life are critical for language development. On the other hand, a sensitive period refers to a period of time when it is easiest for children to develop a particular skill (Rey, 2012). It is regarded as a period of maximum sensitivity that starts and ends more gradually and is more amenable to recovery. For instance, though it is not impossible to learn a second language at any age, it is easier before age 6 and most older learners do not speak with a native accent (Rey, 2012).

In low-resource countries, children and adolescents live in poor conditions which compromise their development and mental health. "Poverty reduces all resources and increases the likelihood of low participation in formal education, and of early participation in income generation, including exploitative child labour" (Fisher *et al.*, 2011). Other challenges faced by children in low-resource countries include war and displacement, living on the street, being in conflict with the law, malnutrition, and infectious diseases. All of these have developmentally damaging effect and predispose the adolescents to mental health problems (Fisher *et al.*, 2011).

2.3 Determinants of Mental Health and Mental Health Problems of Children and Adolescents

Several biological, psychological, and social factors interact to influence mental health and mental health problems in children and adolescents, and these factors could serve has risk factors or protective factors in the development of mental health problems (Omigbodun, 2004; Omigbodun and Bella, 2004; Patel *et al.*, 2007; Al-Habeeb *et al.*, 2012). The

determinants of mental health and mental health problems are both personal factors and social environmental factors (Fisher *et al.*, 2011).

Individual Factors

The personal factors are largely biological and psychological in nature. According to Fisher *et al.*, (2011), the individual factors that contribute to mental health of adolescents include: their intellectual and motor skills; their physical health; their capacities to relate to others and maintain relationships; and their characteristic ways of responding to challenge and disappointment. Adolescents with abilities to learn and understand; to solve problems; to participate in physical activities; to trust others; to initiate social interactions and build relationships; and who have sufficient self-esteem to manage disappointment, are likely to have good mental health. Whereas, adolescents are rendered vulnerable to mental health problems if they have intellectual, learning, sensory or physical disabilities; lack social skills or have developmental difficulties that impair interpersonal functioning; or have low self-esteem and are unable to trust or relate well to others (Patel *et al.*, 2007; Remschmidt *et al.*, 2007).

In addition, adolescents are vulnerable to mental health problems in the face of poor nutrition, infectious diseases, and traumatic injuries, especially head injuries (Fisher *et al.*, 2011). Maternal perinatal complications are also commonly associated with mental health outcomes in children and adolescents (Omigbodun and Bella, 2004; Al-Habeeb *et al.*, 2012). The commonest obstetric risk factors identified by Omigbodun and Bella, (2004) included birth asphyxia (11%) and emergency caesarean sections (6%). Alcohol and substance abuse are strongly reciprocally related to poor mental health: those with mental health problems are more likely to abuse alcohol and other substances, and people who are abusing substances are

rendered vulnerable to mental health problems (Belfer and Nurcombe, 2007; Patel *et al.*, 2007).

Social environmental factors

The social environment of children and adolescents greatly affects their mental health (Rey *et al.*, 2000; Rubia and Smith, 2001; Omigbodun, 2004; Al-Habeeb *et al.*, 2012). According to Fisher *et al.*, (2011), the social environment includes the family, educational institutions and the wider community.

Mental health is protected in adolescents who live in families in which they feel valued and supported, where affection is expressed openly, relationships are characterised by trust and mutual respect, and opportunities to take responsibility and make a positive contribution to family life are provided and acknowledged (Fisher *et al.*, 2011). The mental health of adolescents is promoted in families that permit opportunities for the growth of independence and mastery of life-skills and self-care, but that maintain supervision and have consistent guidelines for protection of safety (Belfer and Nurcombe, 2007; Patel *et al.*, 2007). Risk of poor mental health is increased in adolescents who live in families in which there are poorly resolved hostile conflicts, critical coercion and interpersonal violence; inadequate parental caretaking, including attention to nutrition, safety, need for health care and emotional support; and limited parental supervision or involvement in relevant decision-making (Fisher *et al.*, 2011). The experience of physical, emotional and/or sexual abuse in childhood and in adolescence is consistently associated with significantly increased risk of mental health problems (Omigbodun, 2004; Gureje *et al.*, 2007; Fisher *et al.*, 2011). Parental substance abuse or other mental disorders is associated with compromised caretaking and higher risk of mental health problems in children and adolescents (Patel *et al.*, 2007; Remschmidt *et al.*, 2007).

Schools and other educational and social institutions such as sporting associations or interest clubs are important means of socialisation and milieus of participation for adolescents. Risk of poor mental health is higher in adolescents who constantly experience failure in educational settings or who have unassisted learning difficulties (Fisher *et al.*, 2011). The mental health of adolescents is poor in schools that lack supervisory structures and guidelines about acceptable behaviour to ensure a safe environment, and regular attendance and adherence to rules and regulations (Patel *et al.*, 2007; Remschmidt *et al.*, 2007). Mental health is protected and enhanced in educational institutions that have a philosophy of inclusiveness, that promote the right of all to equality of learning opportunities, and where achievement is rewarded (Fisher *et al.*, 2011). A curriculum that is individualised, in which opportunities are provided for each young person to experience mastery and growth, increase in knowledge and skills, feel socially included, receive constructive feedback, and be protected against humiliation and marginalisation is very important (Fisher *et al.*, 2011). Active strategies to detect and address intimidation, harassment and bullying are also crucial to the promotion of mental health. Adolescents who appreciate the value of education and have a sense of attachment to an educational organisation have generally better mental health (Patel *et al.*, 2007).

Omigbodun, (2004) documented the psychosocial issues in a child and adolescent mental health clinic population in Nigeria. A great majority (62.2%) of the new referrals to the clinic had significant psychosocial stressors in the year preceding presentation. Problems with primary support (e.g. separation with parents to live with relatives, disruption of the family, abandonment by mother, psychiatric illness in a parent, and sexual/physical abused) were the most common, occurring in 39.4% of the participants. This was followed by educational problems (30.7%), problems with social environment (8.7%), and economic problems (3.9%). Other psychosocial stressors (11.8%) were also identified. Furthermore, significantly

more children and adolescents with disruptive behaviour disorders and disorders such as enuresis, separation anxiety and suicidal behaviour had psychosocial stressors when compared to children with psychotic conditions, autistic disorder and epilepsy (χ^2 =9.6; p=0.048).

The core components informing a diagnostic formulation as highlighted by the International Association of Child and Adolescent Psychiatry and Allied Professionals (IACAPAP) are summarised in tables A and B.

Table 2.1a Core Components Informing a Diagnostic Formulation (Rey, 2014)

COMPONENT	DETAILS CAN INCLUDE:
Sources of information	Patient, collateral information, medical records
Chief complaint	What brought the patient in
History of present illness	Symptoms, course, severity, triggering events, pertinent negatives
Past psychiatric history	Previous evaluations, therapies, hospitalizations, medications and treatments; history of aggression or harm towards self or others; substance abuse history
Past medical history	Illnesses, hospitalizations, surgeries, and medications including folk and alternative medicine remedies, etc
Family psychiatric and medical history	Pertinent positives and negatives in the family's psychiatric and medical history, especially substance abuse, suicide, and cardiac history (e.g., sudden deaths)
Social history	Family constellation, peer relations, interactions with the law and social services, and key events such as immigration

Table 2.1b Core Components Informing a Diagnostic Formulation (continued) (Rey, 2014)

COMPONENT	DETAILS CAN INCLUDE:
Education history	Schools, grades, report cards, special or regular education, changes in schools, suspensions
Developmental history	Mother's pregnancy and labour, delivery, milestones during infancy; stages of motor, cognitive, social and behavioural development
Psychological testing	IQ, tests of adaptive functioning, speech and language evaluations
Mental status exam	
Assessment	Diagnoses, hypotheses of causality.
Plan	Treatment goals and options, other persons or agencies to contact.

Table 2.2 The Components of the Biopsychosocial Model (Rey, 2014)

BIOLOGICAL	PSYCHOLOGICAL	SOCIAL
• Family history	• Emotional development	• Family constellation
• Genetics	• Personality structure	• Peer relationships
• Physical development	• Self-esteem	• School
• Constitution	• Insight	• Neighbourhood
• Intelligence	• Defenses	• Ethnic influences
• Temperament	• Patterns of behaviour	• Socioeconomic issues
• Medical comorbidities	• Patterns of cognition	• Culture(s)
	• Responses to stressors	• Religion(s)
	• Coping strategies	

2.4 Child and Adolescent Mental Health Problems and Sociodemographic Characteristics

Studies have shown that the pattern of presentation of psychopathology varies with age and changes as childhood progresses to adolescence. For instance, depression, substance related disorders, and psychotic disorders are more prevalent in adolescents than in children (Oyewumi, 1989). Olashore *et al.*, (2017) found that ADHD and Autism were more frequently diagnosed in children aged between 5 and 9 years, while those aged between 14 and 17 years were more likely to present with psychotic disorders, depression, adjustment disorder, and substance related disorders.

A review of community-based studies in Sub-Saharan Africa suggests that psychological difficulties are slightly more common in boys than girls in community settings (Cortina *et al.*, 2012). In a meta-analysis of 7 out of 10 studies providing data for 9713 children aged 0 to 16 years from 6 countries in Sub-Saharan Africa, Cortina *et al.*, (2012) found that the weighted average for boys was 12.5% and for girls was 12.3%. Further review revealed that the male gender is consistently far more represented in child and adolescent mental health clinics than the female gender (Omigbodun, 2004; Omigbodun and Bella, 2004; Tunde-Ayinmode, 2010; Al-Habeeb *et al.*, 2012; Olashore *et al.*, 2017; Adnan *et al.*, 2019; Chukwujekwu, 2019). The male to female ratio is about 3:2 in Nigerian CAMH clinics (Omigbodun, 2004; Omigbodun and Bella, 2004; Chukwujekwu, 2019), which is similar to what obtains in other Low-and-Middle-Income-Countries (Olashore *et al.*, 2017; Adnan *et al.*, 2019). The gender difference was less marked in a study by Tunde-Ayinmode, (2010) in which 52% of the cohort was of the male gender, while 48% was female. It is however worthy of note that the facility was not a stand-alone CAMH clinic, a great majority (82%) of the patients were aged 14 to 19 years, and neurodevelopmental disorders were rarely seen (only one case of intellectual disability). Therefore, the narrow gender difference in the study may be explained by the preponderance

of adolescents and the absence of neurodevelopmental disorders in that cohort, as studies have shown that such disorders are more common in younger children as well as in boys.

Furthermore, the pattern of presentation of mental health problems at CAMH clinics varies with gender. Olashore *et al.*, (2017) carried out a retrospective investigation of information from the medical records of 238 patients aged 17 years and younger at the national psychiatric hospital in Botswana. The authors found that ADHD, autism and schizophrenia were more common among boys, while depression and adjustment disorder occurred more commonly among their female counterparts. Similarly, Chukwujekwu, (2019) found that more boys presented with ADHD, Autism, intellectual disability, while schizophrenia, depression, and conversion disorder were more frequent among the girls presenting at a Nigerian teaching hospital.

2.5 Pattern of Presentation of Mental Health Problems in CAMH Clinics

Generally, psychiatrists providing outpatient CAMH services attend to a broadening array of complex, highly comorbid, and sometimes difficult-to-treat mental health problems (Staller, 2006). The pattern of presentation of mental, neurological, and substance use disorders among children and adolescents varies from one region to the other (Sadock *et al.*, 2014; Olashore *et al.*, 2017). In the United States of America, Staller, (2006) reviewed 1 282 outpatient records from 8 treatment facilities and found that externalising disorders (ADHD and/or Behaviour disorders) were the most commonly diagnosed, followed by internalising disorders (depression and anxiety disorders), and the disorders were highly comorbid (Staller, 2006). The most common diagnosis was ADHD (43%), followed by conduct disorder (30%) and depressive disorders (27%). Whereas, in Saudi Arabia, Al-Habeeb *et al.*, (2012) identified mental retardation (intellectual disability) as the most frequent diagnosis (30.2%), followed by anxiety disorders (16.1%) among attendees of three child psychiatric clinics. ADHD was less common (13.2%). This is similar to the findings of Adnan *et al.*, (2019) in Iraq from a cross-sectional

survey of 207 child and adolescent outpatients. Intellectual disability (44.0%) was the most common disorder followed by autism spectrum disorder (17.4%). A significant proportion (17.4%) of the ID cases had comorbidities, including behavioural and emotional problems, and anxiety disorders.

Also, there appears to be variations from clinic to clinic depending on settings. For example, in an Indian study, the most common mental disorder category was depressive spectrum (depression, dysthymia, and adjustment disorder), which constituted 21%, followed by oppositional defiance disorder and anxiety disorders (13% each); while conduct disorder and ADHD were less common (9% each) (Vivek and Nimish, 2018). Whereas, an earlier study in North India reported mental retardation as the most common presentation (18.4%-33.2%), followed by neurotic and stress related disorders (16.4%-18.5%) and epilepsy and organic brain disorder (7.1%-15.1%) (Savita *et al.*, 2007). But in this study also, hyperkinetic and conduct disorders were less common (8.3%-17.9%), as against the findings in the US study (Staller, 2006).

There is a dearth of data on the pattern of mental health problems presenting at outpatient CAMH facilities in Nigeria; however, available evidence suggests that neurodevelopmental/neurologic disorders and psychotic disorders are the most common presentations, the commonest being intellectual disability (Omigbodun, 2004; Omigbodun and Bella, 2004; Tunde-Ayinmode, 2010; Abdulmalik and Sale, 2012). In a previous study by Omigbodun, (2004) during the early stage of the outpatient CAMH clinic of the University College Hospital, Ibadan (the site of the current study), 30% of the children and adolescents had intellectual disability, followed by other psychotic disorders (20.5%), autism & schizophrenia (11.8%), epilepsy & bipolar disorder (11.0%). In another study of the same outpatient CAMH population by Omigbodun and Bella, (2004), 40% of them had intellectual disability, and the diagnosis of intellectual disability was more common in boys and children

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below the age of 13 years. In the study by Tunde-Ayinmode, (2010) at a teaching hospital in Northcentral, Nigeria, the major diagnoses were schizophrenia (50%), delirium (15%), and seizure disorder (9%). However, the latter was a review of medical records from a mixed clinic setting with only one case of intellectual disability and complete absence of other neurodevelopmental disorders during the 5 year-period. In another general psychiatry clinic population in the Northeast, the most common presentations were epilepsy (42.6%), neurologic conditions (19.4%), and psychoses (10.7%); however, the most disabling disorders were ADHD (80%) and mental retardation (77.8%) (Abdulmalik and Sale, 2012). These discrepancies in the pattern of presentation may imply that CAMH clinics are more likely to attract neurodevelopmental disorders than the general psychiatry outpatient clinics.

In general, comorbidities are common and it may be evident in nearly half of the children and adolescents irrespective of age (Omigbodun, 2004; Staller, 2006; Al-Habeeb *et al.*, 2012). In their review of records from three child and adolescent psychiatry clinics in Saudi Arabia, Al-Habeeb *et al.*, (2012) noted psychiatric comorbid in 40.5% of cases. Intellectual disability is particularly more likely to occur with other diagnoses. Omigbodun, (2004), found that the conditions that were frequently comorbid with intellectual disability were Autistic disorder, challenging behaviour, and ADHD; while bipolar disorder, schizophrenia, other psychotic disorders, and conduct disorder were less likely to be comorbid with intellectual disability.

Word count: 3545

CHAPTER THREE

METHODOLOGY

3.1 Study Site

The study was carried out at the Child and Adolescent Mental Health (CAMH) outpatient facility of the University College Hospital (UCH), Ibadan.

The University College Hospital, Ibadan is the premier tertiary health institution in Nigeria. It was strategically located in Ibadan, then the largest city in West Africa which is also the seat of the premier University in Nigeria. The physical development of the Hospital commenced in 1953 in its present site and was formally commissioned after completion on November 20, 1957 (www.uch-ibadan.org.ng). The University College Hospital, Ibadan was initially commissioned with 500-bed spaces; currently, the hospital has 850 bed spaces and 163 examination couches with occupancy rate ranging from 55-60% (www.uch-ibadan.org.ng).

For many years, only general psychiatry outpatient clinics were available in the hospital. The clinics held twice every week and child and adolescent referrals were seen as part of the general psychiatry clinics (Omigbodun, 2004). However, in year 2000, two psychiatry specialty outpatient mental health services were created – Child and Adolescent Mental Health clinic and Old Age psychiatry clinic (Omigbodun, 2004). With the unflinching efforts of Prof. Olayinka Omigbodun, the immediate past Head of Department of Psychiatry and the Director of the Centre for Child and Adolescent Mental Health (CCAMH), Child and Adolescent Mental Health Services (CAMHS) in the hospital has been greatly developed and there is a portion in the hospital dedicated exclusively to CAMH clinic. Also, there is a separate Child and Adolescent Mental Health ward in the department of Psychiatry at the University College Hospital for inpatient care of children and adolescents.

The CAMH outpatient facility caters for children and adolescents aged 19 years and younger. Two major clinics hold in the Child and Adolescent Mental Health clinic every week. There is the intellectual disability clinic, which holds every Monday. The general Child and Adolescent Mental Health clinic holds on Thursdays. However, children and adolescents with varied mental health problems are allowed to present on either of the two clinic days based on their preference or convenience. The intellectual disability clinic is focused mainly on management of intellectual disability and other neurodevelopmental disorders. The cases that commonly present at the clinic include intellectual disability, autism spectrum disorder, attention deficit hyperactivity disorder (ADHD), enuresis, cerebral palsy. Other child and adolescent mental disorders, such as depression, bipolar disorder, psychotic disorders, anxiety disorders, are mostly seen to on Thursdays.

The CAMH outpatient facility serves children and adolescents from various ethnic groups and socioeconomic backgrounds from various parts of the country, with clinic attendance of 13 patients per clinic and 67 per month. Referrals are received from the various clinical departments within the University College Hospital and other health institutions. Referrals also come from other institutions such as primary and secondary schools (main stream and special schools), clinics in higher educational institutions (e.g. Jaja clinic in University of Ibadan) remand home, and other relevant organisations. Some of the patients are referred by other hospital staff, brought directly by care givers, or self-referral (e.g. students from the College of Medicine). The facility is also a training centre for clinical exposure of postgraduate students from the Centre for Child and Adolescent Mental Health (CCAMH), University of Ibadan (UI). The multidisciplinary mental health team at a given clinic consists of 2 child psychiatry specialists, 3 psychiatry resident doctors, 2 clinical psychologists, and 2 nurses, and a medical social worker. Every new referral is first interviewed by a nurse who documents their basic demographic parameters in the registration register. Other information in the registration

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register includes the hospital number of the patient, name of the resident that carried out the initial assessment, name of the consultant under whom the patient was registered. The final diagnosis is also included in the register at the end of the consultation. Clinical psychologists administer psychological assessments and interventions as required by individual child. They are always part of the managing team at the CAMH unit. At least one medical social worker is usually at reach to attend to the social needs of the service users.

In almost all instances, every new referral is first assessed by one of the junior residents with detailed case documentation. Aspects of the documentation include demographic information (from patient and informant), exploration of the presenting complaints, past medical and mental health history, family structure and function, developmental history, and the current functioning of the child. Residents are also expected to do a diagnostic formulation using the 'biopsychosocial' model. Aspects of the diagnostic formulation include aetiological formulation (using the 4 P's - predisposing, precipitating, perpetuating, and protective factors), investigations (using the biopsychosocial model), treatment (using the biopsychosocial model), and prognosis (considering the favourable and unfavourable factors identified in the patient's history).

Subsequently, the resident presents a full case report to one of the Child and Adolescent Consultant Psychiatrists for final assessment and management of the child. In some instances, the new referral is assessed by a senior resident, who institutes a management plan and gives an appointment for a meeting with a child psychiatrist within two weeks. In most instances, senior residents attend to the children who come for follow-up visits. Diagnoses are mostly based on the criteria of the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (APA, 2012).

3.2 Study Design

A retrospective cross-sectional design was used for this study. A retrospective audit was carried out on the medical records of new referrals at the Child and Adolescent Mental Health outpatient facility who were 19 years old and younger from January 1, 2016 to December 31, 2019 (four years).

3.3 Study Population

The study population consisted of all children and adolescents aged 19 years and younger who were newly referred and were assessed at the CAMH outpatient facility of University College Hospital over the 4-year period (January 1, 2016 to December 31, 2019) whose case notes were accessible and reasonably complete.

3.3.1 Inclusion criteria

1. Patients aged 19 years and younger

2. New referrals who underwent detailed assessment

3. Consultant's review of final diagnosis

4. Diagnosis based on DSM-V diagnostic criteria

5. Diagnosis based on DSM-IV or ICD-10 which is adaptable to DSM-V equivalent.

3.3.2 Exclusion criteria

1. Patients that dropped out before detailed assessment and review by a child and adolescent consultant.

2. Case notes with significant amount of missing data.

3.4 Sample Size

The medical records of all new referrals to the CAMH outpatient facility of the University College Hospital over the 4-year period that fulfilled the inclusion criteria. A total of 267 case notes were reviewed in this study.

3.5 Sampling Procedure

The hospital numbers of all new referrals aged 19 years and younger that were registered from 1 January 2016 to 31 December 2019 were obtained from the registration register of the CAMH clinic. Other important demographic and clinical information were also considered during this initial selection process to determine eligibility before the case notes were retrieved. Such additional information that were documented in the register include the age of each patient at presentation, the name of the resident that did the initial assessment, the name of the consultant for whom the patient was booked, and the diagnosis. The case notes of the patients were subsequently retrieved for review with the assistance of staff of the medical records department.

3.6 Data Collection and Study Questionnaires

3.6.1 Data Collection

A semi-structured proforma was designed by the investigator, which was used to abstract data from the case notes of the patients on various aspects of sociodemographic characteristics, risk factors (biological and psychosocial), diagnoses, and management. The case notes were reviewed extensively by the investigator with the assistance of two resident doctors who were supervised by the investigator all through the period of data collection.

3.6.2 Questionnaire

The proforma (See appendix I) included domains on sociodemographic variables (age, sex, educational status, religion, ethnicity, and parents' demographics), diagnostic and other clinical

variables, including treatment. Clinical characteristics included source of referral, duration of illness in months, prior alternative care, the final primary diagnosis, comorbid psychiatric disorders, the mode of initial management, modalities of treatment, oral medication, parenteral medication, depot medication, and past psychiatric history.

The associated biological factors were noted, which included family history of mental illness, presence of a chronic medical condition, pregnancy complications (e.g. multiple pregnancy, hypertension, malaria, febrile illness with rash, preterm, post term, placenta previa), delivery complications (e.g. emergency caesarean section, prolonged labour, birth asphyxia), neonatal complications (e.g. Neonatal jaundice, neonatal sepsis), severe early childhood illness (e.g. febrile convulsions, seizure disorder), and head injury. An aspect was also included to specify other biological factors.

Psychosocial factors were included as follows: problems with primary support group (e.g. death of parent(s), parents' divorce/separation, discord with siblings, removal from home, health problems in family), problems related to the social environment (e.g. death or loss of a friend, living alone, bullying, discrimination), educational problems (e.g. academic problems, discord with teachers or class mates), economic problems (e.g. extreme poverty, insufficient welfare support), problems related to interaction with the legal system/crime (E.g. arrest; incarceration; litigation; victim of crime), and other psychosocial factors (e.g. exposure to disasters, war, other hostilities). The psychosocial factors were categorised in accordance with Axis IV of the DSM-IV Multi-Axial System (psychosocial and environmental problems) (APA, 1994).

3.7 Data Management and Analysis Plan

Data was analysed using the statistical package for social sciences (SPSS version 25.0) computer software. All copies of the proforma were serially numbered. All variables were recoded and entered on the software for analysis.

Frequency tables were employed to present the results of descriptive statistics and cross-tabulations were used to present the relationship between variables. Descriptive statistics for variables such as sociodemographic characteristics, diagnoses, and biopsychosocial variables are presented by means of frequency tables. Cross-tabulations have been used to show relationships between diagnostic categories and sociodemographic characteristics (age and gender) and between diagnostic categories and identified biological risk factors and psychosocial problems. Frequencies and percentages were used to express categorical variables; while means and standard deviations were used to express continuous numerical variables. Chi-square test was used to test the statistical hypotheses of an association and the statistical significance of such associations between diagnostic categories and socio-demographic variables, between diagnostic categories and biopsychosocial categories, and between any other pair of categorical variables. A P-value of 0.05 or less was considered as significant.

Table 3.1a Summary of Data Analysis Plan

S/N	OBJECTIVES	VARIABLES	ANALYTICAL METHOD
1	To determine the pattern of presentations of MNS disorders at the CAMH clinic of University College Hospital, Ibadan from January 2016 to December 2019.	MNS disorders	Descriptive statistics. (E.g. percentage, standard deviation)
2	To identify the biological and psychosocial factors among the children and adolescents who were newly referred to the CAMH clinic of University College Hospital, Ibadan from January 2016 to December 2019.	Biological and psychosocial factors	Descriptive statistics
3	To examine the association between the diagnostic categories and the sociodemographic characteristics of the children and adolescents.	**Dependent variables** Diagnostic categories **Explanatory variables** Sociodemographic characteristics	Chi-square test

Table 3.1b Summary of Data Analysis Plan

4	To examine the association between the diagnostic categories and the identified biological and psychosocial factors.	**Dependent variables** Diagnostic categories **Explanatory variables** Biological and psychosocial categories	Chi-square test

3.8 Ethical Considerations

Ethical approval was obtained for this study from the joint ethical committee of the College of Medicine and the University College Hospital (Appendix II). Permission was also obtained from the hospital management and the department prior to the conduct of the study.

Confidentiality of data

All information collected in the study was given code numbers and no name was recorded. The patient's name or any identifier will not be used in any publication or reports from this study. Also, utmost care was ensured in handling the case notes to prevent unauthorised access to the medical records of the patients.

Beneficence and Non-maleficence

The study did not expose the patients or their care givers to any risk or harm. They were not contacted in person; all information was obtained from review of case notes.

The findings of this study would inform policy for CAMHS development, improvement of existing services, as well as an advocacy tool for CAMH policy initiatives.

Informed consent and assent

This study did not require obtaining consents or assents from care givers or the children and adolescents, as it involved the use of secondary data only.

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CHAPTER FOUR

RESULTS

This study set out to determine the pattern of MNS disorders and the associated biological and psychosocial factors among children and adolescents attending the CAMH outpatient facility at University College Hospital, Ibadan from January 2016 to December 2019. A total of 267 medical records of new referrals to the CAMH clinic during the four-year period were reviewed based on the eligibility criteria. However, fourteen of the children and adolescents did not have a psychiatric diagnosis. Therefore, 253 psychiatric records were included in the data analysis.

4.1 Sociodemographic Characteristics of the Children and Adolescents

4.1.1 Personal Characteristics of the Children and Adolescents

Table 4.1 displays the socio-demographic characteristics of the study subjects. The ages of the study subjects ranged from 1 to 19 years with a mean age of 11.21 (SD 5.06), the majority (62.5%) of whom were adolescents (10-19 years). There were 149 (58.9%) boys and 104 (41.1%) girls. The preponderance of the male gender was irrespective of age group; however, the difference was more marked among the children (M=64; F=31) compared to the adolescents (M=85; F=73). A great majority (88.4%) of them were from the Yoruba tribe and more were from Christian homes (70.4%) than from Muslim homes (28.9%). With respect to educational status, 101 (40.6%) were in primary or lower classes, 25 (10.00%) were in junior secondary school, 32 (12.9%) in senior secondary school, and 26 (10.4%) were university students. Twenty-eight (11.2%) were out of school, while 11 (4.4%) were never enrolled in formal education. Further analysis revealed that children with intellectual disability and intellectual disability (ASD) accounted for 78.8% of the patients who were out of school and 46.2% of those who were never registered. Lastly, 40 (15.8%) of the attendees of the clinic had travelled from other towns or cities to access mental health services.

Table 4.1 Personal Characteristics of the Children and Adolescents Attending the CAMH Clinic (N =253)

Variables	n (%)
Gender	
Male	149 (58.9)
Female	104 (41.1)
Age (years)	
1-9	85 (37.5)
10-19	158 (62.5)
Ethnic group	
Yoruba	220 (88.4)
Igbo	16 (6.4)
Hausa	3 (1.2)
Other	10 (4.0)
Religion	
Christianity	178 (70.4)
Islam	73 (28.9)
Not available	2 (0.8)
Educational status	
KG, Nursery, Primary	101 (40.6)
Junior secondary school	25 (10.0)
Senior secondary school	32 (12.9)
Special school	24 (9.6)
Higher institution	26 (10.4)
Out of school	28 (11.2)
Never registered	11 (4.4)
Not available	2 (0.8)
Residence	
Within Ibadan	211 (83.4)
Outside Ibadan	40 (15.8)
Not available	2 (0.8)

4.1.2 Family Characteristics of the Children and Adolescents

As shown in Table 4.2, a great majority of the patients were living with both parents (74.7%) and more commonly in a monogamous setting (67.6%). However, 32 (12.6%) of them were either orphaned or from broken homes, while 16 (6.8%) were being raised by single mothers who were never married. In addition, most of the patients were first born children (45.1%) and majority of them (61.3%) had two or more siblings. With respect to the educational status of parents, though majority of the parents had at least secondary level of education, a greater proportion of fathers (50.2%) than mothers (43.9%) were educated up to the tertiary level. In the same vein, while the majority of the parents were engaged in at least a semi-skilled job, the women were less likely (31.2%) than their male counterparts (39.9%) to hold a skilled job and they were more likely to be unemployed than the men (5.5% and 2.4% respectively). Family history of mental illness was documented in 36 (14.2%) of cases.

Table 4.2a Family Characteristics of the Children and Adolescents Attending the CAMH Clinic (N = 253)

Variables	n (%)
Parents' marital status	
Married	189 (74.7)
Separated/divorced/widowed	32 (12.6)
Single mother	16 (6.3)
Not available	16 (6.3)
Family type	
Monogamous	171 (67.6)
Polygamous	18 (7.5)
Not available	63 (24.9)
Birth order	
1st	114 (45.1)
2nd	57 (22.5)
3rd	35 (13.8)
$\geq 4^{th}$	34 (13.4)
Number of siblings	
0-1	85 (33.6)
2-3	112 (44.3)
≥ 4	43 (17.0)
Mother's level of education	
No formal education	4 (1.6)
Primary	19 (7.5)
Secondary	56 (22.1)
Tertiary	111 (43.9)
Not available	63 (24.9)
Father's level of education	
No formal education	4 (1.6)
Primary	14 (5.5)
Secondary	47 (18.6)
Tertiary	127 (50.2)
Not available	61 (24.1)

Table 4.2b Family Characteristics of the Children and Adolescents Attending the CAMH Clinic (N = 253) (continued).

Variables	N (%)
Mother's occupation	
Skilled	79 (31.2)
Semi-skilled	64 (25.3)
Unskilled	71 (28.1)
Unemployed	14 (5.5)
Not available	25 (9.9)
Father's occupation	
Skilled	101 (39.9)
Semi-skilled	85 (33.6)
Unskilled	36 (14.2)
Unemployed	6 (2.4)
Not available	25 (9.9)
Family history of mental illness	
Absent	162 (64.0)
Present	36 (14.2)
Not available	55 (21.7)

4.2 Consultation Patterns

A great majority of the children and adolescents (121; 48.2%) were referred from other clinical departments within the hospital, while others were referred from another health institution (33; 13.1%), or social welfare/educational institutions (35; 13.9%). In other instances, it was the decision of parents (41; 16.3%), other relatives (8; 3.2%), or self-referral (mostly university students) (5; 2.0%). Source of referral could not be placed for 10 (4.0%) of the patients. The duration of untreated illness was greater than 12 months in 197 (77.9%) of cases, while 56 (22.1%) presented within 12 months of onset of illness. Prior to presentation at the facility, 37.6% of the children and adolescents had received nonorthodox methods of care such as faith healing (17.6%), traditional healing (14.1%), both faith healing and traditional healing (1.2%), or other forms of interventions such as herbal concoctions/supplements (4.7%). Information on prior nonorthodox consultation was not available for 182 (68.4%) of the patients.

4.3 Diagnoses

For the purposes of this study and for ease of analysis the diagnoses were further conflated

into 7 categories:

1. Intellectual disability

2. Autism spectrum disorder (ASD)

3. Attention deficit hyperactivity disorder (ADHD)

4. Psychotic disorders (schizophrenia & other psychotic disorders)

5. Mood disorders (major depressive disorder and bipolar disorder)

6. Epilepsy (generalized and complex partial seizures)

7. Other mental disorders (anxiety disorders, substance use disorder, speech disorders,

   enuresis, conduct disorder, oppositional defiant disorder, suicidal behaviour,

   unspecified mental disorders, conversion disorder, and other somatic symptoms &

   related disorders).

The diagnostic categories according to the fifth edition of the Diagnostic and Statistical

Manual of Mental Disorders (DSM-V) are shown in Table 4.3. The most common

primary diagnoses made during the four years were intellectual disability (34.4%) and

ASD (14.2%). Less commonly made diagnoses were psychotic disorders (10.3%),

epilepsy (8.7%), ADHD (7.5%), major depressive disorder (5.5%), and enuresis (5.5%).

Rarer still were speech disorders (2.8%), anxiety disorders (2.4%), conduct disorder

(2.4%), conversion disorder (1.6%), bipolar disorder (1.2%), and substance use disorder

(1.2%). The disorders above were comorbid with another psychiatric disorder in 43.1% of

cases.

Table 4.3 Frequency Distribution of the Diagnoses of Children and Adolescents Attending the CAMH Clinic (N =253)

DSM V Diagnoses	n (%)
Intellectual Disability	87 (34.4)
ASD	36 (14.2)
Epilepsy	22 (8.7)
ADHD	19 (7.5)
Other psychotic disorders	17 (6.7)
Major Depressive Disorder	14 (5.5)
Enuresis	14 (5.5)
Schizophrenia	9 (3.6)
Speech disorders	7 (2.8)
Anxiety disorders	6 (2.4)
Conduct Disorder	6 (2.4)
Conversion Disorder	4 (1.6)
Bipolar Disorder	3 (1.2)
Substance use disorder	3 (1.2)
Other somatic symptoms & related disorders	2 (0.8)
Unspecified mental disorder	2 (0.8)
Oppositional Defiant Disorder	1 (0.4)
Suicidal behaviour	1 (0.4)
Total	253 (100)

4.4 Comorbid Psychiatric and other Chronic Medical Conditions

The disorders with the highest comorbidity were ADHD (78.9%) and ASD (66.7%). Others with lower rates of comorbidity were epilepsy (45.5%), intellectual disability (42.5%), and enuresis (35.7%). These comorbities were mostly cases of intellectual disability co-occurring with other disorders (especially ASD and ADHD) and a co-occurrence of ADHD and ASD. Some patients had co-existing ASD, ADHD, and intellectual disability. No comorbidity was found for bipolar disorder, anxiety disorders, conversion disorder, oppositional defiant disorder, and suicidal behaviour. There were co-existing chronic medical conditions in 40 (15.8%) of the patients. These were mostly neurological syndromes such as Down syndrome and cerebral palsy. Others include HIV infection, sickle cell disease, hyperthyroidism, type 1 diabetes mellitus, and asthma.

4.5 Biological and Psychosocial Factors

The patients presented with history of various biological risk factors and psychosocial problems (Table 4.4). The biopsychosocial factors were as follows.

The biological factors identified were grouped as follows:

1. Family history of a mental illness.

2. Other chronic medical conditions (cerebral palsy, down syndrome, HIV infection, sickle cell disease, hyperthyroidism, type 1 diabetes mellitus, asthma).

3. Pregnancy complications (teenage pregnancy, advanced maternal age, lack of antenatal care, preterm delivery, postdate, threatened abortion, failed induced abortion, placenta previa, premature rupture of membrane, febrile illness in early pregnancy, multiple pregnancy/second twin, abnormal lie, faetal macrosomia, low birthweight, maternal diabetes mellitus or sickle cell disease, pre-eclampsia, maternal alcohol & tobacco use, and rhesus incompatibility).

4. Delivery/birth complications (unsupervised labour, emergency C/S, prolonged labour, foetal distress, meconium aspiration, birth asphyxia, birth trauma), the most common being birth asphyxia.

5. Neonatal complications (neonatal sepsis, neonatal jaundice), the more common being neonatal jaundice.

6. Severe early childhood illness (meningitis, severe/cerebral malaria with febrile convulsions, severe sepsis, hyperglycaemic crisis in type 1 DM, seizure disorder, measles).

7. Head injury (fall from a height, traumatic hydrocephalus, recurrent head banging).

Biological risk factors were identified in 172 (68.0%) of the children and adolescents. The vast majority (45.5%) of them presented with a history of delivery/birth complications, followed by severe early childhood illness (30.2%), pregnancy complications (27.9%), and neonatal complications (24.4%). The male patients (62.3%) were more likely to have a history of biological risk factors (especially obstetric complications and head injury) compared to their female counterparts (37.7%) (x^2=4.689; p=0.030). History of biological risk factors was also more common among the adolescents (53.5%) than the children (46.5%) (x^2=8.825; p=0.003). Children of women who were unemployed or engaged in unskilled vocation were more likely to have a history of severe early childhood illness (x^2=5.298; p=0.021).

Psychosocial factors were grouped as follows (according to the DSM-IV)

1. Problems with primary support group (maternal HIV infected, maternal severe mental illness, sibling rivalry, discrimination, born out of wedlock, severe parental discord, separated from parents, separated/divorced parents, maternal/paternal deprivation,

orphaned, abandoned by parents, physical abuse, emotional abuse, discord with parent, authoritarian parenting style).

2. Problems related to social environment (cyber bullying, other forms of bullying, physical abuse, sexual abuse, sexual assault, discord with peers).

3. Educational problems (poor academic performance, poor mathematical skills, being out of school, school refusal, withdrawn from mainstream school to special school, truancy, bullying, never registered, delayed admission into higher institution, discord with teacher/lecturer, suspensions).

4. Economic problems (insufficient welfare, severe poverty).

5. Problems related to interaction with the legal system/crime (arrests, detainment, victim of kidnapping).

Psychosocial problems were identified in three-quarter (75.9%) of the children and adolescents. The singular most common psychosocial problem was educational problem (78.6%), followed by problems related to primary support group (45.8%), and economic problem (17.7%).

Table 4.4 Biopsychosocial Factors in Children and Adolescents Presenting at the CAMH Clinic (N = 253)

Biopsychosocial Factors	n (%)
Biological Factors	**172 (68.0)**
Family history of mental illness	36 (20.9)
Other chronic medical conditions	40 (23.3)
Pregnancy complications	48 (27.9)
Delivery/birth complications	79 (45.5)
Neonatal complications	42 (24.4)
Severe early childhood illness	52 (30.2)
Head injury	8 (4.7)
Psychosocial factors	**192 (75.9)**
Primary support group	88 (45.8)
Social environment	31 (16.1)
Educational problem	151 (78.6)
Economic problem	34 (17.7)
Legal problem	7 (3.6)

4.6 Pattern of Clinical Interventions

As shown in Table 4.5, approximately 9 in 10 (91.1%) of the children and adolescents were managed on outpatient basis. One hundred and sixty-two (64.0%) of them were managed using the biopsychosocial model (I.e. both pharmacological and psychosocial interventions were administered). Eighty-seven (34.4%) children received only psychosocial interventions as indicated, while 3 of them were assumed to have received only pharmacological treatment due to lack of clinical records of psychosocial interventions. However, it is common practice to give all patients at least psychoeducation. The psychosocial interventions included psychoeducation, cognitive behavioural therapy (CBT), family therapy, supportive counselling, behavioural techniques, parenting skills training, speech therapy, social support, and educational interventions.

The majority (41.7%%) of those who did not receive pharmacological treatment had a diagnosis of intellectual disability, followed by other mental disorders (such as enuresis, speech disorder, conversion disorder) (39.6%), and ASD (10.4%). However, a majority of patients with intellectual disability (54.0%) and ASD (72.2%) required pharmacologic treatment, most commonly for challenging behaviours. Patients with ADHD received a combination of oral medications in 40.0% of cases, commonly a psychostimulant medication (26.7%) and an atypical antipsychotic (26.7%). Generally, the most prescribed oral psychotropic medications were atypical antipsychotics (43.3%), mood stabilisers/anticonvulsants (19.9%), and antidepressants (9.9%). Risperidone and SSRIs were the most frequently prescribed antipsychotic and antidepressants respectively. Parenteral medications were used in 3.2% of cases, another 2.8% received depot medication such as flupenthixol decanoate and fluphenazine decanoate. Other parenteral medications included intramuscular haloperidol and intravenous benzodiazepines.

Table 4.5 Pattern of Clinical Interventions Received by the Children and Adolescents at the CAMH Clinic (N = 253)

Clinical interventions	N (%)
Mode of initial management	
Inpatient	21 (8.3)
Outpatient	232 (91.1)
Modalities of treatment	
Biopsychosocial	162 (64.0)
Psychosocial	87 (34.4)
Biological only	3 (1.2)
Not available	1 (0.4)
Parenteral medication use	
Yes	8 (3.2)
No	245 (96.8)
Depot medication	
Yes	7 (2.8)
No	246 (97.2)
Number of follow-up visits	
None (after first consultation)	93 (41.3)
One visit	48 (21.)
More than one visit	84 (37.3)

4.7 Pattern of Follow-up Visits

As many as 2 in 5 (41.3%) of the children and adolescents never came back for follow-up, and less than 2 in 5 (37.3%) made more than one follow-up visit, majority of which did not come the third time (Table 4.5). The number of follow-up visits was significantly associated with diagnosis (x^2= 28.67; p<0.001) and whether psychotropic medication was prescribed or not (x^2=80.12; p<0.001). Patients with mood disorders (71.1%), psychotic disorders (68.0%), and epilepsy (55.6%) were more likely to make more than one follow-up visits compared to those with ADHD (42.1%), ASD (33.3%), intellectual disability (25.0%), and other mental disorders (22.7%). Furthermore, a vast majority of the patients with intellectual disability (55.6%), other mental disorders (especially enuresis, conduct disorder, and oppositional defiant disorder) (54.5%), ASD (39.4%), and ADHD (36.8%) did not return after the first consultation. Similarly, those who were prescribed psychotropic medications (60.0%) were more likely to make more than one follow-up visit compared to those without prescription (9.0%). Further analysis revealed that 71.2% of those who did not receive pharmacological treatment never returned after the first consultation. In addition, at least half (51.0%) of the patients that received biopsychosocial model of intervention made more than one follow-up visit compared to 33.3% and 8.3% of those with only biological or psychosocial intervention respectively (Figure 4.2). Place of residence (within or outside Ibadan) was not significantly associated with the number of follow-up visits.
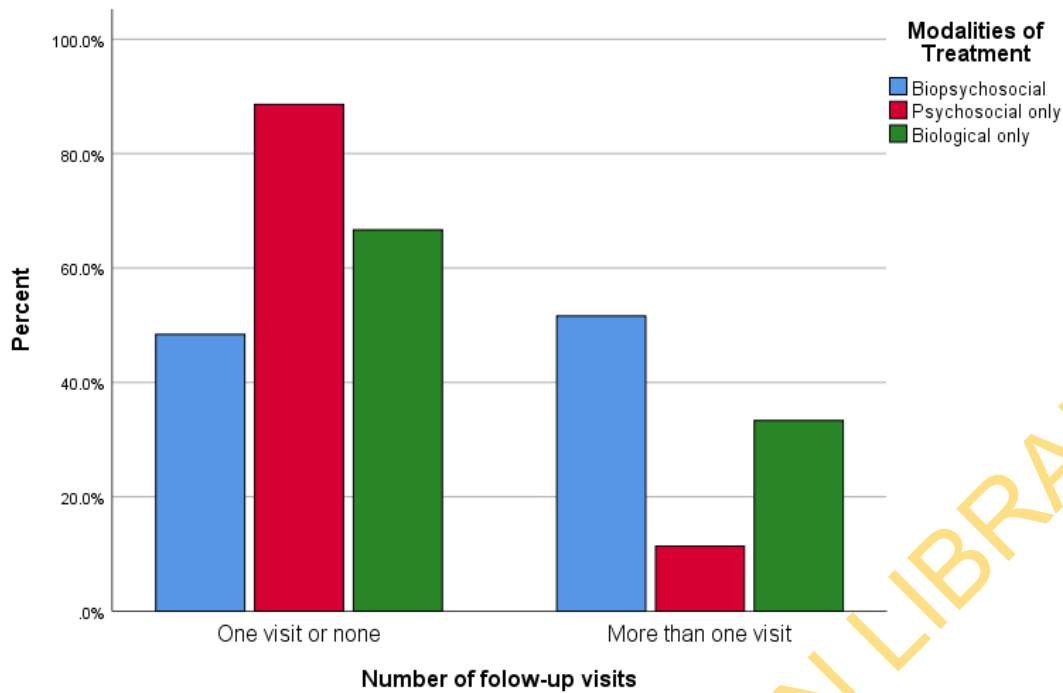
Figure 4.2 Number of Follow-up Visits by Treatment Modality

4.8 Association Between Diagnostic Categories and Socio-demographic Characteristics

The diagnostic categories were significantly associated with age group (x2=67.666; p<0.001), gender (x2=16.036; p=0.014), and the educational status of the patients (x^2=176.342; p<0.001). Table 4.6 displays the association between diagnostic categories and age and gender. ASD and ADHD were significantly more likely to be diagnosed among the children (1-9 years); whereas, psychotic disorders (including schizophrenia) and mood disorders (MDD & Bipolar disorder) occurred more commonly among the adolescents (10-19 years). Similarly, the boys were more likely to present with ASD compared to the girls; whereas, mood disorders were more common among the girls. The majority of those with intellectual disability were in Nursery/Primary school (49.4%) or special school (20.0%) at presentation, and fourteen (16.5%) of them were out of school. Furthermore, half (50.0%) of the patients who were out of school and almost 1/3 (30.8%) of those who were never registered had a diagnosis of intellectual disability.

A significant association was also found between intellectual disability and mother's level of education (x^2=5.494; p=0.019) and between mother's occupation and history of early childhood illness (x2=5.370; p=0.020). Although 85.1% of mothers whose children had intellectual disability had at least secondary education, the majority (56.5%) of the women with less than secondary education had children with intellectual disability. Similarly, 55.8% of those with history of severe early childhood illness had mothers who were either unemployed or were engaged in unskilled vocations.

Table 4.6 Frequency of Diagnostic Categories by Age and Gender

Diagnostic Categories	Age		p value	Gender		p value
	1-9 N (%)	10-19 N (%)		Male	Female	
Intellectual disability	29 (33.3)	58 (66.7)	0.316	49 (56.3)	38 (43.7)	0.547
ASD	28 (77.8)	8 (22.2)	<0.001*	28 (77.8)	8 (22.2)	0.013*
ADHD	16 (84.2)	3 (15.8)	<0.001*	13 (68.4)	6 (31.6)	0.380
Psychotic disorders	1 (3.8)	25 (96.2)	<0.001*	18 (69.2)	8 (30.8)	0.258
Mood disorders	0 (0.0)	17 (100.0)	0.001*	5 (29.4)	12 (70.6)	0.011*
Other mental disorders	13 (28.3)	33 (71.7)	0.150	22 (47.8)	24 (52.2)	0.092
Epilepsy	8 (36.4)	14 (63.6)	0.904	14 (63.6)	8 (36.4)	0.636

*Significant at p<0.05

4.9 Association Between Diagnostic Categories and Biopsychosocial Categories

Table 4.7 displays the association between diagnostic categories and biopsychosocial categories. Children and adolescents with intellectual disability, ASD, psychotic disorders, mood disorders, and 'other' mental disorders were more likely to have a history of a biological risk factor. A vast majority (80.2%) of the patients with a diagnosis of intellectual disability had biological risk factors (x^2=18.075; p<0.001), which include delivery/birth complications (46.9%), severe early childhood illness (38.0%), neonatal complications (32.1%), and pregnancy complications (30.4%). Patients with ASD were more likely to have suffered delivery complications, while those with mood disorders were more likely to have a family history of mental illness. Delivery/birth complications were the biological risk factors most commonly associated with the diagnostic categories. No biological risk factors were identified for ADHD and epilepsy.

Patients with intellectual disability (x^2=25.245; p<0.001) and psychotic disorders (x^2=8.001; p<0.05) were more likely to have had a history of psychosocial problems. Educational problems (most commonly poor academic performance) were the most commonly reported psychosocial problems among the children and adolescents. Patients with intellectual disability (86.2%) were more likely to have experienced difficulties with educational achievement. Though not significant, a vast majority (66.7%) of the children with ASD presented with associated educational problem.

Table 4.7a Association Between Diagnostic Categories and Biological Categories

Biopsychosocial Categories	Diagnostic Categories						
	ID n (%)	ASD n (%)	ADHD n (%)	Psychosis n (%)	Mood do n (%)	Epilepsy n(%)	Other n(%)
Biological							
Family history	13 (18.8)	2 (8.3)	3 (23.1)	5 (20.8)	**5 (41.7)***	1 (4.8)	7 (20.0)
Chronic medical condition	19 (21.8)	4 (11.1)	2 (10.5)	3 (11.5)	2 (11.8)	5 (22.7)	5 (10.9)
Pregnancy complications	**24 (30.4)***	9 (28.1)	4 (22.2)	**1 (4.5)***	1 (7.1)	4 (18.2)	5 (12.2)
Delivery complications	**38 (46.9)***	**18 (56.3)***	7 (38.9)	**2 (9.1)***	**0 (0.00)***	7 (31.8)	**7 (16.7)***
Neonatal complications	**25 (32.1)****	5 (16.1)	1 (5.6)	**0 (0.0)***	1 (7.7)	3 (13.6)	7 (16.7)
Severe early childhood illness	**30 (38.0)****	7 (21.2)	2 (11.8)	2 (9.1)	1 (7.7)	8 (38.1)	**2 (4.8)***
Head injury	1 (1.3)	1 (3.2)	1 (6.7)	1 (4.5)	1 (9.1)	2 (9.5)	1 (2.5)

*p<0.05; **p<0.001

Table 4.7b Association Between Diagnostic Categories and Psychosocial Categories (continued).

Biopsychosocial Categories	Diagnostic Categories						
	ID n (%)	ASD n (%)	ADHD n (%)	Psychosis n (%)	Mood do n (%)	Epilepsy n (%)	Other n (%)
Psychosocial							
Primary support group	32 (36.8)	9 (25.0)	3 (15.8)	9 (34.6)	7 (41.2)	7 (31.8)	21 (45.7)
Social environment	9 (10.3)	2 (5.6)	0 (0.0)	3 (11.5)	3 (17.6)	1 (4.5)	**13 (28.3)****
Educational problems	**75 (86.2)****	24 (66.7)	12 (63.2)	**8 (30.8)***	**6 (35.3)***	**8 (36.4)***	**18 (39.1)***
Economic problem	10 (11.5)	7 (19.4)	1 (5.3)	3 (11.5)	1 (5.9)	**6 (27.3)***	6 (13.0)
Legal problem	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (5.9)	1 (4.5)	**5 (10.9)****

*p<0.05; **p<0.001

Word count: 3227.

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1.0 Discussion

This study revealed the general diagnostic and biopsychosocial profiles of children and adolescents who presented at the CAMH clinic of the University College Hospital, Ibadan, from January 2016 to December 2019.

5.1.1 Sociodemographic Characteristics of the Children and Adolescents

A preponderance of adolescents was observed in this study, which is in agreement with most of the existing similar studies (Omigbodun, 2004; Omigbodun and Bella, 2004; Tunde-Ayinmode, 2010; Chukwujekwu, 2019). The reverse was however the case in some studies where children were more than adolescents (Al-Habeeb *et al.*, 2012; Adnan *et al.*, 2019). Also, male preponderance was noted in this study, which aligns with findings from community based epidemiological studies (Cortina *et al.*, 2012), studies conducted in CAMH clinics in Nigeria (Omigbodun, 2004; Omigbodun and Bella, 2004) and elsewhere (Al-Habeeb *et al.*, 2012; Adnan *et al.*, 2019). Our finding that gender difference was less marked among the adolescents is in keeping with the age long observation of increased mental health symptoms in girls at the onset of puberty (Lawlor and James, 2000).

In addition, this study revealed that more than 1 in 10 (11.2%) of the children and adolescents were out of school, while another 4.4% were never enrolled in formal education. In an earlier study in the facility, a quarter of the children were not in school (Omigbodun, 2004). Furthermore, 15.8% of the attendees of the clinic had travelled from other towns or cities to access mental health services. This is a little improvement over the 21% reported earlier by Omigbodun, (2004) in the same clinic. The improvement may be a reflection of possible improvement in availability of mental health services.

5.1.2 Consultation Patterns

Among this clinic population, the duration from when the disorder was first observed to the point of presentation was greater than a year in a vast majority (77.9%) of the children and adolescents. It is not unlikely that the delay was partly due to complex pathways to care, as almost 2 in 5 (37.6%) of the patients had received nonorthodox methods of care such as faith healing, traditional healing, or a combination of these and other forms of interventions before presenting at the CAMH clinic. This finding is similar to 36.4% reported by Abdulmalik and Sale, (2012) in their study of pathways to psychiatric care for children and adolescents at a tertiary hospital in Northern Nigeria. This pattern of health-seeking behaviour is not surprising in Africa due to widespread superstitions and stigmatisation of mental and neurological disorders (Gureje *et al.*, 2005).

5.1.3 Diagnoses

The diagnostic categories observed in this study are largely similar to previous findings in the same clinic population as the current study, with a few differences. This study reports intellectual disability as the most commonly diagnosed condition (34.4%). The previous studies at the facility had also reported intellectual disability as the most frequent presentation at 30.0% (Omigbodun, 2004) and 40.0% (Omigbodun and Bella, 2004) respectively, followed by ASD. A similar pattern has been reported in studies from other developing countries (Savita *et al.*, 2007; Al-Habeeb *et al.*, 2012; Adnan *et al.*, 2019). The observation is different in developed countries, as intellectual disability is less prevalent in those countries. For instance, externalising disorders such as conduct disorder and ADHD were the most frequently diagnosed at CAMH clinics in the USA (Staller, 2006). Also, studies conducted in general psychiatric clinic in Nigeria were more likely to report highest rates for psychotic disorders, depression and ADHD (Tunde-Ayinmode, 2010; Chukwujekwu, 2019). Children with epilepsy continue to constitute a significant proportion of the children presenting at the

CAMH clinic. Most of the children with a diagnosis of epilepsy in this study had complex partial seizure and had presented on account of behavioural manifestations of the seizure. Those with generalised tonic-clonic type had presented without a formal referral and most likely because epilepsy is commonly regarded as a form of mental disorder in many parts of the country (Omigbodun, 2004; Abdulmalik and Sale, 2012). The rates of psychotic disorders and conduct disorder were lower in this study compared to the rates reported in the earlier studies in this clinic (Omigbodun, 2004; Omigbodun and Bella, 2004). The possible reason for this could not be readily identified.

5.1.4 Comorbid Psychiatric and other Chronic Medical Conditions

Studies have consistently reported that child and adolescent mental health problems are highly comorbid (Omigbodun, 2004; Staller, 2006). This study is not an exception. We found that ADHD and ASD were highly comorbid with each other and each was more likely to be comorbid with intellectual disability and other neurodevelopmental disorders in particular. The association between ASD and ID has long been established, with up to 25-40% of children with ID receiving a diagnosis of ASD compared to prevalence of 1-3% of ID in the general population (Mpaka *et al.*, 2016). Moreover, ASD without ID is rarely diagnosed in Africa (Mankoski *et al.*, 2006), possibly because the cases that present in the hospital are the more severe ones (Bakare and Munir, 2011). Co-existing chronic medical conditions were noted in 15.8% of cases. Comorbidity with other chronic medical conditions was mostly with neurological syndromes such as Down's syndrome and cerebral palsy. Such children were referred to the facility mostly on account of associated intellectual disability, challenging behaviours, and affective symptoms. Similar findings have been noted in previous studies (Al-Habeeb *et al.*, 2012; Olashore *et al.*, 2017).

5.1.5 Biological and Psychosocial Factors

Among the biological risk factors examined in this study, only obstetric complications and severe early childhood illness were significantly associated with the diagnostic categories. The most frequently reported biological risk factors were delivery/birth complications, severe early childhood illness, pregnancy complications, and neonatal complications respectively. The most common obstetric risk factors were delivery/birth complications, especially perinatal asphyxia and emergency caesarean sections. These findings are a reflection of the poor state of maternal and child health services in some areas in the country.

The above findings align with findings earlier reported by Omigbodun and Bella, (2004). However, contrary to report of lack of gender difference in obstetric complications in the previous study, this study found that boys were significantly more likely (62.3%) to have a history of biological risk factors compared to the girls (37.7%). Also, we found that biological risk factors were more common among the adolescents (10-19 years) than the children (1-9 years); while the reverse was the case in the former study. These conflicting findings may be due to the fact that while the previous study examined only obstetric complications, this study included other biological risk factors in the analysis, including severe early childhood illness and head injury. Epidemiological studies have consistently shown that paediatric sepsis and head injury are more common in boys (Watson *et al.*, 2003; Alhabdan *et al.*, 2013). In addition, this study revealed that children of women who were unemployed or engaged in unskilled vocations were more likely to have a history of severe early childhood illness. In a country where health services are largely procured on a 'pay as go basis', this underscores the importance of women empowerment programmes, as women are the primary caregivers in most families.

Psychosocial problems were identified in three-quarter (75.9%) of the children and adolescents in this study. This is higher than 62.2% reported in the previous study examining

psychosocial issues among patients in the clinic. Likewise, this study identified an excess of educational problems (78.6%) among the psychosocial problems of the children and adolescents, whereas the earlier study reported an excess of problems related to primary support group. The possible explanations would include the high prevalence of intellectual disability in this study, which is associated with impairment in academic learning and other psychosocial problems.

5.1.6 Pattern of Clinical Interventions

With respect to the pattern of available clinical interventions at the clinic, two major findings are worthy of special note. First, nearly all (98.4%) of the children and adolescents benefited from one psychosocial intervention or the other. Therefore, the biopsychosocial model of patient management is commonly applied in the clinic. This is good because studies have shown that biological, psychological and social factors are associated with mental disorders in childhood and adolescence (Omigbodun, 2004; Kieling *et al.*, 2011) and the Biopsychosocial model of case formulation has been described as a "way of thinking that enables the physician to act rationally in areas now excluded from a rational approach" (Engel, 1980). Second, more than half of the patients with intellectual disability and nearly 3/4 of those with ASD required pharmacologic treatment at presentation, the most common indication being challenging behaviours. This may imply that the presence of challenging behaviours plays an important role in help-seeking behaviours of parents of children with intellectual disability and ASD. Patients with ADHD received a combination of oral medications in 40.0% of cases, commonly an atypical antipsychotic medication in combination with a psychostimulant medication such as methylphenidate. Whereas, Omigbodun, (2004) had reported the use of tricyclic antidepressants instead for patients with ADHD due to unavailability of psychostimulant medications in the country at that time.

5.1.7 Association Between Diagnostic Categories and Sociodemographic Variables

The variation in the pattern of presentation of psychopathology at the CAMH clinic as reported in this study is in keeping with the existing scientific literature both in Nigeria and other parts of the world. For instance, this study found that ASD and ADHD were significantly more likely to be diagnosed among the children; whereas, psychotic disorders and mood disorders occurred more commonly among the adolescents. This is in keeping with findings from previous studies (Oyewumi, 1989; Olashore *et al.*, 2017). Also, this study found that boys were more likely to present with neurodevelopmental disorders such as ASD compared to the girls; whereas, mood disorders were more common among the girls. This is also in agreement with previous studies (Olashore *et al.*, 2017; Chukwujekwu, 2019).

It is of great concern to find that children with intellectual disability and ASD accounted for about 4 in 5 (78.8%) of the patients who were out of school and almost half (46.2%) of those who were never registered. This may imply that many parents of children with severe neurodevelopmental disorders are not aware of the option of special school placement. However, it is more likely to be due to the fact that such facilities are not readily available or accessible in the country (Omigbodun, 2004). Furthermore, it is bothersome that the majority (56.5%) of mothers in this study with less than secondary education had presented with children with diagnosis of intellectual disability. This underscores the significance of educating the girl child. Yet still, this study revealed that children of women who were unemployed or engaged in unskilled vocations were more likely to have a history of severe early childhood illness. This may be due to delayed treatment consequent to financial constraints and the need to await husband's decision before treatment can be sought (Abdulraheem and Parakoyi, 2009). This underscores the importance of women empowerment programmes.

5.1.8 Association Between Diagnostic Categories and Biopsychosocial Categories

Nearly all the diagnostic categories were associated with biological risk factors. This finding further confirms the earlier finding of no significant difference between diagnostic categories and obstetric complications (Omigbodun and Bella, 2004). Studies have shown that several psychiatric disorders are linked with obstetric complications, including schizophrenia (Boog, 2004). Intellectual disability was particularly more likely to be associated with history of biologic risk factors. About 4 in 5 of the children and adolescents with intellectual disability had a reported history of biological risk factor, especially obstetric complications and severe early childhood illness. Overall, delivery/birth complications were most commonly reported in association with most of the diagnostic categories; however, patients with ASD were particularly more likely to have had delivery/birth complications. Though studies have shown that there is no evidence to implicate one particular perinatal or neonatal factor in the aetiology of ASD; instead, multiple such factors have been identified as risk factors (Gardener *et al.*, 2011). Adequate management of perinatal period can prevent obstetric complications that could serve as risk factors for mental disorders in children and adolescents (Olashore *et al.*, 2017). It has been suggested that obstetric complications interact with genetic factors to give rise to psychiatric disorders such as schizophrenia (Boog, 2004).

Intellectual disability and psychotic disorders were more likely to be associated with psychosocial problems, the most common being educational problems. Educational problems were particularly more frequently associated with intellectual disability. This is not surprising as intellectual disability is inherently associated with impairment in mental abilities, including academic learning.

5.1.9   Strength of the Study

This study is one of the few studies that have examined the pattern of presentation of psychopathology and associated biological and psychosocial factors in a CAMH clinic

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population. The findings of the study provide an overview of diagnostic and biopsychosocial profiles at the clinic in the preceding 4 years, which is vital for service improvement and development. It is worthy of note that there was detailed and good quality case documentation by psychiatry residents and child and adolescent specialists at the clinic. Also, consistent eligibility criteria were adhered to in the selection of the sample, which screened out incomplete or inconclusive clinical records. Only cases with clear psychiatric diagnosis by experienced child and adolescent mental health psychiatrists were included in the study.

5.1.10 Limitations of the Study

The findings of the current study should be interpreted cautiously in the light of the following limitations. First, a cross-sectional retrospective study design was used for this study, which implies that inferences about causality and temporal relationships cannot be made. Secondly, this study relied exclusively on secondary source of data. Therefore, the limitations of secondary data collection also apply, such as missing data, inaccuracies, missing case notes. In addition, information could not be corroborated, explored adequately, or substantiated as the case may be. Lastly, the findings from this study cannot be generalized to the general child and adolescent population because it was a hospital-based study with all the subjects having psychiatric diagnoses.

5.2.0 Conclusion

The current study set out to determine the pattern of mental, neurological, and substance use disorders and the associated biological and psychosocial factors among children and adolescents attending the child and adolescent mental health (CAMH) outpatient facility at the University College Hospital, Ibadan from January 2016 to December 2019. The findings illustrate that several biological risk factors and psychosocial factors are associated with mental health problems in children and adolescents.

The most common disorders at the clinic remain intellectual disability and ASD, and comorbidity was highly common. The biological risk factors identified in this study were mainly obstetric complications such as delivery/birth complications and severe early childhood illnesses Likewise, a vast majority of the children and adolescents presented with various psychosocial problems, especially educational problems, problems related to primary support group, and economic problems.

There was significant association between diagnostic categories and age group, gender, educational status of the patient, mother's level of education, and mother's occupation. Also, almost all the diagnostic categories were significantly associated with biological risk factors and psychosocial problems. Of all the diagnostic categories, intellectual disability was the mostly frequently associated with biological risk factors, particularly obstetric complications. Whereas, intellectual disability and psychotic disorders were the disorders most frequently associated with psychosocial problems.

These findings underscore the importance of using the biopsychosocial model of case formulation in the management of mental health problems in children and adolescents; the necessity of providing quality maternal and child health services in promoting mental health and preventing mental health problems; and the necessity of educational interventions for children with neurodevelopmental disorders and all children with mental health problems such as special school placement.

5.3.0 Recommendations

1. Future studies should focus on determining the pattern of the various childhood and adolescent mental health problems and associated biopsychosocial factors in the community nationwide for a more representative data for the general population.

2. A retrospective cohort study following up children with history of obstetric complications, neonatal complications, and severe early childhood illnesses would be useful for evaluating their possible aetiological significance in future onset of mental health problems.

3. A multi-centre cross-sectional study employing structured diagnostic schedules should be conducted to assess the current state of child and adolescent mental health services (CAMHS) in Nigeria.

4. Mental health professionals should organise more awareness campaigns and mental health advocacy for children and adolescents. This would increase awareness and reduce ignorance and stigma about mental health problems in children and adolescents.

5. Federal and State governments should be committed to and ensure improved maternal and child health care to reduce obstetric complications and childhood diseases.

6. Policy makers/hospital managements should create stand-alone CAMH facilities in order to expand CAMH services and improve access to care for children and adolescents in the country.

Word count: 2883

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APPENDIX

DIAGNOSTIC AND BIOPSYCHOSOCIAL PROFILES OF CHILDREN AND ADOLESCENTS AT THE CHILD AND ADOLESCENT MENTAL HEALTH CLINIC OF UNIVERSITY COLLEGE HOSPITAL, IBADAN

DATA COLLECTION PROFORMA

Serial Number : _____

<u>**Sociodemographic Characteristics**</u>

1.) Date of Birth: ____/____/____

2.) Age at presentation (Years): _____

3.) Gender: 1 - Male   2 – Female

4.) Ethnic group:

   1 - Hausa   2 - Igbo   3 - Yoruba   4 - Other (Specify)_____

5.) Educational status

   1 – Nursery/Primary school   2 – Junior secondary school

   3 – Senior secondary school   4 – Special school

   5 – Quranic school   6 – Higher institution

   7 – Out of school   8 – Never registered

6.) Residence

   1 – Within Ibadan   2 – Outside Ibadan

   3 – Not available

7.) Religion:

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1 - Christianity

2 - Islam

3 - Traditional religion

4 – Not available

8.) Family Type:

1 - Monogamous

2 – Polygamous

3 – Not available

9.) Number of siblings _____

10.) Birth order (position among siblings) _____

11.) Father's level of education

1 – No Formal Education

2 – Primary School

3 – Secondary School

4 – Tertiary

5 – Not available

12.) Father's occupation

1 – Skilled

2 – Semi-skilled

3 – Unskilled

4 - Unemployed

5 – Not available

13.) Mother's level of education

1 – No Formal Education

2 – Primary School

3 – Secondary School

4 – Tertiary

5 – Not available

14.) Mother's occupation

1 – Skilled   2 – Semi-skilled

3 – Unskilled   4 - Unemployed

5 – Not available

Specific Psychosocial Factors

15.) Problems with primary support group (E.g. death of parent(s), parents'

divorce/separation, discord with siblings, removal from home, health problems in

family).

_____

16.) Problems related to the social environment (E.g. death or loss of a friend, living

alone, bullying, discrimination).

_____

17.) Educational problems (E.g. academic problems, discord with teachers or class

mates)

_____

18.) Economic problems (E.g. extreme poverty, insufficient welfare support)

_____

19.) Problems related to interaction with the legal system/crime (E.g. arrest;

incarceration; litigation; victim of crime).

_____

20.) Other psychosocial factors (E.g. exposure to disasters, war, other hostilities)

_____

Clinical Characteristics

21.) Source of referral

1 – Other clinical departments within the hospital   2 – Another health institution

3 – Social welfare/educational institutions   4 – Decision by parent(s)

5 – Decision by other relatives   6 – Self referral

22.) Duration of illness (months)

1 - < 1   2 - 1 to 6

3 - 7 to 12   4 - > 12

23.) Pathway to care

1 – No prior alternative care   2 – Been to faith healers

3 – Been to traditional healers   4 – Other (Specify) _____

5 – Not available

24.) Final primary diagnosis _____

25.) Comorbid psychiatric disorder(s)

1 – Absent   2 – Present (Specify) _____

26.) Mode of initial management

1 – Inpatient   2 – Outpatient

27.) Modalities of treatment

1 – Biopsychosocial   2 – Psychosocial only   3 – Biological only

4 – Biopsychosocial plus ECT   5 – Biological plus ECT   6 – No treatment

28.) Oral medication(s)

   1 – Atypical antipsychotic   2 – Typical antipsychotic   3 – Antidepressant

   4 – Mood stabilizer   5 – Stimulant   6 – None

   7 - Other (Specify) _____

29.) Parenteral medication   1 – Yes   2 – No

30.) Depot medication?   1 – Yes   2 – No

31.) Past psychiatric history   1 – Absent   2 – Present

32.) Follow up visits   1 – 0-1 visit   2 - ≥ 2 visits

Specific Biological Factors

33.) Family history of mental illness

   1 - Absent   2 – Present (Who?) _____

34.) Chronic medical condition

   1 – Absent   2 – Present (Specify) _____

35.) Pregnancy Complications (E.g. multiple pregnancy, hypertension, malaria, febrile illness with rash, preterm, post term, placenta previa).

   1 – No   2 – Yes (Specify) _____

36.) Delivery Complications (E.g. emergency caesarean section, prolonged labour, birth asphyxia).

   1 – No   2 – Yes (Specify) _____

37.) Neonatal Complications (E.g. Neonatal jaundice, neonatal sepsis).

   1 – No   2 – Yes (Specify) _____

38.) Severe Early Childhood Illness (E.g. febrile convulsions, seizure disorder).

   1 – No   2 – Yes (Specify) _____

39.) Head injury

   1 – No   2 – Yes (Describe mechanism of injury) _____

40.) Other specified biological factors

_____

APPENDIX II

Ethical Approval

INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)
College of Medicine, University of Ibadan, Ibadan, Nigeria.

Director: **Prof. Catherine O. Falade**, MBBS (Ib), M.Sc., FMCP, FWACP
Tel: 0803 326 4593, 0802 360 9151
e-mail: cfalade@comui.edu.ng lillyfunke@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**
NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: Diagnostic and Biopsychosocial Profiles at the Child and Adolescent Mental Health Clinic of University College Hospital, Ibadan.

UI/UCH Ethics Committee assigned number: UI/EC/20/0216
Name of Principal Investigator: **Isaac A. Alakeji**
Address of Principal Investigator: Centre for Child & Adolescent Mental Health
College of Medicine
University of Ibadan, Ibadan

Date of receipt of valid application: 18/03/2020
Date of meeting when final determination on ethical approval was made: **N/A**

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from **06/05/2020 to 05/05/2021.** If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the UI/UCH EC assigned number and duration of UI/UCH EC approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC at least four weeks before the expiration of this approval in order to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. No changes are permitted in the research without prior approval by the UI/UCH EC except in circumstances outlined in the Code. The UI/UCH EC reserves the right to conduct compliance visit to your research site without previous notification.

Professor Catherine O. Falade
Director, IAMRAT
Chairperson, UI/UCH Research Ethics Committee
E-mail: uiuchec@gmail.com

Research Units • Genetics & Bioethics • Malaria • Environmental Sciences • Epidemiology Research & Service • Behavioural & Social Sciences • Pharmaceutical Sciences • Cancer Research & Services • HIV/AIDS