Article

Research

Psychiatric comorbidities of epilepsy and treatment gap among children and adolescents at Butabika National Referral Psychiatric Hospital of Uganda

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Abstract

*Introduction: psychiatric comorbidities of epilepsy are common. In order to improve the overall quality of life of the affected individuals it is imperative for clinicians to screen and treat these conditions early. We aimed at determining prevalence of psychiatric comorbidities of epilepsy and treatment gap among children and adolescents (6-17) at Butabika Hospital. **Methods:** we conducted a cross sectional study; psychiatric disorders were assessed using the Mini International Neuropsychiatric Interview for Children (MINI-kid 7.0.2 version) and clinical data abstraction was used to collect data from patient file. Quantitative data was analyzed using SPSS v25 software while qualitative data was analyzed using thematic analysis. The study followed the Consolidated criteria for Reporting Qualitative research (COREQ) and statement on guidelines for Strengthening the Reporting of Observational studies in epidemiology (STROBE). **Results:** a total of 157 participants were enrolled and, 38.9% (95%CI: 31.5-46.6%) had at least one psychiatric disorder whereas 12.1% had two or more psychiatric disorders. Attention Deficit Hyperactivity Disorder (11.5%), Autism Spectrum Disorder (7.0%) and Major Depressive Disorder (5.1%) were the most common psychiatric disorders. The treatment gap was 33.1% (95%CI: 26.1-40.7%). The barriers to screening were challenging psychiatric disorders, exhausting to screen; and inadequate diagnostic information. The barriers to treatment were poor compliance to treatment, poorly controlled seizures and inadequate human resources. **Conclusion:** psychiatric disorders are highly prevalent among children and adolescents with epilepsy but there is substantial screening and treatment gap. To close the gap, there is need to address institutional, caregiver and patient barriers to screening and treatment of the psychiatric comorbidities. Improving human resources, capacity building and provision of basic requirements for screening, could reduce the assessment and treatment gap.*

Introduction

Epilepsy is one of the most common disorders of the brain, affecting about 70 million people of all ages, race, and social class worldwide [1]. In Uganda, 10 per 1000 suffer from epilepsy [2]. With children and adolescents carrying a higher disease burden [3]. Globally, psychiatric manifestations represent frequent comorbidities in epilepsy [4], with up to 43% of the children with epilepsy presenting with psychiatric disorders [5]. The most common psychiatric comorbidities include; depression (5.2-39.6%) [6], anxiety (5-49%) [7], psychosis (5.4%) [8] attention deficit hyperactivity disorder (ADHD) 30-40% [9], autism spectrum disorder (ASD) 9% [10], and Intellectual Disability (ID) 22.2% [11]. However, only 33% of children with psychiatric comorbidities receive some form of mental health treatment [12]. Although the burden is global, sub-Saharan Africa has the highest prevalence of psychiatric comorbidities in epilepsy [13]. According to previous studies, the prevalence of psychiatric comorbidities among children and adolescents is 54% in Kenya [14], 61% in Tanzania [15], and 57.8% in Uganda [16]. However, no published study has assessed the burden and treatment gap for psychiatric disorders among children and adolescents with epilepsy in East Africa.

Although psychiatric disorders deleteriously impact the health quality of life of people living with epilepsy [17], they are more often ignored, unless they are severe enough to cause major disabilities. The lack of integrated multidisciplinary teams leaves the complex nature of managing epilepsy and associated comorbidities unsolved [16]. In Uganda, the first child and adolescent mental policy was developed with a primary goal of reducing the burden of mental, neurological and substance use disorders and improve the quality of life of the affected children and adolescents [18]. However, lack of current epidemiological data on the burden of psychiatric comorbidities of epilepsy among children and adolescents makes it difficult to plan, budget, and

target mental health services for them. This study aimed to determine the prevalence of psychiatric comorbidities of epilepsy, associated factors and the treatment gap among children and adolescents and the clinician reflections on the untreated psychiatric comorbidities at Butabika National Referral Psychiatric Hospital.

Methods

Study design: this was a cross-sectional study using quantitative and qualitative research methods.

Setting: the study was conducted at the children´s ward of Butabika National Referral Psychiatric Hospital in Uganda. Recruitment was conducted from Aug-2021 to March-2022. The ward provides both inpatient and outpatient services with an upper age limit of 17 years. Of the average 552 cases (480 outpatient and 72 inpatient cases), epilepsy accounted for 71% of all cases [19] according to an anecdotal report in July 2020. The hospital was selected because it serves the biggest number of children and adolescents with epilepsy in Uganda. The ward has a bed capacity of 30 beds with over 150% occupancy by 2014 [20]. In this facility, Psychiatrists, Psychiatric Clinical Officers (PCOs) and Psychiatric Nurses treat patients with epilepsy while supported by Psychologists and Occupational therapists for psychotherapy.

Participants: patients with epilepsy (6 to 17 years) attending the children´s outpatient clinic were screened, and every 2nd participant eligible was systematically selected for participation. This age group was selected because febrile seizures are commonly diagnosed in children under 5 years [21] and a diagnosis for certain disorders is only considered above five years [22].

Variables

Prevalence of psychiatric comorbidities of epilepsy: psychiatric co-morbidity of epilepsy was defined as a mental disorder occurring in association with epilepsy, and might be a cause or a consequence, and may precede, co-occur or follow the diagnosis of epilepsy [23].

Treatment gap of psychiatric comorbidities: this was defined as the difference between the number of children and adolescents treated for psychiatric comorbidities and those who should be treated, expressed as a percentage. Such differences comprise both diagnostic and treatment deficits [24].

Socio-demographic and illness characteristics: these included age of the patient, sex of patient, patient´s relationship with the primary caregiver, patient´s relationship with informant, patient attending school and class of study, tribe of the patient, duration with epilepsy, duration on Anti-Epileptic Drugs (AEDs), AEDs names and dosage.

Data sources/measurement

Prevalence of psychiatric comorbidities of epilepsy: the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI kid 7.0.2) parent version was used to assess for the psychiatric comorbidities. Modules for ASD, ADHD, psychosis, depression, suicidality, and anxiety were used. The MINI kid has been validated in Uganda with substantial sensitivity (0.61-1.00) and excellent specificity (0.81-1.00) [25]. The tool has a shorter administration period and has been widely used in Uganda [25-31].

Treatment gap of psychiatric comorbidities: a semi-structured questionnaire was designed for clinical data abstraction to collect diagnostic and therapeutic data.

Socio-demographic and illness characteristics: a semi-structured interviewer-administered questionnaire was used to collect information on patient factors that could be associated with treatment gap.

Bias: although, the desired sample size was not reached, 82% turn up was achieved without

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missing data. The PI was working on the ward where data was collected.

Study size: the sample size was determined by using a simplified formula for cross-sectional studies developed by Cochran [32,33].

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where, n_0= sample size, p = 57.8% [16], q = 1-P and is the probability of not having psychiatric comorbidity. Z = (area under curve) standard deviation at a 95% confidence interval corresponding to 1.96. e = (percentage precision) absolute error between the estimated and true population prevalence and is 5%=0.05. To get the appropriate sample size for a study of 391 (sampling frame) children and adolescents (5-19 years) living with Epilepsy at children's ward Butabika hospital in the month of July 2020 [19]. A finite population correction for proportions formula was used to adjust the sample size [33].

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Desired sample size = 191. Due to COVID-19 movement restrictions, 157 participants were enrolled.

Quantitative variables: prevalence of psychiatric comorbidities of epilepsy was determined by getting the frequency of all disorders reported on the MINI kid 7.0.2 tool. Treatment gap of psychiatric comorbidities was determined by getting the difference between the MINI kid tool diagnoses of those that should be treated and the diagnoses of those treated in the patient medical file and expressed as a percentage. Socio-demographic, illness characteristics and treatment received were first analyzed descriptively. Then bi-variate analyses were done using Chi-square test before progressing to logistic regression to

determine the patient factors associated with treatment gap.

Qualitative methods: using a phenomenological approach, all the five clinicians working with children on the ward were purposively selected to participate in the Key Informant Interviews. Participants were informed of the purpose of the study during the consenting process. Interviews were conducted face-to-face using a semi-structured topic guide and audio-recorded with brief notes taken during the interview. The topic guide was pretested and adjusted before data collection. The PI, a child and adolescent mental health clinician on the ward with the help of researcher assistants (psychiatric clinical officers not working on the ward) conducted the interviews at the hospital. Interviewers (1-male and 2 female) had refresher training on qualitative data collection.

Statistical analysis: quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS) software, v25. Socio-demographic characteristics were initially, descriptive statistics were presented as means and standard deviation for continuous variables, and proportion/percentages for categorical variables. The 2-sided Exact Likelihood (LR) ratio for binomial proportion was used to compute the confidence intervals for prevalence of psychiatric comorbidities of epilepsy and the treatment gap. Bivariable analysis was then conducted using chi-square to assess the independent association of each predictor variable (patient characteristics) with the outcome variable (treatment gap). Logistic regression was omitted because there were no significant factors on bivariable analysis.

Qualitative analysis: MAXQDA software (v20.3.0) was used to transcribe and code transcripts. Qualitative data were analyzed according to the six stages of thematic analysis by Braun and Clarke [34]. All the 5 transcripts were included in the analysis after review by the participants. In vivo coding was employed by two analysts separately (JM & JK) to generate codes and

themes identified. Following back and forth iterative review, the codes and sub-themes were improved until all authors agreed to the themes and sub-themes.

Results

Participants: participants approached were 198, 40 were excluded due to declining consent, not having a caregiver, being below 6 years and above 18 years (Figure 1).

Descriptive data: participants were 157, mean age 11.32 (±3.55) years, 92 (58.6%) were male, living with their parents 117 (74.5%) and 41 (26.1%) were not in school. Average duration of epilepsy was 4.97 (±3.3) years but had been on treatment for only 2.91 (±2.58) years. The commonly used AEDs were Carbamazepine 75 (47.8%) and Sodium valproate 75 (47.8%). Of the 9 participants who were on treatment for psychiatric comorbidities, 7 (4.5%) were on drug treatment and 2 (1.2%) non-drug treatment (Table 1). For key informant interviews, of the five (5) clinicians working with children and adolescents, four participants had an advanced training in Child and Adolescent Mental Health services (CAMH) and the following are the professions of participants; Psychiatric Clinical officer (PCO), nursing officer, clinical psychologist, occupational therapists and one PCO who had no specialization in children and adolescents.

Outcome data: outcomes of focus were prevalence of psychiatric comorbidities and the treatment gap. Patient factors were omitted at bivariate analysis. Clinician reflections were qualitatively analyzed.

Main results

Prevalence of psychiatric comorbidities of Epilepsy: the prevalence of psychiatric comorbidities was 38.9% (95%CI: 31.5-46.6, p=0.007) and 19 (12.1%) participants had two or more mental disorders (Table 2). The most reported psychiatric comorbidities were ADHD 18(11.5%), ASD 11 (7%) and major depressive disorder (5.1%). Only ADHD 5(3.2%), ASD 3 (1.9%) and psychotic disorder 1 (0.6%) were written in the patient files (Figure 2).

Treatment gap: the treatment gap was 33.1% (95%CI: 26.1-40.7%, p=<0.001) (Table 2).

Clinician reflections on screening and treatment of psychiatric comorbidities: three major themes emerged with several subthemes: 1) barriers to screening, 2) barriers to treatment of comorbidities and 3) recommendations to improve screening and treatment of the comorbidities.

Barriers to screening of psychiatric comorbidities of epilepsy: this theme highlighted several barriers to screening of psychiatric disorders, including challenging psychiatric disorders to screen, being exhausting and time consuming to screen for all psychiatric disorders, and scanty or lack of information from the caregiver.

Challenging psychiatric disorders to screen: when asked about challenges faced while screening, some clinicians, especially psychologists, reported that certain disorders are hard to assess. Such disorders were specific learning disabilities and anxiety disorders, as they required psychometric batteries that take time to administer in the quote below. *"Some disorders are hard to diagnose, especially dyslexia the specific learning disabilities, intellectual disabilities and also screening for anxiety, but when you look at assessing for dyslexia it needs the proper psychometric battery like individual achievement test or the Wechsler intelligence scale for children"* (T3).

Exhausting and time-consuming to screen for all psychiatric disorder: clinicians reported that screening could be done, but they are understaffed and overwhelmed with patient numbers. Others could request the patient to come back on a day that is not a clinic day in order to give them enough time for screening. See the quote below. *"if it is outpatient, I give one week or maximum two-week time to see them again and*

resume assessment because screening for all conditions "my goodness" you may end up seeing 5% of those who need the service" (T2). "…… you get like one clinician attending to over 150-200 patients on a single clinic day" (T1). All clinicians attested that there are no screening tools on the ward and yet tools could reduce on the time spent with the patient, especially parent-administered tools. This is evidenced in the following quotes; *"It could take you over 45 minutes to administer if you want to diagnose conditions like PTSD ……….. sometimes if I cannot print out the tools for the parents to fill, it becomes a challenge"* (T4).

Scanty or lack of information from the caregiver: all clinicians reported that some caregivers did not give enough information to support the diagnosis. They reported that at times the patient is left home or brought by individuals who do not stay with them. This can due to transport costs, being too busy, or someone else is helping the child. A clinician expressed the dilemma in the quote. *"It is not easy because of scanty information from caregivers, as many of them are not the primary caregivers. These may be the relatives such as uncles, aunties, grandparents among others".*(T1).

Barriers to treatment of psychiatric comorbidities of epilepsy: a number of barriers to treatment were also highlighted, including; poor compliance to treatment due to conflicted activities or drug side effects, time consuming to treat psychiatric comorbidities, seizure severity influences the decision to treat comorbidities, inadequate specialist human resource and abandoned children cause a big dilemma in treatment of psychiatric comorbidities.

Poor compliance to treatment due to conflicted activities or drug side effects: clinicians reported that they were willing to screen, but clients had equally important activities that limited them from fulfilling the psychotherapy appointment. The experience of drug side effects was reported to contribute to future non-adherence, which affected the overall improvement of the child. This is shown in the quotes below. *"…. When they*

come during the week, that means they are missing out on lessons, and sometimes they have exams……. Sometimes the compliance to treatment is the one that is difficult" (T3). "She is like those medicines used in Butabika are very bad…. Even if you´re giving another medicine which is not an anti-psychotic, they already have that image that those medicines do this…"* (T5).

Time consuming, yet there is inadequate human resource to treat psychiatric comorbidities: participants wished to treat the diagnosed disorders but some patients had more than one disorder, yet they are understaffed. Therefore, they decided to treat the initial disorder in order to provide services to others as well. Due to inadequacy of psychotherapists on the ward, clinicians would refer patients where they could get the service needed. This is done for psychotherapy, speech and language therapy and physiotherapy. This is evinced in the following quotes. *"Most of the time it's easier to treat the primary disorder than to go ahead and screen for everything as long as you are progressing well because of the timing"* (T3). *"…. We just link where those services are free, I think KCCA is having a project in Nakivubo blue primary school, the speech and language therapist is there ……. The physiotherapist is not available in the hospital so…., we always send them to that organization"* (T5).

Seizure severity influences the decision to treat comorbidities: participants who give psychotherapy were challenged to treat patients who had poorly controlled seizures. They had to pose treatment of psychiatric disorders until the patient had stabilized. *"There are times I find it challenging to use the therapy when the seizures are still severe, you need the child to first be stable on medication"* (T4).

Abandoned children cause a big dilemma in treatment of psychiatric comorbidities: clinicians reported the abandoned children who could not speak were challenging to screen. They reported that even when treated, resettling them for

community care would be hard and thus could relapse at the ward. Stigma towards epilepsy is the strongest contributor to this behavior, according to the following quotes. *"These children who are brought by the police at times they don't talk. They are just dumped…. No one can explain…, the nurses and the people on ground will not get that much time to concentrate on one child… so we even end up neglecting them"* (T5). *"….. Parents do not want to bring children into care early. They lock the child and then only come to hospital when the child is severely sick. This happens due to stigma……. They are abandoned on ward or in the hospital compound"* (T1).

Recommendations to improve screening and treatment of psychiatric comorbidities: this theme emphasized the best practice components to screening and treatment of the psychiatric comorbidities. A multidisciplinary team development to facilitate screening and treatment of psychiatric comorbidities was proposed, extending treatment remotely and closer to the service users, and capacity building of those working with children.

Multidisciplinary team development to facilitate screening and treatment of psychiatric comorbidities: participants suggested that there are specialties missing on the team to screen and treat comorbidities, such specialties were pediatrician, nutritionist, speech and language therapist, and physiotherapists. They reported that this could reduce referrals which may be costly for the patient and improves follow up as the patient consults from within the facility. *"Of course, we need other professionals that we may not have in the hospital like nutritionist……because that component of nutrition is also lacking"* (T4). *"Pediatricians have a role to play…, when I get a child with Epilepsy below 10 years, I always discuss the child with the pediatrician and other health professionals to develop a comprehensive care plan"* (T1).

Extending treatment remotely and closer to the service users: some of the clinicians took the initiative to train school counselors in order to support the child since the patient could not afford coming to Butabika hospital for psychotherapy. *"So, for problems like low self-esteem and depression, the schools have counsellors and so it is easy to support the counsellor and the counsellor supports the child at school……*(T3).

Capacity building of those working with children: in order to improve the quality of services, knowledge and skills are an important contributor and clinicians recommended hospital-based Continued Medical Education (CME) and case discussions while others suggested to train nurses in lower facilities since the patient cannot afford coming to Butabika hospital for psychotherapy. *"May be organizing CMEs, getting people from different departments, or from outside to conduct CMEs in the unit. And also, may be having a platform in the unit where we sit and discuss difficult conditions…."* (T2). *"At the health center IV or III you may find there is a psychiatric nurse, so when it comes to screen for comorbidities, they can screen but now how do they manage…"* (T3).

Ethical approval and consent to participate: this study was approved by Mbarara University of Science and Technology Research Ethics committee (MUST-REC) [MUST-2021-16] and the Uganda National Council of Science and Technology (UNCST) [HS1465ES]. Agreement to use MINI-Kid 7.0.2 was signed with Prof. David Sheehan before data collection. No Serious Adverse Event (SAE) was noted in the study.

Discussion

This study aimed at determining the prevalence of psychiatric comorbidities of epilepsy and treatment gaps among children and adolescents at Butabika National Referral Psychiatric Hospital in Uganda. The prevalence of psychiatric comorbidities of Epilepsy was 38.9%. The most common psychiatric comorbidities were ADHD, ASD and major depression, and the treatment gap

was 33.1%. The barriers to screening were challenging psychiatric disorders to screen, experiencing the task as exhausting and time-consuming; and scanty or lack of information from the caregivers. The barriers to treatment of psychiatric comorbidities were poor compliance to treatment due to conflicted activities or drug side effects, time-consuming to treat, seizure severity influences the decision to treat comorbidities, inadequate specialist human resource and abandoned children cause a big dilemma in treatment of psychiatric comorbidities. The suggestions to improve screening and treatment were multidisciplinary team development, extending treatment remotely and closer to the service users, and capacity building of those working with children.

Prevalence of psychiatric comorbidities of epilepsy: the prevalence of 38.9% in our study is lower than the 58% reported in south-western Uganda in 2020 [16]. Although health services in the central region (urban) are more improved, caregivers of children with epilepsy wish their children to stay in remote areas due to stigma associated with the disease [35]. Additionally, those who may have serious behavioral challenges are kept in remote areas as they may not stabilize in school, yet parents are busy at work in the urban settings. On the contrary, a higher prevalence of 61% was reported in Tanzania [15]. The study in Tanzania used behavioral disorder screening tools. Tools based on clinical diagnostic criterion are more specific and report lower prevalence than the behavioral screening tools [36]. The most common psychiatric comorbidities of epilepsy in this study were ADHD, ASD and Major depression. This is similar to what has been reported in Kenya [14] and in Uganda at Mulago national referral hospital among children aged 4 to 18 years [37].

Treatment gap for psychiatric comorbidities of Epilepsy: treatment gap of 33.1% was equal to the screening gap. This means that in psychiatric facilities, barriers to screening are the strongest contributors to the treatment gap. In Zambia, it

was reported that only 3.5% of those eligible for treatment actually received it [38]. The observed big difference in the treatment gap, could be due to the current study being conducted in a tertiary psychiatric hospital where Epilepsy cases are managed by mental health professionals as opposed to the study in Zambia which was carried out in a general health facility. A Zambian survey on treatment gap of Epilepsy showed that among physicians and electrologists, many were not confident to initiate treatment for the psychiatric comorbidities [39]. Behaviors that are troubling to parents are easily reported during the clinical meeting and treated. For example, ADHD 3.2%, ASD 1.9% and psychotic disorder 0.6% were the only treated disorders in the patient file. The synergy of the parent to only report what is obviously troubling and the clinician only asking what is observed as disturbing in the clinical interview contributes much to the diagnostic deficit, which translates into the treatment gap [12].

Experienced barriers to screening of psychiatric comorbidities of epilepsy: study findings revealed that some disorders were challenging to screen, as they required a lot of time, tools and attention. Such disorders were specific learning disabilities and anxiety disorders. Regardless of being mental health professionals, they still felt inadequacies to screen for certain disorders. Similarly, a survey on Epilepsy screening and treatment revealed that clinicians have deficits in screening, and it is imperative that they become familiar with the diagnostic tools [40]. Overall, screening of Epilepsy was exhausting and time-consuming. Currently, there are no validated overall diagnostic tools for clinical use in Uganda. Although clinical diagnosis is preferred, due to time limitations, use of screening tools is gaining insight. Still, this should be followed with a clinical interview to avoid false positive while considering treatment [41]. The Ministry of Health, Uganda, adopted the use of PHQ-9 among adults with HIV [42]. The same could be done for epilepsy, such as the Neurologic Depression Disorder Inventory [43] considering

the confounding variables among children and adolescents. The study showed that there is insufficient information to support diagnosis. Patients are at times brought by individuals who do not know their history or represented at the clinic visit and due to stigma of mental illness, caregivers may fail to report information about the child [41].

Experienced barriers to treatment of psychiatric comorbidities of epilepsy: compliance to treatment due to conflicted activities or drug side effects affected the treatment process. Unavoidable circumstances such as school programs dictate the adherence to the treatment plan. On occasion, drug side effects cause undesirable experiences, especially for the first time. This may dictate future adherence to treatment regardless of psychoeducation given. Patients´ attitude and medication side effects contribute to future treatment adherence, and others seek for alternatives and do not return to the facility [44]. Seizure severity influenced the decision to treat. Psychotherapy sessions require that the patient is in a stable state to follow the treatment plan. Unfortunately, uncontrolled seizures deter treatment progress. This also affects the child´s ability to comprehend questions during screening. Studies have reported that changes in cognitive abilities of children with epilepsy affect them throughout education [45-47].

Treating psychiatric disorders was time-consuming, yet there was inadequate human resource. For specialized therapeutic services such as speech and language therapy and physiotherapy, and when the available therapists have overwhelming appointments, referral is made to other centers where the services are free. However, some patients can be missed during such referrals to other facilities. Similarly, epileptologists in a survey attested that inadequate psychotherapists make the treatment incomplete [39]. Abandoned children caused a big dilemma in treatment of psychiatric comorbidities. These children cannot speak and there is no one to explain about their condition. In turn, they are admitted and put under observation. While mental health awareness has gained global attention, the community remains unjust in endorsing the basic rights for children and adolescents with epilepsy, such as health care [35]. This is evidenced by the fact that participants in this study had a two-year delay to initiate health care.

Limitations: the study included children who did not have good expressive communication skills. However, the researchers used the parent version of MINI kid tool which allows the caregiver´s input/involvement. The researchers faced a challenge of consistency between the research tool and clinical diagnosis in the patient file. However, a tool based on DSM-V was used, since clinicians in Uganda use DSM-V for diagnosis of mental disorders.

Conclusion

Psychiatric disorders are highly prevalent among children and adolescents with epilepsy, but there is substantial screening and treatment gap. To close the gap, there is a need to address institutional, caregiver and patient barriers to screening and treatment of the psychiatric comorbidities. Improving human resources, capacity building and provision of basic requirements for screening, could reduce the assessment and treatment gap.

What is known about this topic

- *Psychiatric disorders such as ADHD, ASD and Major depression are common among children and adolescents with Epilepsy;*
- *High patient numbers and inadequate human resource is a major hinderance to screening and treatment of psychiatric disorders in developing countries.*

What this study adds

- *The treatment gap of psychiatric comorbidities of epilepsy is 33.1% among children and adolescents, according to our knowledge, this is the first study to determine treatment gap among children and adolescents with Epilepsy in sub-Saharan Africa;*
- *Prevalence of psychiatric disorders is high 38.9% among children and adolescents with Epilepsy and 12% have more than one psychiatric disorder, psychiatric disorders such as ADHD, ASD and psychosis that have behavioral challenges can be given priority and thus treated than emotional disorders;*
- *There are barriers to screening and treatment of psychiatric comorbidities of Epilepsy, these can be caregiver, clinician or institutional barriers.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Jolly Magulu: conceptualization, methodology, investigation, data analysis, original draft, review and editing, Racheal Alinaitwe: conceptualization, methodology, investigation, review and editing, Supervision. Itamar Cohen: conceptualization, investigation, review and editing, eupervision. Joseph Kawuki: conceptualization, data analysis, review and editing. Godfrey Zari Rukundo: conceptualization, validation, investigation, review and editing, supervision. All the authors have read and agreed to the final manuscript.

Acknowledgments

Tables and figures

Table 1: participants´ demographic and illness characteristics

Table 2: prevalence and treatment gap of psychiatric comorbidities of Epilepsy

Figure 1: study flow chart showing recruitment of participants

Figure 2: psychiatric comorbidities of Epilepsy diagnosed on MINI-kid and the patient file

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Table 1: participants' demographic and illness characteristics

Variable	Category	Frequency, n (%)
Sex of patient	Female	65(41.4%)
	Male	92(58.6%)
Relationship with primary caregiver	Parent	117(74.5%)
	Not parent	40(25.5%)
Child in school	Not studying	41(26.1%)
	Studying	116(73.9%)
Tribe of patient	Muganda	108(68.8%)
	Musoga	16(10.2%)
	Others	33(21.0%)
Age of patient (years) 11.3(±3.6)	Children	54(35.4%)
	Adolescents	103(65.6%)
Duration with Epilepsy 4.97(±3.30) years	≤4 years	81(51.6%)
	>4 years	76(49.4%)
Duration with anti-Epileptic Drugs 2.91(±2.58) years	≤4 years	115(73.1%)
	>4 years	42(26.9%)
Drug treatment given for psychiatric comorbidities in the patient file	Risperidone	2(1.3%)
	Haloperidol	1(0.6%)
	Olanzapine	2(1.3%)
	Methylphenidate	2(1.3%)
Non-drug treatment given for psychiatric comorbidities in patient file	Non-specific psychotherapy	1(0.6%)
	Individual psychotherapy	1(0.6%)
Commonly used Anti-Epileptic Drugs		

Anti-Epileptic drugs	Carbamazepine	Lamotrigine	Phenobarbitone	Levite ceram	Sodium valproate
n(%)	75(47.8%)	24(15.2%)	22(14.0%)	4(0.03%)	75(47.8%)
Mode/day	600mg	100mg	30mg	1000mg	600mg

Table 2: prevalence and treatment gap of psychiatric comorbidities of epilepsy

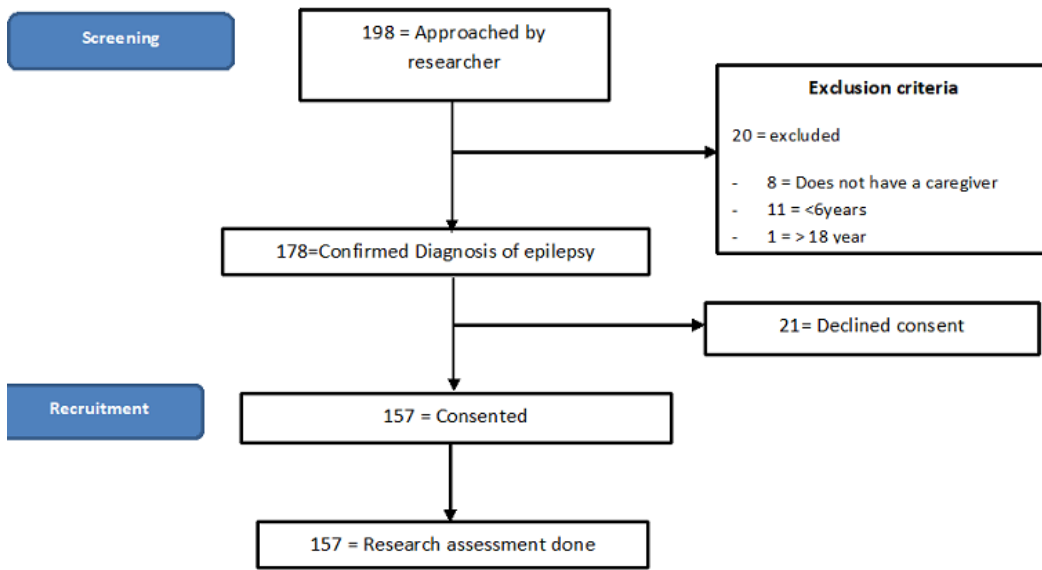| Variable	Frequency, n(%)	95%CI	P-value
Mental disorder diagnosis on mini-kid (yes)	61(38.9)	31.5-46.6	0.007
Two or more mental disorders on mini-Kid	19(12.1%)		
Treatment gap	52(33.1%)	26.1-40.7	0.000

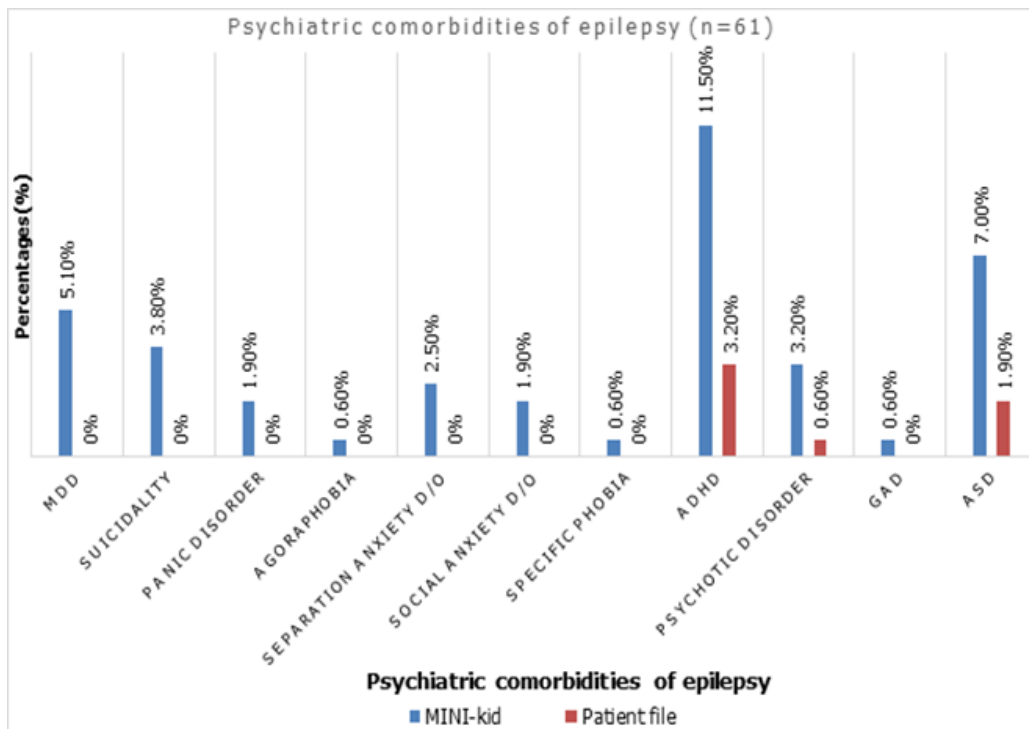**Figure 1**: study flow chart showing recruitment of participants

Figure 2: psychiatric comorbidities of epilepsy diagnosed on MINI-kid and the patient file