"I feel good when I drink"—detecting childhood-onset alcohol abuse and dependence in a Ugandan community trial cohort

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Abstract

Background: Alcohol, substance use, and mental health disorders constitute major public health issues worldwide, including in low income and lower middle-income countries, and early initiation of use is an important predictor for developing substance use disorders in later life. This study reports on the existence of childhood alcohol abuse and dependence in a sub-study of a trial cohort in Eastern Uganda.

Methods: The project SeeTheChild—Mental Child Health in Uganda (STC) included a sub-study of the Ugandan site of the study PROMISE SB: Saving Brains in Uganda and Burkina Faso. PROMISE SB was a follow-up study of a trial birth cohort (PROMISE EBF) that estimated the effect that peer counselling for exclusive breast-feeding had on the children's cognitive functioning and mental health once they reached 5–8 years of age. The STC sub-study (N = 148) used the diagnostic tool MINI-KID to assess mental health conditions in children who scored medium and high (≥ 14) on the Strengths and Difficulties Questionnaire (SDQ) in the PROMISE SB cohort N = (119/148; 80.4%). Another 29/148 (19.6%) were recruited from the PROMISE SB cohort as a comparator with low SDQ scores (< 14). Additionally, the open-ended questions in the diagnostic history were analysed. The MINI-KID comprised diagnostic questions on alcohol abuse and dependence, and descriptive data from the sub-study are presented in this paper.

Results: A total of 11/148 (7.4%) children scored positive for alcohol abuse and dependence in this study, 10 of whom had high SDQ scores (≥ 14). The 10 children with SDQ-scores ≥ 14 had a variety of mental health comorbidities of which suicidality 3/10 (30.0%) and separation anxiety disorder 5/10 (50.0%) were the most common. The one child with an SDQ score below 14 did not have any comorbidities. Access to homemade brew, carer’s knowledge of the drinking, and difficult household circumstances were issues expressed in the children's diagnostic histories.

Conclusions: The discovery of alcohol abuse and dependence among 5–8 year olds in clinical interviews from a community based trial cohort was unexpected, and we recommend continued research and increased awareness of these conditions in this age group.
Background
The United Nation’s Sustainable Development Goals have made preventing mental ill-health and substance use a public health priority specified in goals 3.4: “By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being” and 3.5: “Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol” [1]. Data from the Global Burden of Disease Study 2010 showed that substance use and mental disorders were the leading causes of years lived with disability (YLD) worldwide [2]. Among children and adolescents in low and middle-income countries (LMIC) these conditions accounted for 23.8% of the YLD [3]. It has been estimated that up to 20% of children and adolescents globally suffer from a debilitating mental illness [4, 5] and that 50% of all mental disorders start before age 14 [3, 4]. The World Health Organization (WHO) has estimated that up to 76–85% of all people living with severe mental disorders and 99% of those with past-year substance use disorders in LMIC did not receive treatment [6, 7].

Alcohol consumption in Uganda is among the highest in the world at 26.0 L of alcohol per capita per year in 2016 [8]. At the time of the study the legal regulations from 1960 had not been updated, thus still stating that the legal age for consumption is 18 years, while selling to minors is penalised with a fine not exceeding 500 Ugandan shilling (0.13 USD) and children are allowed to buy on behalf of adults [9]. The Ugandan government has recognised mental illness as a serious public health matter, but service provision remains a major challenge [10]. As a response to the inadequate handling of child and adolescent mental health, the Ministry of Health recently released “Child and Adolescent Mental Health Policy Guidelines” [11] in which substance use in children is recognised, stating that “alcohol and drug abuse in children and adolescents in Uganda is on the increase although not well researched” [11]. A family history of substance use is an important predictor for early onset of alcohol use [12–18], and early initiation of alcohol and substance use is an important predictor for later life harmful use [19]. Harmful substance use and mental illness are often co-morbid conditions that share risk factors and outcomes such as school dropout, sexually transmitted diseases, unwanted pregnancies, traffic accidents, violence, and suicide [20–22]. Harmful alcohol use is, according to ICD-10, a diagnosis requiring “actual damage to the mental or physical health of the user” [23]. Further, early exposure to alcohol may affect the developing brain [21]. According to the US National Institute on Alcohol Abuse and Alcoholism, DSM-IV described two distinct disorders, namely alcohol abuse and alcohol dependence, with specific criteria for each. In DSM-5 these were integrated into one—alcohol use disorder—with mild, moderate, and severe sub-classifications [24].

Until now, research on early substance use has focused on adolescents [21, 25, 26] and has not looked at risk factors or the effects of very early use [19]. The WHO has recognised a lack of knowledge about substance use before age 15 [8], making it difficult to address the needs of this group and to plan appropriate interventions. This article reports on the detection of alcohol abuse and dependence in a birth cohort of children aged 5–8 years in Mbale District, Eastern Uganda.

Methods
Design, objective, and study site
The current study was part of the SeeTheChild—Mental Child Health in Uganda (STC) project. That project had many components, of which one was an ancillary study to the PROMISE Saving Brains (PROMISE SB) study [27]. The PROMISE SB data collection in 2013–2015 was a follow-up study of a cluster randomised trial cohort promoting exclusive breastfeeding among 2579 mother-infant pairs by peer counsellors in Burkina Faso, Uganda, and South Africa (PROMISE-EBF) in the period 2006–2008 and is described elsewhere [28]. The PROMISE SB saw the children in Uganda and Burkina Faso again from 2013 to 2015 when they had reached 5–8 years of age [27].

The Ugandan study site was in Mbale District in Eastern Uganda, 245 km from the capital Kampala. Situated close to the Kenyan border, Mbale Municipality is the main urban trading area in the district, which is predominantly rural and dominated by peasant farming. The
The STC sub-study included a broader mental health assessment of a selection of children from the PROMISE SB study in Uganda compared to what was assessed in PROMISE SB. This was done in order to better understand the mental health issues of this population. The objective was to follow up, get insight about the mental health symptoms of children scoring high on quantitative screening scales, and reassess children for clinical considerations and potential referrals to health care.

**Study tools in PROMISE SB**

A structured questionnaire was administered to the parents during the PROMISE SB data collection. The questionnaire was developed in English, translated into the local language (Lumasaba), and back translated to English to ensure that the original meaning was retained. The word ‘parent’ was used to describe any caregiver or legal primary guardian, whether biological related or not.

**Selection of participants from PROMISE SB**

The selection of children for the STC sub-study was done through screening tools in the PROMISE SB questionnaire, including the English (UK) parent version for children 4–17 years of the Strengths and Difficulties Questionnaire (SDQ) [29], and interviews with data collectors and study clinicians. The SDQ is a screening tool with 25 items related to five symptom scales—emotional, conduct, hyperactivity, peer, and prosocial. The target children were those with a total SDQ score of 14 or higher, thus including those with borderline scores (14–16) and those with abnormal scores (17–20) [29]. At the time of the data collection, we were not aware of any Ugandan-normed version of the SDQ with corresponding cut-off values, so our assumptions for borderline and abnormal scores were based on the original English (UK) version. However, a recent scoping review from Hoosen and colleagues points towards relatively frequent use of the SDQ in Africa, and they report on methodological challenges with corresponding implications for the interpretations of findings [30, 31]. We were aware of its usage in Uganda, and collegial feedback on its usefulness in that context suggested its content validity and its correlation with other mental health problems. The SDQ was thus chosen for the PROMISE SB, which had as its main outcome the detection of any ‘study-arm’ score difference [27, 30, 31]. In addition, the research personnel were interviewed regarding children whom they had identified as having social, emotional, and behavioural difficulties. The consultations with the personnel did not yield any additional cases to those found through screening with the SDQ.

The PROMISE SB aimed to see at least 70% of the 765 enrolled children participating in PROMISE EBF [28], in other words 535 children. We anticipated a psychiatric problem rate of approximately 20% [32] of the PROMISE-SB population, or around 110 cases. We also wanted to see cases with normal SDQ scores (<14) for consistency and validity judgement. The cases scoring <14 on the SDQ were consecutively recruited from PROMISE SB into the STC sub-study from June to December 2014. In total, the STC sub-study reassessed 120 children with high (≥14) SDQ scores and 29 children with low (<14) SDQ scores (N=149). The parents of the children were contacted to provide written informed consent before participation in the sub-study. Participants received a transport reimbursement and a meal for their participation.

**Diagnostic assessments**

We used the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID) designed for children and adolescents aged 6–17 years to perform the mental health assessment of the selected children (N=149). We used the full MINI-KID inventory and description, as described by Sheehan and colleagues in 2009 [33], to assess the presence of DSM-IV and ICD-10 psychiatric disorders in a comprehensive and concise way. The structured interview was held with the child and parent together. The MINI-KID interview has been shown to be useful in clinical and research settings [33], and it is regularly used clinically and in research in Uganda [34].

In this study, we report on the section on alcohol use in the MINI-KID. This section opens with three screening questions where a ‘yes’ on any of the following questions would open up for further questions: (1) whether the child ever had 3 or more drinks in a day; (2) whether the child ever had more than 3 drinks in 3 h; and (3) if this took place more than 3 times in the past year. The subsequent questions screened if alcohol was taken in a larger amount and probed for withdrawal symptoms, excessive drinking, unsuccessful efforts to cut down on drinking, time expenditure, additional problems in life due to drinking, hang-overs, reduced school performance, risk-taking, and legal problems. For positive responses on the alcohol section, comorbidities were assessed.

**Qualitative data description**

The open-ended answers to the questionnaire were transcribed and sorted in a spreadsheet. The transcripts were coded on the following issues: (i) how the child got access to alcohol, particularly home brew versus commercially produced drinks; (ii) who provided the alcohol; (iii) the social circumstances; and (iv) the social implications.
variety of mental health comorbidities of which suicidal -
the group with a low SDQ score. Tables 1 and 2 show that the par-
149 children, of whom 148 had complete data and were
3.4%) with an SDQ score < 14 did not have any comor -
(3/10, 30.0%) and separation anxiety disorder (5/10,
Alcoholism in middle childhood
A total of 11 children were diagnosed with alcohol
dependence (N = 6) and alcohol abuse (N = 5), of whom
10 had SDQ scores ≥ 14 (Table 3). The one child (1/29,
3.4%) with an SDQ score < 14 did not have any comor-
bidities. The 10 children with SDQ scores ≥ 14 had a
variety of mental health comorbidities of which suicidality
(3/10, 30.0%) and separation anxiety disorder (5/10,
members present [35]. Reviewing the literature on substance use in children below 10 years of age in low and lower middle-income countries (LLMIC), as defined by the World Bank [36], we only managed to identify three papers describing non-street-connected children, one from Kenya and two from Vietnam. These studies reported a prevalence of substance use of 1.3–13% [37–39]. A prevalence of 22.5–59.6% has been reported among street-connected children in LMIC [40, 41], including one study finding children initiating drinking as early as 5.5 years [42].

Our study did not investigate specific risk factors connected to alcohol abuse and dependence. As mentioned, before the study commenced we were unsure whether investigating substance use in this age group was even relevant. Although limited, our qualitative data do point to social vulnerability and poverty as driving factors for child alcoholism. This is in accordance with the finding that the prevalence of alcoholism is much higher among street-connected children, and not going to school was shown to be a significant risk factor among non-street-connected children [39].

All of the children in our sample had access to alcohol, but some of the children snuck away to drink and hid their drinking. Family history and peer influence have been found to be substantial contributors to the onset of alcohol use [20]. However, among the studies we identified investigating children under age 10 in LLMIC, the results were not as clear. A study from Kenya showed that living with a father, stepfather, or siblings increased lifetime drug use, but it found no significant correlation with the father’s substance abuse [38]. In two of the studies

| Table 1 Socio-demographic characteristics of STC sub-study participants by SDQ score, categorical variables |
|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| SDQ ≥ 14 N = 119 N, % | SDQ < 14 N = 29 N, % |
| Sex of child | Sex of child | Sex of child |
| Boy | 63 (52.9) | 20 (69.0) |
| Primary caregiver | Primary caregiver | Primary caregiver |
| Mother | 97 (81.5) | 25 (86.2) |
| Father | 4 (3.4) | 1 (3.5) |
| Other | 18 (15.1) | 3 (10.3) |
| Caregiver marital status | Caregiver marital status | Caregiver marital status |
| Caregiver married | 89 (74.8) | 18 (64.3) |
| Polygamous household | 22 (18.5) | 6 (20.7) |
| Literacy | Literacy | Literacy |
| The father can read | 93 (78.2) | 19 (67.9) |
| The mother can read | 77 (64.7) | 17 (60.7) |
| Socio-economic status | Socio-economic status | Socio-economic status |
| Socio-economic quintile | Socio-economic quintile | Socio-economic quintile |
| Lowest | 32 (26.9) | 6 (20.7) |
| 2nd | 20 (16.8) | 6 (20.7) |
| 3rd | 23 (19.3) | 7 (24.1) |
| 4th | 19 (16.0) | 3 (10.3) |
| Highest | 25 (21.0) | 7 (24.1) |
| Literacy | Literacy | Literacy |
| Literacy | Literacy | Literacy |
| Electricity | Electricity | Electricity |
| Wood | 84 (70.6) | 22 (76.9) |
| Coal | 33 (27.7) | 5 (17.2) |
| Drinking water | Drinking water | Drinking water |
| Open source | 46 (38.7) | 11 (37.9) |
| Protected (tap, pump) | 73 (61.3) | 17 (58.6) |
| School and kindergarten attendance | School and kindergarten attendance | School and kindergarten attendance |
| Never school or kindergarten | 21 (17.6) | 5 (17.2) |
| Either kindergarten or school | 59 (49.6) | 13 (44.8) |
| Prior kindergarten and current school | 37 (31.1) | 8 (27.6) |
| Allocated to the PROMISE EBF intervention | Allocated to the PROMISE EBF intervention | Allocated to the PROMISE EBF intervention |
| 64 (53.8) | 13 (44.8) |
on children below age 10, no significant correlation was found with the father’s socio-economic status, household wealth, or family functioning [37, 38]. Peer use has been identified in one study in Vietnam as the strongest independent predictive factor for substance use in a sample of children. Having friends who drank was associated with a four-fold increase in risk for having tried substances [37]. Further investigations into the risk factors associated with childhood alcohol and substance use are warranted.

Although our study did not investigate specific risks or associated factors such as socio-economic, parenting or peer-factors, our study seems to indicate a relationship between mental health challenges and alcohol use among the very young. This is well established in older age groups [22]. Our findings may suggest a vicious cycle where alcohol drinking leads to less acceptable behaviour, more social stigmatisation, and more emotional stress. However, we also saw that alcohol was used as a strategy to relieve stress expressed as “I feel good when I drink.”

Our study has clear limitations. First, the study was not designed to estimate prevalence or risk factors or to validate the findings of the study. It is therefore important to investigate childhood drinking in a more systematic manner in the region. Secondly, we focused the reassessment on those scoring high on the SDQ, resulting in a biased sample. The group of children with lower scores on SDQ was limited to only 29/406, so we were not able to make any conclusions about that group. Also, the chosen cutoffs were based on UK thresholds, and those have not been normed for Uganda. Further, the available MINI-KID instrument at the time of the study was based on the DSM-IV criteria for alcohol abuse and dependence, but in the updated DSM-5 these are now classified together as alcohol use disorder and are categorised into mild, moderate, and severe. Thus, we are not able to suggest how our findings might correspond to the new diagnostic classification. Further, the MINI-KID screening questions as given in the method section might not be appropriate for very young children. For example, the thresholds of three drinks in a day or three drinks in three hours are high and might suffer from subjective interpretation. First, fewer than three drinks did not signal a positive answer on the screening, and this might also represent a problem. Children might also have problems defining the drinks, both in quantity and frequency. This is particularly true if they are drinking from drinking pots, using small sachets, or taking sips from leftover drinks. Thus, we are worried that our findings most likely highly underestimate the problem. Despite these limitations, we believe it is justified to share these findings because they describe a possible severe public health issue in need of further investigation.
Conclusions
Our findings show that while the magnitude is not yet established, alcohol use is occurring in children aged 5–8 years in Mbane District, Uganda. This finding should have implications for future studies that investigate the prevalence of alcohol use disorders and related risk factors and outcomes in similar settings. Meanwhile, health workers and educators working with this age group should not assume the non-existence of these conditions.

Abbreviations
DSM: Diagnostic and Statistical Manual of Mental Disorders; ICD-10 International Classifications of Diseases; LMIC: Low and Lower Middle-Income Countries; MIND: Mini International Neuropsychiatric Interview for Children and Adolescents; PROMISE EBF: Promoting exclusive breastfeeding for six months by peer counsellors in Burkina Faso, Uganda, and South Africa; PROMISE SB: Saving Brains in Uganda and Burkina Faso; SDQ: Strengths and Difficulties Questionnaire; STC: See-The-Child: Mental Child Health in Uganda; YLD: Years Lived with Disability; WHO: World Health Organisation.

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Authors’ contributions
JKT, IMSE, JN, VS, AA, and GN contributed to the PROMISE SB STC protocol amendment. JKT, IE, GN, and VN contributed to the PROMISE SB protocol. JN was the investigating child psychiatrist. VS, AA, GN, and IE were active in the STC fieldwork. IE, VS, and JN conceptualised the paper and wrote the first draft of the paper. All authors read and approved the final manuscript.

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Availability of data and materials
The PROMISE SB consortium host institution Makere University, Uganda is legally bound to make the data available through the Saving Brains Project implementation committee: To request data access, please email savingbrain-implementation@chm.mak.ac.ug.

Ethics approval and consent to participate
The study was approved by the Makerere University School of Medicine Research and Ethics Committee (SOM-REC ref. 2012–177) and by the Uganda National Council for Science and Technology (Ref. SS 3123), and children were only included after having obtained written informed consent from their care-givers. The parents provided informed consent and assent for their children. The psychiatric interviews were conducted by a psychiatrist specialist in child and adolescent psychiatry, and any critical finding from the interviews resulted in necessary counselling and referral.

Consent for publication
The participants were informed that the data being collected were for research purposes, and they consented to the publication of the results.

Competing interests
The authors declare no competing interests.

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