Original Article

Prevalence of Adverse Childhood Experiences : A Cross-Sectional Study among Inpatients at Ndera Neuropsychiatric Teaching Hospital in Rwanda

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Abstract

Background
Adverse Childhood Experiences (ACEs) are the potentially traumatic events that occurred during childhood. Understanding their magnitude and the way exposure to one type triggers other types of ACEs could lead to more focused psychiatric interventions.
Objective
To determine the prevalence of ACEs and explore the associations between household challenges and child maltreatment among inpatients with mental disorders.
Methods
A cross-sectional design was used from August to September 2019 at Ndera Neuropsychiatric Teaching Hospital. We informed 176 adult inpatients, 159 consented to have their eligibility examined, and 122 were eligible and then interviewed using the Adverse Childhood Experience International Questionnaire. Data were analysed using SPSS software version 21.
Results
Most of the participants (57%) were men, 61% were in the 20–35 age range, and 67% had attended primary school. Almost everyone (98%) reported at least one ACE. Having separated/divorced or deceased parents was the most common ACE (65%). Child maltreatment was associated with household challenges.
Conclusion
The study found a high prevalence of ACEs among psychiatric inpatients. Therefore, the burden associated with the high prevalence of ACEs could be alleviated through interventions targeting ACE preventions.
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Keywords: Adverse childhood experiences, child maltreatment, household challenges

Background

The world is facing a heavy socio-economic burden arising from preventable problems, including those rooted in Adverse Childhood Experiences (ACEs).[1–4] Adverse Childhood Experiences (ACEs) refer to potentially traumatic events such as child maltreatment (child abuse and neglect), growing up in a violent community and/or household challenges characterized by domestic violence, having a family member with mental illness, having a jailed family member, experiencing parental separation, or living in a household with drug or alcohol abuse.[2,5] The risk factors to ACEs include but not limited to the adults with history of ACEs, social determinants of health and historical/cultural trauma.[6,7]

Studies have found a strong association between ACEs and a wide range of mental disorders, including anxiety, depression, posttraumatic stress disorder, substance use disorders, and personality disorders.[8–10] The pathogenesis is that ACEs cause a toxic stress response, which disrupts brain development. The disrupted neurodevelopment results in cognitive, emotional, behavioural, and physiological impairments that last a lifetime.[8,11]
Globally, between 41% and over 97% of persons with mental disorders worldwide have experienced one ACE.[12] Although specific figures can vary depending on the country in question, in general, ACE prevalence is high in patients with mental disorders from middle-income countries. A survey conducted in 2021 in Kenya, Indonesia, and Vietnam revealed that between 36.9% and 65.8% of patients with mental disorders had experienced at least one ACE.[13]

Moreover, the majority of children in sub-Saharan African countries experienced multiple ACEs during their lifetimes.[14,15] The contributing factors include poverty, conflict, cultural norms, and restricted access to healthcare and education.[16–18]

In addition, research carried out in Kenya on patients with mental disorders revealed that more than 70% of participants had more than one type of ACE.[19]

In nations like Rwanda that have endured collective violence, such as the 1994 genocide against the Tutsi, the prevalence and effects of ACEs remain largely undocumented.[20–22] Despite the potential impact of ACEs on mental health, there are limited data on ACE prevalence among adult patients with mental disorders in Rwanda. This study aimed to determine the prevalence of adverse childhood experiences and explore the associations between household challenges and child maltreatment among patients with mental disorders admitted to Ndera Neuropsychiatric Teaching Hospital from August 12 to September 8, 2019. These findings are crucial for guiding mental health policy in Rwanda.

Methods

Study Design

This was an analytical cross-sectional study to assess the prevalence of ACEs and explore the associations between household challenges and child maltreatment among adult patients with mental disorders between August 12 and September 8, 2019.

Study Setting

The study was conducted in Kigali, Rwanda, at Ndera Neuropsychiatric Teaching Hospital (NNPTH). The hospital (NNPTH) was established in July 1968 by the Congregation of Brothers of Charity, and started operation in 1972. It serves as a national referral and teaching hospital affiliated with the University of Rwanda. It offers inpatient and outpatient care for patients with mental and neurological health conditions. The hospital accommodates 274 inpatient beds and provides the following services: psychiatry, neurology, clinical psychology, ergotherapy, and physiotherapy. Regarding psychiatry, patients with critical symptoms are admitted in two wards for males and females respectively. Once their symptoms have subsided, these patients are transferred to

two post-crisis wards where they continue psychotherapy, rehabilitation, and become ready for outpatient care.

Study Population and Eligibility Criteria

Inpatients who were 18 years of age or older and receiving treatment for their mental disorders were eligible for the study. They received detailed information on the objectives, methods, risks, and benefits of the study. Then, we assessed their decision-making capacity based on clinical criteria, such as their comprehension of the study's details, the consequences of their participation, and their capacity to communicate a clear choice. The inpatients unable to make a decision were excluded, while those who passed the decision-making test and accepted to participate, signed the informed consent form and were interviewed using an anonymised questionnaire.

Sample Size and Sampling Procedure

A convenience sampling method was used to select participants from the list of adult patients who were admitted to the hospital from 12th August to 8th September, 2019. The idea was to acquire a sufficient sample size by enrolling eligible patients who were available throughout data collection, consistent with the study duration and available resources. Slovin's formula was used to determine the sample size.[23]

$$n = \frac{N}{1+Ne^2}$$

where n is the required sample size, N is the total population, and e is the margin error. In this study, N=176, e=0.05 and

$$n = \frac{176}{1+176\,(0.05)^2} \approx 122$$

Thus, the required sample size was 122 participants.

Therefore, using a convenience sampling method, we approached all eligible inpatients during study period, yielding a total of 176 potential patients, and 159 consented to learn more about the study and have their eligibility assessed. After eligibility test, we kept 122 patients signed informed consent form (ICF) and completed the questionnaires.

Data Collection Instruments

Data were collected using the Adverse Childhood Experience International Questionnaire (ACE-IQ). It was designed for people 18 years old and above by the WHO to measure ACEs in all countries.[24] It has also been a validated tool to measure ACEs in Africa.[25] The sociodemographic section of ACE-IQ was adapted for the Rwandan context. Although the original instrument includes a question on ethnic group, it was removed since it was irrelevant in Rwanda. For this section, only data on age, gender, marital status, educational attainment, and employment status were collected.

Participants' ages were grouped in 5-year intervals as used by the World Health Organization (WHO), the Demographic and Health Surveys (DHS), and national census reporting. We chose this approach to ensure sufficient numbers within each age group, and enable meaningful interpretation of age-related trends. Although eligibility began at 18 years, no participants were in the 18–19 age range.

Gender was defined as male or female. The level of education of the participants was defined as less than primary school, primary school completed, high school completed, and university or college completed. The category less than primary school level included both participants with no formal schooling and those who did not complete primary education. These categories were kept the same to allow comparison with other ACE studies, although we recognise that they do not exactly match with the Rwanda Qualification Framework. The marital status was measured as single, married, separated/ divorced, and widowed. The employment status was assessed as unemployed with inability to work, unemployed with ability to work, retired, student, and paid employee were the employment statuses.

The ACEs were measured using the WHO

ACE-IQ, covering 13 types of childhood adversities. If an ACE was reported at least once, it was coded as present ; if not, it was marked as absent. The total number of ACEs experienced was added up to create a cumulative ACE score which ranges from 0 to 13. The ACEs were then categorised into child maltreatment, household challenges and violent community. Child maltreatment includes child physical, emotional and sexual abuse, and child physical and emotional neglect. Regarding child physical, emotional and sexual abuse, participants were asked if they were placed in a threatening situation which could result in physical and emotional harm.

In addition, child physical and emotional neglect were assessed based on the lack of basic needs such as the absence of food, care, or emotional support necessary for child physical and emotional development. Household challenges were characterised by exposure to a household member being treated violently, household mental illness, separation, divorce or the death of parents, incarceration of a household member, and household drug or alcohol abuse. A violent community was characterised by peer violence or bullying, community violence and collective violence.

To assess if the participant experienced peer violence, it was asked if their peers shoved around them, made fun of or ignored them because of their nationality, religion or because of how their body or face looked. Community violence was assessed by asking if the participants ever saw or heard someone other than their household member being beaten up, stabbed, shot, being threatened with a knife or gun in real life. Corrective violence was assessed by interviewing the participants if they were exposed to wars, terrorism, political or ethnic conflicts, genocide, repression, torture and organised violent crime such as banditry and gangs. Information about mental health diagnoses was taken from the medical records of the patients.

Data Collection Procedures

The ACE-IQ was given to a team of three trained data collectors with educational background in mental health nursing. They visited the adult inpatients from 12th August to 8th September 2019 and provided detailed information about the study objectives, procedures, potential risks and benefits. Those who consented had their eligibility assessed. Those inpatients who were eligible signed Informed Consent Forms (ICF). The data collectors performed structured interviews with participants and collected the data. Daily meetings were held to address challenges and ensure consistency in data collection.

Data Quality Control

Data quality control was strictly performed to guarantee the completeness and accuracy of the dataset used in this study. The procedures included verifying data consistency where missing information identified in the electronic dataset was corrected using data available from the corresponding hard-copy questionnaires.

Study Variables

The independent variables were identified under the category of the household challenges, which includes household member being treated violently, separated, divorced or died parent, household drug or alcohol abuse, household mental illness, and incarceration of a household member. The dependent variables were identified under the category of child maltreatment, which includes child physical, emotional, and sexual abuse as well as child physical and emotional neglect. These household challenges can impair caregiving ability, increase family stress, and lower protective environmental factors that can raise the likelihood of child maltreatment.

Data Management and Analysis

Data extracted from the questionnaires were assigned numerical values (Yes = 1, No = 0). This approach enabled consistent data management and prepared it for analysis using IBM SPSS Statistics for Windows

version 21.0 (IBM Corp, Armonk, NY, USA) software. Descriptive and analytical statistics using univariate, bivariate and multivariable analysis were performed to find frequency and percentages, and associations between household challenges and child maltreatment. In the first round, univariate analysis was performed to describe socio-demographic characteristic of respondents and then determine ACE prevalence. The association between household challenges and child maltreatment was analysed using bivariate logistic regression to find unadjusted odd ratios. Possible confounders such age and gender were controlled using multivariable logistic regression to determine adjusted odd ratios. Factors in the category of household challenges that had a P value of less than 0.05 at the multivariable stage were deemed to be linked to child maltreatment.

Ethical Approval and Consent to Participate

The study was reviewed and approved by both the College of Medicine and Health Sciences (CMHS) Institutional Review Board (IRB) under EC notice No 355/CMHS IRB/2019 and the IRB of NNPTH under EC notice No 009/CNEC/2019. Patients received detailed information about the study objectives, procedures, and potential risks, and benefits. They were informed of their right to refuse or leave the study any time without consequences. Those who were eligible, and agreed to participate, signed an informed consent form. Measures were taken to reduce distress during data collection and clinical staff were available to provide assistance if needed. All data were anonymized and their access was restricted to the research team only. Ethical conduct of research involving vulnerable populations such as patients with mental disorders followed international guidelines, including the World Medical Association Declaration of Helsinki.[26]

Results

Sociodemographic Characteristics of Participants

A sample of 122 inpatients with mental disorders participated in this study. Most of the participants were men, and slightly over half were married. Sixty-one percent of the participants were aged between 20 and 35 years. Majority of the study participants were Rwandans, and most of them were from Kigali City. Most participants had not studied beyond the primary school level. The majority of participants were not able to work in the previous year. However, almost one-third had not worked in the previous year (Table 1).

Table 1. Socio-demographic characteristics of participants (N=122)

Socio-demographic Characteristics		n	%	Total %
Gender	Female	53	43.4	43.4
	Male	69	56.6	100
Marital status	Single	44	36.1	36.1
	Married	63	51.6	87.7
	Separated/Divorced	10	8.2	95.9
	Widowed	5	4.1	100.0
Age	20-24	25	20.5	20.5
	25-29	26	21.3	41.8
	30-34	24	19.7	61.5
	35-39	19	15.6	77.1
	40-44	10	8.2	85.3
	45-49	8	6.6	91.9
	50-54	5	4.1	96.0
	55-59	4	3.3	99.3
	60-64	1	0.7	100.0

Table 1. Continued

Socio-demographic Characteristics		n	%	Total %
Place of birth	Kigali city	31	25.4	25.4
	Eastern Province	28	23	48.4
	Western Province	17	13.9	62.3
	Northern Province	17	13.9	76.2
	Southern Province	15	12.3	88.5
	Uganda	6	4.9	93.4
	RDC	3	2.5	95.9
	Burundi	2	1.6	97.5
	Other countries	3	2.5	100
Level of education	Less than primary school	41	32.8	32.8
	Primary school completed	42	34.4	67.2
	High school completed	32	26.2	93.4
	University or college completed	8	6.6	100
Work status	Unemployed with inability to work	36	29.5	29.5
	Unemployed with ability to work	52	42.6	72.1
	Retired	2	1.6	73.7
	Student	8	6.6	80.3
	Paid employee	24	19.7	100

The types of ACEs reported by the Participants

The study revealed which ACE is more prevalent than others among patients with mental disorders. The purpose of this table was to offer descriptive information on the distribution of ACEs by sex. It only included descriptive, sex-disaggregated data without statistical testing. Child exposure to separated/divorced or deceased parents (65%) was the most commonly reported ACE. Child emotional abuse was reported by 58% of participants, Table 2.

Table 2. Types of ACEs reported by the participants (N=122)

ACEs	Total		Male		Female	
	n	%	n	%	n	%
Separated, divorced or died parents	79	64.8	40	58	39	73.6
Emotional abuse	71	58.2	42	60.9	29	54.7
Physical abuse	68	55.7	37	53.6	31	58.5
Collective violence	65	53.3	34	49.3	31	58.5
Emotional neglect	61	50	33	47.8	28	52.8
Household member treated violently	60	49.2	27	39.1	33	62.3
Physical neglect	58	47.5	30	43.5	28	52.8
Peer violence	57	46.7	37	53.6	20	37.7
Household drug abuse	50	41	26	37.7	24	45.3
Community violence	50	41	29	42	21	39.6
Incarceration of household members	42	34.4	24	34.8	18	34
Household mental illness	40	32.8	24	34.8	16	30.2
Sexual abuse	37	30.3	13	18.8	24	45.3

Prevalence of ACEs among the Participants

Almost all (98%) of participants were exposed to one ACE. It shows also that many participants were exposed to more than one ACE. Nighty -one percent of participants experienced 2 ACEs. Seventy-seven percent reported four ACEs. The prevalence of ACEs among participants is presented in Table 3.

Table 3. Prevalence of ACEs among participants (N=122)

Number of ACEs	n	%	Total %
13	0	0.0	0.0
12	3	2.4	2.4
11	5	4.1	6.5
10	12	9.8	16.3
9	12	9.8	26.1
8	7	5.7	31.8
7	14	11.5	43.3
6	16	13.1	56.4
5	10	8.2	64.6
4	16	13.1	77.7
3	10	8.2	85.9
2	7	5.7	91.6
1	8	6.5	98.1

Association between household challenges and child maltreatment

Children from households with challenges had 3.2 times the odds of experiencing emotional neglect compared to those without household challenges (AOR = 3.2, 95% CI: 1.375-7.466, p = 0.007). The association between household challenges and child sexual abuse was also significant (AOR=3.0, 95% CI: 1.145-7.896, p = 0.025). In addition, children from households with challenges had 2.9 times the odds of experiencing emotional neglect compared to those without household challenges (AOR = 2.9, 95% CI: 2.245-6.799, p = 0.014). The Unadjusted and adjusted Odd Ratio (OR & AOR) of the household challenges and child maltreatment is displayed in Table 4.

Table 4. Non-adjusted and Adjusted Odd ratio of household challenges and child maltreatment (N=122)*

Household challenges	Category (Yes/No)	Child maltreatment	Non-adjusted Odds Ratio (OR) (95% CI)	P-value	Adjusted Odds Ratio (AOR) (95% CI)	P-value
Household member being treated violently (n=60)	No	Reference	1	-	1	-
	Yes	Child physical abuse	4.3[2.022-9.377]	<0.001	2.5[1.047-5.812]	0.039
		Child emotional abuse	4.2[1.920-8.989]	<0.001	1.8[0.785-4.171]	0.164
		Child sexual abuse	1.8[0.829-3.970]	0.136	3.0[1.145-7.896]	0.025
		Child physical neglect	3.6[1.717-7.662	0.001	2.9[1.245-6.799]	0.014
		Child emotional neglect	3.4[1.606-7.099]	0.001	3.2[1.375-7.466]	0.007
Separated, divorced or died parents (n=79)	No	Reference	1	-	1	-
	Yes	Child physical abuse	2.8[1.295-5.990]	0.009	2.5[1.047-5.812]	0.039
		Child emotional abuse	2.4[1.137-5.205]	0.022	1.8[0.785-4.171]	0.164
		Child sexual abuse	3.1[1.244-7968]	0.015	3.0[1.145-7.896]	0.025
		Child physical neglect	3.6[1.614-8.034]	0.002	2.9[1.245-6.799]	0.014
		Child emotional neglect	3.6[1.618-7.890]	0.002	3.2[1.375-7.466]	0.007
		Child sexual abuse	1.5[0.658-3.258]	0.35	3.0[1.145-7.896]	0.025
		Child physical neglect	1.2[0.550-2.455]	0.694	2.9[1.245-6.799]	0.014
		Child emotional neglect	1.8[0.943-3.833]	0.129	3.2[1.375-7.466]	0.007

Table 4. Continued

Household challenges	Category (Yes/No)	Child maltreatment	Non-adjusted Odds Ratio (OR) (95% CI)	P-value	Adjusted Odds Ratio (AOR) (95% CI)	P-value
Household drug or alcohol abuse (n=50)	No	Reference	1	-	1	-
	Yes	Child physical abuse	3.2[1.484-6.961]	0.003	2.5[1.047-5.812]	0.039
		Child emotional abuse	3.7[1.686-8.309]	0.001	1.8[0.785-4.171]	0.164
		Child sexual abuse	3.2[1.484-6.961]	0.003	3.0[1.145-7.896]	0.025
		Child physical neglect	2.7[1.292-5.723]	0.008	2.9[1.245-6.799]	0.014
		Child emotional neglect	2.0[0.953-4.130]	0.067	3.2[1.375-7.466]	0.007
Household mental illness (n=40)	No	Reference	1	-	1	-
	Yes	Child physical abuse	2.4[1.098-5.469]	0.029	2.5[1.047-5.812]	0.039
		Child emotional abuse	1.0[0.446-2.060]	0.913	1.8[0.785-4.171]	0.164
		Child sexual abuse	1.2[0.515-2.628]	0.716	3.0[1.145-7.896]	0.025
		Child physical neglect	1.2[0.543-2.468]	0.704	2.9[1.245-6.799]	0.014
		Child emotional neglect	1.3[0.631-2.878]	0.441	3.2[1.375-7.466]	0.007
Incarceration of household member (n=42)	No	Reference	1	-	1	-
	Yes	Child physical abuse	1.7[0794-3.692]	0.17	2.5[1.047-5.812]	0.039
		Child emotional abuse	1.1[0.509-2.322]	0.83	1.8[0.785-4.171]	0.164
		Child sexual abuse	1.5[0.658-3.258]	0.35	3.0[1.145-7.896]	0.025
		Child physical neglect	1.2[0.550-2.455]	0.694	2.9[1.245-6.799]	0.014
		Child emotional neglect	1.8[0.943-3.833]	0.129	3.2[1.375-7.466]	0.007

Discussion

The purpose of this study was to assess the prevalence of ACEs and explore the associations between household challenges and child maltreatment in adult patients with mental disorders admitted at Ndera Neuropsychiatric Teaching Hospital in Rwanda. The results revealed that 98% of patients with mental disorders experienced at least one ACE and many of them experienced more than one ACE. Ninety-one percent (91%) of participants reported having two or more ACEs and 77 percent experienced 4 or more ACEs. The ACE prevalence in this study is high compared with the rates in the studies conducted in Netherlands,[9] Uganda,[27] and Kenya,[28] which were 69.1%, 90%, and 47%, respectively.

These findings support those of earlier studies that more severe mental health disorders were associated with higher ACE scores.[8,10] The high prevalence of ACEs among Rwandan patients with mental

disorders may be related to the country's historical trauma. The 1994 genocide against the Tutsi disrupted families as well as society and consequently children underwent and/or were directly exposed to extreme violence.

The most frequent ACE mentioned by 65% of participants was growing up in a household with challenges, mainly parental separation, divorce, or death. The household serves as a child's safety net.[29,30] These findings demonstrate how these patients were susceptible to additional forms of ACEs since they were raised in a disrupted environment, as highlighted in other studies.[31,32] This finding indicates a profound gap in child care and insufficient programs that may improve child protection in Rwanda.

The household challenges were associated with increased odds of child physical abuse, sexual abuse, and neglect. These findings underlined the link between household challenges and child maltreatment. Previous studies explained that household challenges create an environment that is more likely to result in child maltreatment.[33,34] Exposure to a violently treated household member was associated with increased risks of child physical abuse, sexual abuse, physical neglect, and emotional neglect. So, domestic violence increases caregiver stress, normalises aggressive behaviours, and reduces emotional availability, thereby raising children's risk of maltreatment. After adjustment, parental separation, divorce, or death was still significantly associated with physical abuse, sexual abuse, physical neglect, and emotional neglect. Family disruption may increase child maltreatment risk through economic strain, inadequate supervision, and caregiver overburden.[35] Household drug or alcohol abuse was significantly associated with physical abuse, sexual abuse, physical neglect, and emotional neglect. Substance abuse likely compromises caregiving capacity and judgment, increasing vulnerability to abuse and neglect.[36]

Household mental illness showed a significant adjusted odds ratio with child physical abuse, sexual abuse, and neglect outcomes. Difficulties in emotional regulation and consistent caregiving among affected caregivers contribute to the likelihood of child maltreatment.[37] The absence of an adjusted odds ratio between household challenges and child emotional abuse suggests the influence of other overlapping ACEs. This association between household challenges and child maltreatment emphasises the importance of integrated, family-centred interventions that address the detrimental effects of ACEs.

Additionally, the findings of our study show that most hospitalised patients with mental disorders experienced low educational attainment and economic hardship. The majority (67.2%) did not study beyond the primary school level. They were also economically challenged because 73.7% were unable to work in the previous year. This socioeconomic burden on patients with mental disorders is consistent with other research study findings showing that children with high ACE scores are more likely to experience reduced educational achievement, limited employment opportunities, and chronic mental and physical health disorders.[35–37] These outcomes greatly lower earning potential and economic mobility, contributing to long-term poverty and economic hardship. The burden associated with high prevalence of ACEs in patients with mental disorders can be addressed through ACE prevention, early detection and support of children at risk, increasing access to social and mental health services, and economic empowerment for survivors of ACEs.

Strengths and Limitations

The strength of this study lies in the detailed assessment of ACEs made using of a validated questionnaire. However, this study has several limitations that should be considered when interpreting the findings. Its reliance on self-reported experiences may have affected the accuracy of participants' responses due to recall bias and social desirability bias.

Additionally, since the sample consisted of hospitalised patients, the findings could not be generalisable to individuals with mental disorders in community settings. Furthermore, the ACE-IQ standard classification was used to classify education level, rather of using the Rwanda Qualification Framework (RQF). Although this improves international comparability, it lessens the contextual accuracy of Rwanda's educational system.

Conclusion

This study revealed a high prevalence of ACEs among inpatients with mental disorders in Rwanda. In addition, household challenges such as parental separation, divorce, or death, play a substantial role in increasing the risk of child maltreatment. Therefore, family-based interventions such as strengthening family stability, ACE prevention, early detection and assistance prior to a crisis, increasing access to social and mental health resources, and economic empowerment for ACE survivors could reduce the burden associated with high prevalence of ACEs in patients with mental disorders. The prevalence of ACEs in Rwandan population and the effectiveness of the interventions to mitigate the effects of ACEs on mental health should be the subjects of future research.

Conflicts of interests

The authors declare no competing interests associated with this publication.

Authors' contributions

All authors contributed significantly to the work reported, whether it was in the conception, study design, execution, data collection, analysis, and interpretation. They all participated in the article's drafting, and critical review. They all agreed on the journal to which the article was submitted and they all agreed to take responsibility for every part of the work.

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