

Prevalence of Childhood Adversities Among Inpatients With Mental Disorders: A Cross-Sectional Study At Neuropsychiatric Referral Hospital in Rwanda

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Abstract

Background

The world is dealing with a significant socio-economic burden that must be addressed to secure a favourable future. To figure out this problem, there is an urgent need of healthy and well educated adult population to participate effectively in global economy. Indeed, childhood experiences may affect adult health outcome. Responsive caregiving during childhood is associated with good physical and mental health. On the other hand, a strong link was established between Adverse Childhood Experiences (ACEs) and poor adult physical and mental health outcomes. This study assessed the prevalence of ACEs among adult patients with mental disorders admitted to the post-crisis wards at Caraes Ndera Neuropsychiatric Hospital in Kigali, Rwanda.

Methodology :

This research was developed as a descriptive cross-sectional study that involved a total of 122 patients aged 18 to 64 years. A convenience sampling was used to collect data using the Adverse Childhood Experiences International Questionnaire (ACE-IQ). Data was analyzed in terms of frequencies and percentages using the Statistical Package for the Social Sciences (SPSS 21.0).

Results

Initially, 159 participants were invited to join the study, 122 (77%) met the inclusion criteria and voluntarily consented to participate. Of the 122 participants, 43.4% were female, 61% were youth, 67.2% had primary school as the highest level of education and 29.5% did not work during the last 12 months. Having separated/divorced or deceased parents was the most frequent ACE item with 64.8% of participants responding affirmatively. Nearly all (98.4%) participants had at least one ACE and 77.9% had at least 4 ACEs.

Conclusions

This study on ACEs in Rwandan adults with mental disorders revealed that 98.4% had at least one ACE and almost 80% of the 122 participants had at least 4 ACEs. The findings indicate that there is a significant need to implement interventions necessary for the prevention of ACEs. Such interventions are necessary to mitigate negative effects of ACEs on child development, to increase children's resiliency and to improve future adult physical and mental health outcomes.

1. Background

The world is dealing with a significant socio-economic burden that must be addressed to secure a favourable future (Jenkins et al., 2011). To overcome this burden, nations must have healthy and well educated adults; skilled enough to participate effectively in the global economy (O'Donnell & O'Donnell, 2016). Thus, child rearing should focus on raising children who grow up being loved, protected, healthy and well educated in order to become responsible adults able to understand and address various challenges in life (*UNICEF Annual Report 2017 | UNICEF Publications | UNICEF, n.d.*).

Responsive caregiving during childhood is associated with good physical and mental health (Johnson et al., 2013). Children with a history of insecure attachment and a lack of love and trust are more likely to experience psychosocial problems, including anti-social behaviours (P. M. Miller et al., 2000). These potential traumatic experiences during childhood are known as adverse childhood experiences (ACEs). ACEs include child abuse and neglect, growing up in a violent community or an unsafe household 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 (World Health Organization, 2018).

ACEs may lead to detrimental health outcomes, including physical and mental disorders according to Felitti and other authors (Felitti et al., 1998). The relationship between ACEs and health outcomes is complex. It likely involves both direct physiological damage in terms of disrupted neurodevelopment resulting from unsafe child exposure to stressors as well as indirect effects through adopting risky soothing behaviours as a way of coping with ACEs (Sterling et al., 2018).

The National Scientific Council on the Developing Child has established three different categories of stress responses in early childhood (National Scientific Council on the Developing Child, 2014; Shonkoff, 2010). The positive stress response refers to a mild or moderate activation of the stress response system with the availability of a protective adult who helps the child to be at ease so that he can observe, learn, practice coping mechanisms and gain experience. A tolerable stress response refers to exposure to severe adversity in the hands of a responsive caregiver that helps the child to calm down. And lastly, the toxic stress response refers to exposure to frequent, prolonged or high level of adversities in the absence of a soothing and protective adult (Franke, 2014; Szilagyi, 2012).

The main effect of the toxic stress response during the developmental period is to establish the stress response system as a dysregulated pattern. This dysregulation may affect various systems, including the nervous, immune, hormonal, cardiovascular, respiratory and gastrointestinal systems. It may also induce modifications in the DNA expression (Anda et al., 2006). The toxic stress response may further have intergenerational effects. Individuals with ACEs were found to be more likely engaged in behaviours that might create potential ACEs among their offspring (M. A. Bellis et al., 2014; Renner & Slack, 2006).

ACEs are common worldwide. Surveys conducted across 23 states in the USA have indicated that approximately 62% of adults had been exposed to at least one form of ACE while almost 25% of them had experienced more than three forms of ACEs (Merrick et al., 2018). However, ACEs are unequally distributed between and within countries with the largest proportions found in low- and middle-income

countries and among socially disadvantaged groups, including ethnic minorities and poorer communities (M. A. Bellis et al., 2014; Health Organization & Office for Europe, 2013). In these groups, child abuse and neglect have been reported as the most common forms of ACEs and they may be mediated by household challenges including domestic violence, parental drunkenness and drugs or alcohol misuse (Kabiru et al., 2010; Kiburi et al., 2018; Okello et al., 2014; *Violence Against Children and Youth Survey Republic of Rwanda Republic of Rwanda*, n.d.).

ACEs remain an unaddressed public challenge that communities are faced with, especially in low-resource settings (Ginocchio, 2018). This may be partly due to the lack of information about ACEs, which contributes to a poor understanding of interventions required for ACE prevention (Oh, Jerman, Silvério Marques, et al., 2018). The aim of this study was to determine the prevalence of ACEs among inpatients with mental disorders. It may contribute to increasing data related to ACEs in Rwanda, where little is known regarding early adverse childhood events and their long-term effect on physical and mental health outcomes.

2. Methods

Design, population and duration of the study

This research is a descriptive cross-sectional study to assess the prevalence of childhood adversities among patients with mental disorders during a four week period of time, from August to September 2019. Patients included in the study were males and females between the ages of 18 and 64 years and had been diagnosed primarily with psychotic, mood and substance-related disorders. All patients aged 18 years and above, receiving inpatient care during the study period and only those who were able and willing to give informed consent, were included in this research.

Setting

Caraes Ndera Neuropsychiatric Hospital is a national referral hospital for patients with neurologic and psychiatric disorders located in Kigali, Rwanda. It was established by the Congregation of Brothers of Charity in July 1968 and became functional in 1972. It also serves as a teaching hospital for the University of Rwanda and offers a variety of services: psychiatry, neurology, clinical psychology, ergotherapy and physiotherapy. In this hospital, there are two wards for adult patients with critical symptoms and two post-crisis wards for adult patients with remitted symptoms; one for males and another one for females. Patients are transferred from critical wards to post-crisis wards after remission of their symptoms; in order to continue care with psychotherapy and rehabilitation, prepare them to return to their families and to continue outpatient care.

Procedure and ethical consideration

Ethical clearance for this study was requested and obtained from the Institutional Review Board (IRB) of the University of Rwanda (UR)/College of Medicine Health Sciences (CMHS). We used the convenience

sampling method to enroll study participants. All participants received a clear explanation about the nature and the purpose of the research project in the language that they understand well; either English or Kinyarwanda. Participation was strictly voluntary and refusal to participate did not affect their treatment or care. A mental status examination was initially conducted on all participants in order to rule out active neuropsychiatric symptoms that could hinder a successful interview. Patients who volunteered to participate signed an informed consent document and completed questionnaires without identifying information. All data collected was used for research purposes only.

Materials and measures

The ACE-IQ was designed for individuals aged 18 years and above by the WHO to measure ACEs in all countries (World Health Organization, 2018). It has also been validated to measure ACEs in Nigeria (Kazeem, 2015). The socio-demographic section of the ACE-IQ that captures data on variables such as age, sex, ethnic group, marital status, educational level and employment status, was modified slightly by removing the variable on ethnic groups as it was not applicable to this study population. Items on the ACE-IQ screen for child exposure to physical, emotional and sexual abuse, physical and emotional neglect, household member treated violently, household member with substance abuse, household member with mental illness, incarcerated household member, having separated/divorced or dead parents, peer violence (bullying), community violence and collective violence. The total score is calculated by summing up the number of events the participant was exposed to and it varies from 0 to 13.

Statistical analysis

Descriptive statistics were used to recapitulate socio-demographic variables and ACEs in terms of frequencies and percentages using the Statistical Package for the Social Sciences (SPSS) version 21.

3. Results

3.1. Sociodemographic characteristics of participants

A total number of 159 patients were admitted to the post-crisis wards over the period of 4 weeks between August and September 2019. All 159 patients were invited to participate in the study and 122 patients (77%) gave their consent and filled out questionnaires; 4 patients (2%) refused to participate and 33 patients (21%) were not able to give consent due to their unstable mental status.

Table 1 displays the socio-demographic characteristics of participants: 43.4% were female, 56.6% were male and slightly more than half (51.6%) were single. The majority (61%) of respondents were youth between the ages of 18 and 35 years. The majority of study participants (88.5%) were Rwandan with 25.4% coming from the urban area of Kigali city. Regarding the highest level of education, the majority of our participants (67.2%) did not go beyond primary school. Less than one fifth (19.7%) had paid jobs and nearly one third (29.5%) did not work during the last 12 months.

Table 1
Sociodemographic characteristics of participants

Variables	Characteristics	% & Freq.	Cumulative %& Freq.
Gender	Female	43.4% (53)	43.4% (53)
	Male	56.6% (69)	100% (122)
Marital status	Single	36.1% (44)	36.1% (44)
	Married	51.6% (63)	87.7% (107)
	Separated/Divorced	8.2% (10)	95.9% (117)
	Widowed	4.1% (5)	100.0% (122)
aGE	15–19*	4.9% (6)	4.9% (6)
	20–24	15.6% (19)	20.5% (25)
	25–29	21.3% (26)	41.8% (51)
	30–34	19.7% (24)	61.5% (75)
	35–39	15.6% (19)	77.0% (94)
	40–44	8.2% (10)	85.2% (104)
	45–49	6.6% (8)	91.8% (112)
	50–54	4.1% (5)	95.9% (117)
	55–59	3.3% (4)	99.2% (121)
	60–64	0.8% (1)	100% (122)
Place of birth	Kigali city	25.4% (31)	25.4% (31)
	Eastern Province	23.0% (28)	48.4% (59)
	Western province	13.9% (17)	62.3% (76)
	Northern province	13.9% (17)	76.2% (93)
	Southern province	12.3% (15)	88.5% (108)
	Uganda	4.9% (6)	93.4% (114)
	RDC	2.5% (3)	95.9% (117)
	Burundi	1.6% (2)	97.5% (119)
	Other countries	2.5% (3)	100.0% (122)
Level of education	No formal schooling	4.9% (6)	4.9% (6)
*All 6 participants were 18 or 19 years old within this age category of 15–19 years			

Variables	Characteristics	% & Freq.	Cumulative %& Freq.
	Less than primary school	27.9% (35)	32.8% (41)
	Primary school completed	34.4% (42)	67.2% (83)
	High school completed	26.2% (32)	93.4% (115)
	University or college completed	6.6% (8)	100.0% (122)
Work status	Not employed with inability to work	29.5% (36)	29.5% (36)
	Not employed with ability to work	42.6% (52)	72.1% (88)
	Retired	1.6% (2)	73.7% (90)
	Student	6.6% (8)	80.3% (98)
	Paid employee	19.7% (24)	100.0% (122)
*All 6 participants were 18 or 19 years old within this age category of 15–19 years			

3.2. The Prevalence of ACEs among inpatients with mental disorders

The prevalence of ACEs among inpatients with mental disorders is shown in **Tables 2 and 3**. The ACE item most frequently selected was exposure to separated/divorced or deceased parents (n = 79 ;64.8%). The second most frequently reported ACE was emotional abuse (n = 71 ; 58.2%). Physical abuse was reported by 68 (55.7%) participants. Sixty-five patients (53.3%) were exposed to collective violence. Sixty-one patients (50.0%) experienced emotional neglect.

Exposure to a household member who was treated violently was reported by 60 (49.2%) patients. Physical neglect was reported by 58 (47.5%) patients. Fifty-seven (46.7%) patients have experienced peer violence. Household drug abuse was acknowledged by 50 (41.0%) patients.

Exposure to community violence was noted by 50 (41.0%) patients. Incarceration of household members was reported by 42 (34.4%). Having a household member with mental illness was reported by 40 (32.8%) patients. Sexual abuse was noted by 37 (30.3%) patients and this ACE was 2.4 times higher in female (45.3%) than in male patients(18.8%).

Table 2
ACEs among participants

Nº	ACEs	Total %& Frequency /122	% &Frequency of Female/53	Frequency & % of males/69
1	Separated, divorced or died parents	64.8% (79)	73.6% (39)	58.0%(40)
2	Emotional abuse	58.2%(71)	54.7%(29)	60.9%(42)
3	Physical abuse	55.7%(68)	58.5%(31)	53.6%(37)
4	Collective violence	53.3%(65)	58.5%(31)	49.3%(34)
5	Emotional neglect	50.0%(61)	52.8%(28)	47.8%(33)
6	Household member treated violently	49.2%(60)	62.3%(33)	39.1%(27)
7	Physical neglect	47.5%(58)	52.8%(28)	43.5%(30)
8	Peer violence	46.7%(57)	37.7%(20)	53.6%(37)
9	Household drug abuse	41.0%(50)	45.3%(24)	37.7%(26)
10	Community violence	41.0%(50)	39.6%(21)	42.0%(29)
11	Incarceration of household members	34.4%(42)	34.0%(18)	34.8% (24)
12	Household mental illness	32.8%(40)	30.2%(16)	34.8%(24)
13	Sexual abuse	30.3%(37)	45.3%(24)	18.8%(13)

3.3. ACE scores among participants

ACE scores among participants are shown in Table 3. Nearly all (98.4%) patients with mental disorders including all (100%) female patients and 97.1% of male respondents have had at least one ACE. Almost 92% of respondents have experienced at least 2 ACEs. Eight-six per cent of patients have had at least 3 ACEs. Almost 78% of patients experienced 4 ACEs and 32.0% of them reported at least 8 ACEs.

Table 3
ACE scores among participants

ACEs score	Frequency & total %/122	Cumulative % and Freq.	%& Freq.for females/53	Cumulative % & Freq for females	%&FrEq. of males/69	Cumulative % & FrEq. for males
12	2.5%(3)	2.5% (3)	3.8%(2)	3.8% (2)	1.4% (1)	1.4% (1)
11	4.1%(5)	6.6% (8)	0.0% (0)	3.8% (2)	7.2%(5)	8.7% (6)
10	9.8%(12)	16.4% (20)	9.4% (5)	13.2% (7)	10.1% (7)	18.8% (13)
9	9.8%(12)	26.2% (32)	13.2%(7)	26.4% (14)	7.2% (5)	26.1% (18)
8	5.7%(7)	32.0% (39)	9.4%(5)	35.8% (19)	2.9% (2)	28.9% (20)
7	11.5%(14)	43.4% (53)	11.3%(6)	47.1% (25)	11.6%(8)	40.5% (28)
6	13.1%(16)	56.6% (69)	15.1%(8)	62.2% (33)	11.6%(8)	52.1% (36)
5	8.2%(10)	64.8% (79)	11.3%(6)	73.6% (39)	5.8%(4)	57.9% (40)
4	13.1%(16)	77.9% (95)	11.3%(6)	84.9% (45)	14.5% (10)	72.4% (50)
3	8.2%(10)	86.1% (105)	7.5%(4)	92.4% (49)	8.7%(6)	81.1% (56)
2	5.7%(7)	91.8% (112)	5.7%(3)	98.1% (52)	5.8%(4)	86.9% (60)
1	6.6%(8)	98.4% (120)	1.9%(1)	100% (53)	10.1%(7)	97.1% (67)
0	1.6%(2)	100% (122)	0.0%(0)	100% (53)	2.9%(2)	100% (69)

3.4. Correlations between variables

The lack of correlation between the patients'ACE score and their level of education as well as with regard to their work status during the past 12 months is indicated in Table 4. The correlation coefficients were $r = -0.143$ and $r = 0.071$ respectively. The p values were $p = 0.113$ and $p = 0.434$ respectively. The r values are very close to 0 and p values are above 0.05; there is no correlation between above variables.

However, there was a correlation between household challenges and child maltreatment as indicated in Table 4 especially between childhood exposure to household member being treated violently and physical abuse ($r = 0.348$; $p = 0.000$); childhood exposure to household member being treated violently and emotional abuse ($r = 0.335$; $p = 0.000$); childhood exposure to household member being treated violently and emotional neglect ($r = 0.295$; $p = 0.001$); parental divorce or death and physical abuse ($r = 0.241$; $p = 0.008$); parental divorce or death and emotional abuse ($r = 0.210$, $p = 0.021$); parental divorce or death and sexual abuse ($r = 0.225$; $p = 0.013$); parental divorce or death and emotional neglect ($r = 0.292$; $p = 0.001$); parental divorce or death and physical neglect ($r = 0.290$; $p = 0.001$); household mental illness and

physical abuse ($r = 0.201$; $p = 0.027$); household drug or alcohol abuse and physical abuse ($r = 0.273$; $p = 0.002$); household drug or alcohol abuse and emotional abuse ($r = 0.301$; $p = 0.001$).

Table 4

Correlations between the patients' ACE score and other variables and interrelatedness between ACEs

N = 122 Correlation between		Pearson Correlation	P value	Significant at
ACE score	Level of education	-0.143	0.115	No
	Work status	0.071	0.434	No
Household member being treated violently	Physical abuse	0.348	0.000	0.01 level
	Emotional abuse	0.335	0.000	0.01 level
	Emotional neglect	0.295	0.001	0.01 level
Parental divorce or death	Physical abuse	0.241	0.008	0.01 level
	Emotional abuse	0.210	0.021	0.05 level
	Sexual abuse	0.225	0.013	0.05 level
	Emotional neglect	0.292	0.001	0.01 level
	Physical neglect	0.290	0.001	0.01 level
Household mental illness	Physical abuse	0.201	0.027	0.05 level
Household substance abuse	Physical abuse	0.273	0.002	0.01 level
	Emotional abuse	0.301	0.001	0.01 level

4. Discussion

The current study is the first in Rwanda to assess the prevalence of ACEs among patients with mental disorders. Nearly all (98.4%) patients with mental disorders have had at least one ACE with a prevalence rate significantly higher than the 52% rate observed in a general population of adults participating in the original ACE study by Felitti at Kaiser Permanente Hospital in San Diego, California, US (Felitti et al., 1998; Norman et al., 2012). Two other studies measuring the prevalence of ACEs respectively, found 85% of adolescents of a Brazilian birth cohort (Soares et al., 2016) and 62% of residents of rural regions of Wisconsin (Iniguez & Stankowski, 2016) experienced at least one ACE. The disparities in the prevalence may be due to different cultural, socio-economic and medical vs. mental health settings.

Nearly 78% of the study participants experienced at least 4 ACEs. This finding was significantly higher than those from an ACE study on outpatients with affective disorders in the Netherlands in which 35.6% of patients reported at least 4 ACEs (van der Feltz-Cornelis et al., 2019). The difference between the two studies may be interpreted in terms of the sociocultural background of developed countries who typically place more emphasis on child protection than in low income country settings (M. A. Bellis et al., 2014; Health Organization & Office for Europe, 2013). Individuals with 4 or more ACEs are at high risk of developing a multitude of physical conditions and mental disorders which subsequently result in an increase in cost in national health care services (Anda et al., 2006; M. Bellis et al., 2017; Björkenstam et al., 2013; Varese et al., 2012). Study findings by Anda et al., (2006), Björkenstam et al., (2013) and others, underline the importance for medical personnel to enquire about ACEs during every patient's clinical interview.

The most prevalent ACE in our findings were adults (64.8%) who had experienced separation, divorce or death of parents during their childhood. This finding was higher than 42% of Brazilian adolescents who reported parental separation and 10.1% of them reported parental death (Soares et al., 2016). Indeed, 50% of American children will see their parents' divorce (Oren & Hadomi, 2020). Descriptively, these data provide insight into some households to be at high risk of child maltreatment: a single parent home has been associated with a higher prevalence of child maltreatment, especially child neglect (Afifi et al., 2015).

Interestingly, emotional abuse was experienced by 58.2% of the current study's participants. These findings are consistent with a study in Singapore that found similar elevated ACE scores in mental health patients (59.1%) regarding childhood emotional abuse (Devi et al., 2019). On the other hand, less concern has been shown regarding the impact of emotional abuse on future physical and psychological disorders than other ACE types probably due to the common erroneous belief that it is the least damaging form of ACEs. Despite this misperception, previous studies demonstrated the consequences of emotional abuse and significant harmful effects with regard to several mental, physical and behavioral health outcomes in comparison to other ACEs (Liu et al., 2018).

The prevalence of physical abuse varies not only across continents and countries but also across gender. Physical abuse was reported by 55.7% of study participants. This prevalence was extremely high compared to the general population in which the global prevalence of childhood physical abuse has been estimated at 25%. There is significant variability in the prevalence physical abuse across countries with 12.0% and 27.0% for girls and boys respectively in Europe (Moody et al., 2018). However, these findings for the Rwandan inpatient population are similar to those found in other African countries for the general population. In Zimbabwe 64% of male and 76% females and in Kenya 66% of males and 73% of females respectively experienced physical abuse during childhood (Cui et al., 2018; Moody et al., 2018).

Exposure to collective violence was reported by 53.3% of patients. This finding was significantly higher than the global review which found that more than 10% of children are affected by the armed conflicts worldwide. During collective violence, children may experience direct consequences of violence such as

physical injuries/death, illnesses, disability, exposure to armed conflicts, torture or indirect consequences such as altered physical, emotional and cognitive development, displacement, separation from family, becoming orphaned, having limited access to health care and education, being required to assume adult responsibilities, having a lack of access to basic needs such as foods and water, violation of children's child right and child maltreatment (Kadir et al., 2019).

Exposure to a household member who was treated violently was reported by almost half (49.2%) of the study respondents. These findings supported the results of previous research that found the prevalence of IPV in African countries is estimated to be from 26.5–48% (Taquette et al., 2019). Furthermore, a significant relationship between children's health problems and their exposure to their mother being treated violently has been established. Kajeepeta et al., (2015) & Roth et al., (2014) found a significant association between childhood exposure to family conflicts and insomnia later in life. Regardless of the degree of exposure to IPV, children growing up in violent homes experience more emotional, behavioural, social and cognitive problems and more symptoms, such as depression, anxiety, conduct disorder and attention deficit hyperactivity disorders (ADHD) than children growing up in nonviolent homes (Rydström et al., 2019)

Bullying was reported by 46.7% of patients and it was more often reported by male than female patients. This finding was slightly similar to the general population in 40 western countries where the range from 8.6 % to 45.2 % and 4.8 % to 35.8 % among boys and girls respectively experienced bullying (Craig et al., 2009). Researchers have found persuasive evidence of interrelatedness between bullying victimization of children and adverse mental, behavioural and physical outcomes later in life. Given the evidence, there is a need for effective actions to be implemented in different institutions caring for children especially at schools where the high prevalence of children and adolescents engaging in bullying has been found (Moore et al., 2017).

Exposure to community violence was noted by 41.0% of patients. These data fall within the same range of the rates of child exposure to community violence among African American (54.4%), Hispanic (42.9%), White (21.8%) and Asian (21.8%) youth (Chen et al., 2016). Moreover, witnessing the killing of someone, seeing dead, mutilated bodies and physical attack with weapons have been proven to be the most upsetting traumatic experiences during community violence (Rieder & Elbert, 2013).

Having a household member with mental illness was reported by 32.8% of patients. These findings were much higher than the global estimation of 15% and 23% of children living with parent with mental illness (Patrick et al., 2019). The literature suggests that mental illness in the household creates a non conducive environment to the optimal development of a child. It is therefore better to detect and treat mental illness during the postnatal period as early as possible. The benefit may be the prevention of harmful consequences such as insecure infant attachment at 2 and 18 months and maladaptive behaviours of the patients including maltreatment of their children (Slomian et al., 2019).

The prevalence of childhood sexual abuse occurs more frequently in girls (25%) than boys (9%) worldwide (*Evaluation of Sexual Abuse in Children and Adolescents - UpToDate*, n.d.). Our findings

revealed that childhood sexual abuse in psychiatric patients occurred at significantly a higher rate compared to the general population; 45.3% of female patients and 18.8% of male patients reported experiencing sexual abuse as a child. Those alarming findings are congruent to the Rwandan survey on Violence Against Children and Youth that almost 24% of girls and 10% of boys were victims of sexual abuse (*Violence Against Children and Youth Survey Republic of Rwanda Republic of Rwanda*, n.d.). Interpretation may refer to children's vulnerability especially in the context of household challenges. Consistent with this interpretation, girls are vulnerable to sexual abuse but prevention and intervention programs target both genders (Pérez-Fuentes et al., 2013). However, male individuals with history of sexual abuse are more likely to develop psychopathology such as mood disorders and suicidal behaviours than their counterparts (Angelakis et al., 2019; A. B. Miller et al., 2013).

The current research study has revealed the significant burden that ACEs place on a select inpatient psychiatric population in Rwanda. The study demonstrates the negative impact of ACEs on the community as well as on individuals' medical and psychological health (Dube et al., 2009; Norman et al., 2012). Previous studies have found that hospitalization is an important indicator of expensive health care. Furthermore, mental and behavioural disorders are the most common pathologies responsible for hospital readmissions (Anda et al., 2007; Fang et al., 2015; Gryczynski et al., 2016).

The findings of this study did not find a correlation between an ACE score and the participants' level of education and work status during last 12 months. The data may be interpreted in terms of resilience which is defined as the capacity to resist or to overcome the damaging effects of adversity. Some participants have resisted adversities for a long period of time; 6.6% have completed a university level of education and 19.7% held paying jobs and were relatively stable in their occupational, social and professional functions before being admitted to the hospital for their symptomatology. Key factors to promote resilience are responsive care giving, fair treatment, good educational experiences, and opportunities to exert valued social roles (M. A. Bellis et al., 2018).

Despite this perspective, the majority of this study population did not achieve a high level of education and 67.2% did not study beyond the primary school level. They were also economically challenged as 42.6% of those who could work, were not employed, 29% were either totally or partially unable to work during the previous 12 months and 1.6% were retired. These alarming findings highlight the socioeconomic burden for patients with mental disorders. It is true that ACEs may contribute to this problem but further research studies are encouraged in order to delineate other underlying causes.

However, our findings demonstrated a correlation between child maltreatment and different household challenges as noted in the previous studies (Choudhry et al., 2018). This interrelatedness between ACEs suggests that they cannot be regarded as independent events during ACE studies. Anyway, different forms of ACEs share the same interacting factors at different levels: individual, parental, familial and social (Soares et al., 2016).

Limitations

The results of this study have been interpreted within the context of several possible limitations. The ACEs mentioned in the ACE-IQ are not alone to produce toxic stress response. Other risk factors to toxic stress have been identified in recent studies such as separation from a caregiver in foster care, migration and discrimination (Oh, Jerman, Purewal Boparai, et al., 2018). Additional considerations such as being born with HIV infection, being born from sex worker parents, teenager and unwanted pregnancy may hypothetically be added to the list given the psychopathology associated with those childhood events in Rwanda.

In addition, similar to other studies on ACEs, the retrospective nature and the self-reported data of the ACE-IQ may limit the ability to document all ACEs with precision. This limitation may be due to the possibility of recall error, overestimation or underestimation of those experiences and other retrospective biases.

6. Conclusions And Recommendations

This seminal study provides introductory and useful data in advancing our insight on the high prevalence of ACEs in hospitalized patients with mental disorders and the paucity of data on ACEs in Rwanda. Early recognition of ACEs with appropriate interventions can mitigate their negative effects on child development and can lead to better mental and physical health outcomes. If Rwandans had insight into the pernicious effects of ACEs on their mental health, it may empower them to seek preventive mental health care services. This insight may also provide motivation to learn useful parenting skills to help stop the intergenerational cycle of ACE transmission from parents to children.

It is critical to set the stage early for the prevention of ACEs in Rwandan children. Recognition of the lifelong impact of ACEs on normal development of children has been lacking in Rwanda and other developing countries. Identifying and addressing family problems, providing positive parenting programs, Trauma-Informed Care and Trauma-Informed Network of Care, and all interventions that can foster individuals' resiliency have been used in high-income countries with positive outcomes. It is imperative that the healthcare system in Rwanda includes ACE screenings in its general approach to medical healthcare in order to identify children and families at high risk for future mental and physical health problem.

List Of Acronyms And Abbreviations

ACE-IQ: Adverse Childhood Experiences International Questionnaire

ACEs: Adverse Childhood Experiences

CDC: Center for Disease Control and Prevention

CMHS: College of Medicine Health Sciences

CPA : Childhood Physical Abuse

CRH: Corticotropin-Releasing Hormone

CSA : Child Sexual Abuse

DNA: Deoxyribonucleic acid

HPA: The Hypothalamic-Pituitary-Adrenal axis

IPV: Intimate Partner Violence

IRB: Institutional Review Board

NPH : Neuropsychiatric Hospital

RDC : Republic Democratic of Congo

SDGs: Sustainable Development Goals

SPSS: Statistical Package for the Social Sciences

UR: University of Rwanda

Declarations

Ethics approval and consent to participate : Ethical clearance for this study has been requested and obtained from the Institutional Review Board (IRB) of the University of Rwanda (UR)/College of Medicine Health Sciences (CMHS). Written informed consents were given to the participants during the period of data collection. The meaning of the investigation was explained, and their participation was invited anonymously and voluntarily, resulting in a 77% participation. Subsequently, the questionnaires were distributed on paper. During its completion the main author of the study remained in place with the intention of resolving any doubt or difficulties. All methods were carried out in accordance with the ethical principles for medical research involving human subjects.

Consent for publication : Not applicable.

Availability of data and materials : All data and sensitive information are not publicly available. However, under a reasonable requirement, the data can be shared by writing a request to the following email address: vianney2020@gmail.com

Competing interests : The authors declare that they have no competing interests.

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Authors' contributions : VN, JY and BR have conceived the study. VN has developed study design, data collection and analysis and interpretation of the findings. JY, BR and AM did study supervision. Drafting of the manuscript was done by VN. Critical revision of the manuscript for important intellectual content was carried out by JY, AM, CM, BR and CC. All authors have approved the final manuscript.

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