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Narrative exposure therapy for post-traumatic stress disorder and appetitive aggression among soldiers retiring from active service in Uganda

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Abstract

Background Narrative exposure therapy (NET) is a form of treatment for trauma disorders, particularly in individuals suffering from multiple traumas. It is an evidence-based trauma-focused therapeutic approach designed to help individuals process and manage experiences of trauma, especially in the context of complex trauma. Information on the effectiveness of narrative exposure therapy in managing post-traumatic stress disorder and appetitive aggression among retiring soldiers is limited. This study aimed to determine the effectiveness of narrative exposure therapy as a form of treatment for post-traumatic stress disorder (PTSD) and appetitive aggression (AA) among soldiers retiring from active service in Uganda.

Methods An interventional study was conducted among 70 retired Uganda People's Defence forces (UPDF) soldiers who had earlier been screened for PTSD and AA at Gaddafi Barracks in Jinja District, eastern Uganda, in preparation for retirement. At baseline, participants underwent NET comprising eight 90-minute sessions delivered at two weeks interval for four months. Sessions were conducted either at nearby barracks or within participants' homes. Following completion of the four-month intervention period, participants were reassessed for PTSD and AA at endline.

Results Mean PTSD scores decreased from 23.16 (SD = 2.00) at baseline to 17.34 (SD = 1.42) at endline, representing a mean reduction of 5.81 points (t (69) = 3.91, $p < 0.001$). Similarly, mean appetitive aggression scores decreased from 33.26 (SD = 0.89) to 14.30 (SD = 1.18), representing a mean reduction of 18.96 points (t (69) = 11.84, $p < 0.001$). An exploratory post hoc analysis indicated that reductions were greater in the symptom domain present at baseline, with greater reductions in PTSD among participants with PTSD only and greater reductions in appetitive aggression among those with appetitive aggression only.

Conclusion Narrative exposure therapy demonstrated effectiveness in reducing symptoms of post-traumatic stress disorder and appetitive aggression among retiring soldiers in Uganda. These findings support consideration of integrating narrative exposure therapy into the UPDF retirement process prior to community reintegration.

Keywords Soldiers · Narrative exposure therapy · Post-traumatic stress disorder · Appetitive aggression · Uganda · Sub-Saharan Africa

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Introduction

Narrative exposure therapy (NET) is a form of treatment for trauma disorders particularly in individuals suffering from multiple trauma [1]. It is an evidence-based, trauma-focused therapeutic approach designed to help individuals process and manage experiences of trauma, especially in the context of cumulative or complex trauma [1, 2]. NET is an intervention to trauma-spectrum illnesses amongst survivors of several as well as complex trauma, built on the theory of the dual representation of traumatic memories [1]. It is thought to contextualize the particular associative elements of the fear network, the sensory, affective and cognitive memories of the trauma to understand and process the memory of a traumatic event in the course of the particular life of an individual [1]; Raghuraman S et al. [3]). It is noted that narrative exposure therapy permits reflection on the person's entire life as a whole, nurturing a sense of personal identity (Robjant et al. [4],). In narrative exposure therapy sessions, the formerly unrelated fear network for the traumatic events is stimulated and connected with the cold memory, so as to contextualize the events [1]. This is aimed at completing an autobiographical memory by connecting the hot and cold memory in this way, contextualizing each event [1]. Furthermore, the fear reaction can be reversed through exposure to the traumatic memory [5].

Narrative Exposure Therapy (NET) is a short-term, trauma-focused psychotherapy designed specifically for survivors of war, combatants, and individuals exposed to repeated traumatic events [6]. It is particularly effective for treating PTSD in populations where violence and trauma are chronic, such as soldiers and ex-combatants. In Uganda, NET was used among former child soldiers leading to significant reductions in PTSD symptoms and improved reintegration outcomes [7]. The strongest evidence comes from randomized controlled trials and pilot studies conducted in northern Uganda and refugee settlements and in Burundi, ex-combatants treated with NET and its forensic variant (FORNET) showed decreased appetitive aggression, making them less likely to relapse into armed conflict(Anke Kobach et al. [8]). Some studies found cognitive Processing Therapy (CPT) as one of the most effective trauma-focused psychotherapies for combatants with PTSD, consistently reducing symptoms such as intrusive memories, hyperarousal, and avoidance, however with limited evidence in reducing appetitive aggression (AA), with the only ability in restructuring of maladaptive beliefs about violence and trauma which indirectly reduces aggression by challenging the cognitive distortions that make violent acts appealing [9]. While another study has found out that Prolonged Exposure Therapy (PE) as one of the most effective trauma-focused treatments for PTSD among combatants, with randomized controlled trials showing that more than 60% of military personnel experience clinically significant symptom reduction and over 50% achieve long-term remission after intensive Prolonged Exposure programs [10]. Among the leading three most effective therapies in managing of repeated trauma, its only NET that has been found to be most effective in managing both PTSD and appetitive aggression among combatants as it has proved to be effective in Burundi, especially strong when adapted as FORNET, which integrates violent acts into the narrative, reducing their rewarding appeal.

Post-traumatic stress disorder (PTSD) is one of the commonest mental health challenges among veterans and service members [11, 12]. The risk of PTSD is highest among military personnel who are deployed in war zones due to exposure to various traumatic events [13] and most especially among the soldiers who get injured in their line of duty [14]. The prevalence of PTSD among military personnel with a history of combat exposure has been found to range from 10% to 15%, with a lifetime prevalence of up to 30%(Wisco BE et al. [15]). PTSD consists of a cluster of symptoms that severely impact daily functioning and quality of life (Wanguih William Ishak et al. [16]). The psychological and behavioral symptoms include re-experiencing of the trauma, avoidance of stimuli associated with the trauma, negative alterations in cognitions and mood and hyperarousal [17]. PTSD can have far-reaching consequences significantly affecting service members and their families [11, 18]. While the course of PTSD among the veterans varies, it has been noted to be persistent and may last a lifetime [11, 14].

In addition to PTSD, soldiers and individuals exposed to armed conflict frequently experience multiple forms of severe violence, including gang-related violence, emotional abuse, harassment, torture, combat-related injuries, forced displacement, and witnessing death or atrocities [19]. Repeated exposure to organized violence has

been consistently associated with an increased risk of mental health disorders such as PTSD, depression, anxiety, substance use disorders, suicidal behaviors, and trauma-related emotional dysregulation [20, 21]. Exposure to prolonged violence may also alter emotional processing and behavioral responses, particularly among combatants who repeatedly engage in violent acts during armed conflict (Hermenau et al. [22],). Repeated participation in violent encounters may reduce fear responses and increase emotional desensitization to suffering and death [23]. Over time, some combatants may begin to perceive violence as exciting, rewarding, or emotionally stimulating rather than threatening, a phenomenon described as appetitive aggression(AA) [24]. AA refers to a biologically and psychologically reinforced attraction toward violence in which individuals derive feelings of power, dominance, social recognition, or personal satisfaction from perpetrating aggressive acts [25]. Unlike reactive aggression, which occurs in response to threat or provocation, AA is often proactive and associated with the intrinsic enjoyment of violence and cruelty [23]. Among soldiers and members of armed groups, AA may emerge as an adaptive survival mechanism within violent environments where aggression is rewarded, normalized, or linked to social status and group acceptance [24, 26]. Studies conducted among former combatants in conflict-affected settings have shown that higher levels of exposure to perpetrated violence are associated with increased appetitive aggression, which in turn may contribute to persistent aggressive behavior, difficulties with social reintegration, interpersonal violence, and ongoing psychological distress after conflict ends [27, 28]. Although AA may temporarily reduce fear and emotional vulnerability during combat, long-term exposure to violent behavior may negatively affect empathy, emotional regulation, and post-conflict adjustment [23].

The Ugandan military has been involved in various operations both domestically and in neighboring countries including a thirteen year war insurgency in northern Uganda with reports of human rights violations by soldiers including killings, rapes, and physical assault [29]. The military's role in maintaining security can sometimes lead to tensions and violence, especially in conflict-prone areas [30, 31]. Many of these wars have been reported to be traumatic in nature, involving exposure to near-fatal experiences [32]. Some soldier s have demonstrated hostile behavior in the community after their time in the army including the killing of fellow citizens [33]. As such, some soldiers have exhibited aggressive behavior after returning to the community. Despite increasing recognition of the mental health consequences of military service, there has been limited evidence on the effective psychological interventions among retiring soldiers in Uganda. Most available studies have focused on active-duty military personnel, former combatants in post-conflict settings, or civilian populations, with little attention given to soldiers transitioning from military to civilian life. Furthermore, while Narrative Exposure Therapy (NET) has demonstrated effectiveness in treating trauma-related disorders in other conflict-affected populations, there has been insufficient evidence regarding its applicability and effectiveness among retiring soldiers in the Ugandan context. This lack of context-specific evidence has limited the ability of military health services and policy makers to develop evidence-based screening, prevention, and treatment programs tailored to the needs of this population. Therefore, this study aimed at addressing these knowledge gaps by evaluating the effectiveness of Narrative Exposure Therapy in reducing symptoms of both post-traumatic stress disorder and appetitive aggression retiring from active service in Uganda.

Methods

Study design

The study adopted a quasi-experimental one-group pretest–posttest design, where outcomes were assessed before and after implementation of the intervention among the same group of participants. The study population consisted of 247 soldiers preparing for retirement from active military service who were recruited between July and August 2023. During the initial assessment, all participants were screened for PTSD, AA depression, substance use disorder, alcohol use disorder, and childhood trauma exposure. Participants screened positive for PTSD and/or appetitive aggression at baseline, provided written consent and were ready to undergo eight treatment sessions

were enrolled for intervention. A total of 70 participants met the eligibility criteria and were enrolled in the intervention phase. Among these, 11 participants presented with both PTSD and appetitive aggression, 21 screened positive for PTSD only, and 38 screened positive for appetitive aggression only. All eligible participants subsequently received Narrative Exposure Therapy as the study intervention for eight sessions, delivered at an interval of two weeks for a period of four months, each session lasting for 90 minutes.

Study setting

Screening was conducted at the Gaddafi Military Barracks located in Jinja District in eastern Uganda. This barracks serves as the assembly and preparation center for soldiers retiring from active military service in Uganda, where they typically stay for approximately one month before reintegration into civilian communities

Sample size

The sample size was estimated before the intervention using a paired-sample power analysis, as the study involved comparing participants' outcomes before and after the intervention. The calculation assumed a 95% confidence level, 80% statistical power, and a moderate effect size of Cohen's d = 0.5. The moderate effect size was used as a conventional assumption for estimating the minimum sample required rather than being derived from a previous study in this specific population. Based on these assumptions, approximately 32 participants were required to provide adequate statistical power. The calculated sample size represented the minimum required for the analysis rather than a fixed recruitment target. Of the individuals screened, 70 participants met the eligibility criteria, screened positive for symptoms of PTSD and appetitive aggression, consented to participate, and were available to undergo the intervention. All 70 eligible participants were therefore enrolled and followed through the intervention sessions. Including participants beyond the minimum required sample also improved the precision and statistical power of the study.

Sampling procedure

For easy data collection, the study employed a stratified random sampling design at baseline. Soldiers residing in the barracks were first stratified into eight groups based on length of service, rank (officers and militants), and position held at the time of retirement (command or administrative roles). From these strata, eligibility was further determined by combat exposure. The sampling frame comprised all individuals within the retiring cohort who satisfied the predefined inclusion criteria, participants were randomly selected from eligible strata, Soldiers who did not meet the inclusion criteria or were not in the retiring cohort were excluded. This approach ensured adequate representation across relevant service characteristics while maintaining consistency with the study's objectives.

Recruitment procedures

Participants were recruited from retiring personnel of the Uganda People's Defence Forces (UPDF) who were undergoing routine retirement documentation and debriefing in preparation for reintegration back into civilian communities. As part of the baseline assessment, potential participants were screened for PTSD and appetitive aggression AA) Individuals who screened positive for PTSD and/or appetitive aggression and were ready to undergo 8 treatment sessions were considered eligible for inclusion in the intervention phase of the study. All eligible participants subsequently underwent a detailed baseline assessment that evaluated PTSD, appetitive aggression, depression, childhood trauma exposure, substance use disorder, and alcohol use disorder. Participants who met the eligibility criteria and voluntarily provided written informed consent were enrolled into the study and received NET. Before enrollment, participants were informed about the purpose of the study, the nature of

the intervention, the expected duration and frequency of therapy sessions, and their right to decline participation or withdraw from the study at any stage without any penalty or effect on their reintegration process.

Inclusion criteria

At baseline, participants were eligible for inclusion in the study if they had served in the army for a minimum of 10 years, had participated in at least one combat operation, and provided written informed consent to participate in the study. The requirement of at least 10 years of military service was intended to reduce the likelihood of including individuals who retired early due to voluntary resignation or medical discharge before completing substantial military service. A service duration of ten years or more was therefore considered indicative of meaningful military experience and sufficient exposure to standard military service and retirement processes [34].

Exclusion criteria

At baseline, participants were excluded from the study if they were intoxicated or demonstrated observable symptoms of mental illness during the data collection process. These symptoms included severe mood instability, disorganized or unusual behavior, incoherent speech, impaired orientation, apathy, pronounced social withdrawal, heightened suspiciousness or sensitivity, and observable aggressive behavior. Individuals presenting with these conditions were considered unlikely to fully comprehend the study procedures, understand the questionnaire items, or provide informed and reliable responses during the interview.

Data collection

Data were collected by trained research assistants using semi-structured interviews and standardized questionnaires. The research assistants were qualified counselling psychologists working within the UPDF and participated in the study with authorization from their respective departments. Prior to data collection, research assistants received a one-day training from the principal investigator on the standardized administration of study instruments, ethical research conduct, and appropriate techniques for addressing sensitive questions. Interviews were conducted in private settings to ensure confidentiality and promote open disclosure, with each assessment taking approximately 45–60 minutes to complete.

Measures

All screening instruments were compiled into a single questionnaire that was translated from English into Kiswahili and back translated into English to ensure fidelity. Kiswahili language is an official military language in Uganda used in all their commands and is seconded by English. The questionnaire included social demographic factors such as sex, age, rank, level of education, length of service in the army and marital status, PTSD Checklist, Hopkins Symptoms Checklist (HSCL-25), the Life Events Checklist for DSM-V, Alcohol Use Disorder Identification Test, Drug Abuse Screening Test and the Childhood Trauma Questionnaire.

Appetitive aggression scale

Appetitive aggression was assessed using the Appetitive Aggression Scale which is a 15-item scale that was developed using more than 2000 numbers drawn from diverse conflict affected areas showing and excellent reliability with a Cronbach's alpha of 0.85 [35]. Examples of the items in the Appetitive Aggression Scale include "Is it exciting for you if you make an opponent really suffer?" "Once fighting has started do you get carried away by the violence?". The appetitive aggression is scored on a 5-point Likert scale ranging from 0 (totally disagree) to 4 (totally agree). Items are summed up with minimum score of 0 and a maximum score of 60, scores above

15 indicated appetitive aggression. It has been used in Uganda before among former child soldiers in northern Uganda with Cronbach's alpha of 0.85 [35]. It has demonstrated construct validity (factor structure) where by the original validation study of the Appetitive Aggression Scale demonstrated good construct validity using principal axis factor analysis. Following item reduction from 31 to 15 items, all retained items loaded significantly on a single latent factor, indicating that the AAS measures one underlying construct—appetitive aggression. The single-factor solution explained approximately 32–33% of the total variance, supporting the scale's factorial validity across conflict-affected populations, including Ugandan former child soldiers [35]. It has further demonstrated convergent validity, the AAS has demonstrated good convergent validity through significant positive correlations with the Aggression Questionnaire (AQ). Among former child soldiers in northern Uganda, the total AAS score correlated significantly with the AQ total score ($r=0.56$, $p<0.001$) and with its physical aggression ($r=0.52$), verbal aggression ($r=0.39$), anger ($r=0.41$), and hostility ($r=0.39$) subscales. These findings indicate that while appetitive aggression is related to general aggression, it represents a distinct psychological construct [35]. The scale had a Cronbach alpha of 0.79 in this study.

The hopkins symptoms checklist

The Hopkins Symptoms Checklist (HSCL-25) is a self-report symptom inventory [36, 37]. The 25-item HSCL was derived from the 90-item Symptom Checklist (SCL-90) and is usually administered as a 15-item depression subscale and a 10-item anxiety subscale [38]. Participants are asked to rate the frequency of each symptom in the last seven days on a four-point Likert-type scale, from "not at all" (1) to "very much" (4). The average score of 1.75 or higher suggests significant depressive symptoms [38]. The HSCL-25 has been validated for use in Uganda with good psychometric properties demonstrated by a Cronbach's alpha of 0.91 [39].

Apart from Cronbach alpha, has demonstrated construct validity. A psychometric validation study conducted among people living with HIV in rural Mbarara, Uganda, found strong evidence of construct validity. The depression and anxiety subscales correlated in the expected directions with conceptually related variables, including subjective happiness, food insecurity, and self-reported overall health. Participants with poorer health, greater food insecurity, and lower happiness scores had significantly higher HSCL scores, confirming that the instrument accurately measures symptoms of depression and anxiety [39]. Also, HSCL-25 has demonstrated factorial validity (factor structure). Using exploratory factor analysis with parallel analysis [39], identified a three-factor structure consisting of depression (7 items), anxiety (5 items), and somatic symptoms (7 items). Together, these three factors explained approximately 83% of the total variance, demonstrating excellent factorial validity in a Ugandan population. This finding also suggests that somatic symptoms represent an important dimension of psychological distress among Ugandans and should not automatically be excluded from depression screening. The HSCL-25 had a Cronbach's alpha of 0.92 in this study.

The life events checklist for DSM-V

The Life Events Checklist for DSM-5 (LEC-5) is a self-report measure intended to screen for likely traumatic events in a person's lifetime(Weathers, F.W. et al. [40]). The Life Events Checklist for DSM-5 (LEC-5) assesses exposure to a variety of potentially traumatic events which include natural disasters like floods, fire or explosion, transportation accidents, serious accidents at work or home, exposure to toxic substances, physical assault or assault with a weapon, sexual assault, combat exposure, captivity, life-threatening illness or injury, and serious injury [40]. The Life Events Checklist for DSM-5 has been used in Kenya among adults with potential traumatic events [41]. The LEC-5 is not scored by summing responses because the six response options represent different types of trauma exposure rather than increasing levels of severity. The most common approach is to identify Criterion A trauma exposure by determining whether the respondent endorsed at least one event as "Happened to me," "Witnessed it," or "Part of my job." These response categories generally represent direct exposure pathways recognized by DSM-5, whereas "Learned about it" may qualify only under specific circumstances (for example,

when the traumatic event involves the violent or accidental death of a close family member or friend), requiring additional clinical assessment [17]. In epidemiological studies, investigators frequently calculate a cumulative trauma exposure score by counting the number of traumatic events personally experienced. Typically, only responses marked "Happened to me" are summed to estimate the individual's lifetime trauma burden. Some studies broaden the definition by including "Witnessed it" and "Part of my job," particularly in military, police, or humanitarian populations where occupational exposure is common [42]. For this study, responses were broadened to include witnessed it and part of my job, which were all summed to determine number of traumatic events experienced by each participant as there is no universally accepted scoring algorithm for the LEC-5. The LEC-5 had a Cronbach's alpha of 0.84 in this study.

Alcohol use disorder identification test

Alcohol use disorder was assessed using the Alcohol Use Disorder Identification test (AUDIT) questionnaire which assesses for alcohol use problems, alcohol use behaviors, and dependence [43]. It is a ten item questionnaire scored on a five point Likert scale ranging from 0 to 4 with options of never (=0), monthly or less (=1), 2–3 times a month (=2), 2–4 times a week (=3), and 4 or more times a week (=5) [44]. The AUDIT is unique among alcohol related screening instruments in that it is designed to measure a range of risk levels from low-risk drinking to hazardous drinking and alcohol use disorders [44, 45]. Low risk drinking denotes alcohol consumption in very small amounts which is also known as safe drinking/social drinking, while hazardous drinking is a pattern of alcohol consumption that is associated with alcohol related problems although it does not meet the minimum criteria for alcohol use disorder [46]. The AUDIT has been documented as a reliable and valid measure in identifying alcohol use disorder, hazardous consumption and harmful alcohol use and it has also been found to be a valid indicator for severity of alcohol dependence [47]. The audit had a Cronbach's alpha of 0.84 in this study. AUDIT has demonstrated criterion (diagnostic) validity, one of the strongest psychometric properties reported in Uganda is the criterion validity of the AUDIT. In a validation study among young people living in Ugandan fishing communities, the AUDIT was compared with the Timeline Follow Back (TLFB) interview, DSM-5 Alcohol Use Disorder criteria, and phosphatidylethanol (PEth), a biological marker of alcohol consumption. The study found that the 12-month AUDIT (cut-off ≥8) demonstrated 80.0% sensitivity and 83.3% specificity for identifying heavy drinking when compared with PEth. Similarly, the 30-day AUDIT showed 82.7% sensitivity and 79.8% specificity for identifying binge drinking based on TLFB, indicating good diagnostic accuracy [48]. It has further demonstrated concurrent validity, the Ugandan validation study also demonstrated strong concurrent validity. AUDIT scores correlated well with established measures of alcohol consumption, including TLFB estimates of drinking quantity and frequency, DSM-5 diagnostic classifications, and PEth concentrations. These findings indicate that higher AUDIT scores accurately reflect increasing levels of alcohol misuse in Ugandan populations [48].

Drug abuse screening test

Drug abuse was assessed using the Drug Abuse screening Test (DAST) which is a 10-item scale scored on yes and no responses [49]. It's used to assess the use of drugs not including alcohol or tobacco use in the past 12 months [49]. DAST is a biologically validated instrument that is easy to use with valuable implications as a research tool among both clinical and non-clinical populations [49]. DAST has previously been used among University students in Uganda [50]. DAST has been evaluated good psychometric properties with a Cronbach's ranging from 0.74 to 0.94 across different studies [51, 52]. The DAST had a Cronbach alpha of 0.763 this study. DAST has demonstrated test–retest reliability. The DAST-10 has demonstrated excellent temporal stability across repeated administrations. Studies have reported test–retest reliability coefficients ranging from 0.85 to 0.86, indicating that the instrument yields stable scores over time among individuals whose drug use patterns remain unchanged [53]. Also, it has demonstrated construct validity (factor structure). Factor analytic studies consistently support the construct validity of the DAST. Confirmatory and exploratory factor analyses indicate that the DAST-10 is

predominantly unidimensional, measuring a single underlying construct of problematic drug use. Earlier studies also identified several clinically meaningful subdomains related to recognition of drug problems, social consequences, help-seeking, illegal drug-related activities, and impaired control over drug use [53]. More to that, criterion (diagnostic) validity. The DAST demonstrates good criterion validity when compared with clinical diagnoses based on DSM substance use disorder criteria. Receiver Operating Characteristic (ROC) analyses have reported an area under the curve (AUC) of approximately 0.80, indicating good ability to distinguish individuals with drug use disorders from those without. Recommended cut-off scores generally range between 5 and 10, depending on the target population and screening purpose [53]. Furthermore, DAST demonstrated convergent validity, the DAST has shown satisfactory convergent validity through significant positive correlations with established measures of substance use severity and impulsivity. In psychiatric populations, DAST scores correlated particularly with the sensation-seeking dimension of impulsivity, supporting its ability to measure drug-related behavioral problems consistent with theoretical expectations [53]. Added to that is sensitivity and specificity. Comprehensive reviews of the DAST indicate that the instrument has moderate to high sensitivity and specificity across clinical and community samples, making it an effective screening tool for identifying probable drug use disorders. These diagnostic properties have supported its widespread use in both research and clinical practice [53]. Added to that, DAST, has demonstrated cross-cultural validity. Although a full psychometric validation has not yet been conducted in Uganda, the DAST has been applied successfully in diverse populations, including African settings. A recent Ugandan study has demonstrated that the DAST is easy to administer, biologically validated, and has previously been used among Ugandan university students, supporting its applicability in local research despite the absence of a formal Ugandan validation study.

Childhood trauma questionnaire

Childhood trauma was assessed using the28-item childhood Trauma Questionnaire (CTQ). The CTQ consists of 28 items and 5 subscales that physical, emotional, and sexual abuse; and emotional and physical neglect [54]. Items 10, 16, and 22 comprise the denial subscale. Each item is measured on a five-point Likert scale ranging from "Never true" =0 to "Very often true = 3 [54]. The CTQ items are elicited in context of "when I was growing up" which is followed by the description of a traumatic event that they could have experienced. Sample items include: "When I was growing up, I got hit so hard by someone in my family that I had to see a doctor or go to the hospital"; and "When I was growing up, people in my family said hurtful or insulting things to me. The cut-off scores for different subscales are ≥6 for sexual abuse; ≥8 for physical abuse; ≥9 for emotional abuse; ≥8 for physical neglect; and≥10 emotional neglect [55]. We dichotomized the subscale scores at the specified cut-offs, so that participants who scored above the cut-off were classified as having experienced abuse or neglect, while those who scored lower were classified as not having experienced abuse or neglect. The CTQ has been used among adolescents living with HIV in Uganda where it had a Cronbach's alpha of 0.86 [56]. The scale had a Cronbach alpha of 0.72 in this study. CHTQ has demonstrated construct validity (factor structure). The CTQ has consistently demonstrated strong construct validity across diverse populations. Confirmatory factor analyses support the original five-factor structure, comprising emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. A higher-order hierarchical model has also shown good model fit, confirming that these five domains collectively measure the broader construct of childhood maltreatment [57]. More to that, convergent validity. The CTQ demonstrates good convergent validity through significant associations with clinician-administered trauma assessments and measures of post-traumatic stress disorder. Recent validation research found that the physical abuse and sexual abuse subscales correlated significantly with the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5), indicating that CTQ scores accurately reflect childhood trauma experiences associated with later psychological distress [58]. In addition, CHTQ has demonstrated measurement invariance (cross-group validity). One important psychometric strength of the CTQ-SF is its measurement invariance. Validation studies found that the questionnaire measures childhood trauma consistently across different populations, including adolescents, adults, psychiatric patients, individuals with substance use disorders, and community samples. This

indicates that CTQ scores are comparable across diverse demographic and clinical groups [58]. Also has demonstrated item-level reliability and item-total correlations. Recent psychometric evaluations have shown satisfactory inter-item correlations and item-total correlations for most CTQ subscales, particularly emotional abuse, physical abuse, sexual abuse, and emotional neglect. However, the physical neglect and minimization/denial subscales generally demonstrate weaker psychometric performance and should be interpreted cautiously. More to that, CHTQ has demonstrated cross-cultural validity. The CTQ has been translated and validated in numerous languages and cultural settings worldwide. Nevertheless, a systematic review of CTQ validation studies concluded that cross-cultural validation evidence from African populations remains limited, highlighting the need for additional validation studies in countries such as Uganda [58]. In Uganda, the CTQ has been used in studies investigating adverse childhood experiences, trauma, PTSD, depression, and substance use. However, these studies have primarily reported internal consistency (Cronbach's alpha) and have not comprehensively evaluated other psychometric properties such as construct validity, criterion validity, test–retest reliability, or measurement invariance in Ugandan populations. Consequently, researchers in Uganda generally rely on the original CTQ validation studies and subsequent international psychometric evaluations when justifying the instrument's validity [59].

The post traumatic stress disorder (PTSD) checklist

The PTSD Checklist for DSM-5 (PCL-5) is a 20- self-report measure that assesses the presence and severity of PTSD symptoms [60, 61]. Items on the PCL-5 correspond with DSM-5 criteria for PTSD. The PCL-5 is constructed on a five Likert scale rated as not at all = 0, a little a bit = 1, moderately = 2 quite a bit = 3 and extremely = 4 responses [60, 62]. The score on the PCL-5 is done by summing up all item scores and a total score of 31 or higher suggests the presence of PTSD [62, 63]. The PCL-5, aligns with the DSM-5 criteria for PTSD and has shown strong validity and reliability across various settings [63]. The PCL-5 has been validated among University students in Rwanda with good psychometric properties (Cronbach's alpha = 0.85) [64] and has also been used in eastern Uganda among landslide survivors where it demonstrated a Cronbach's 0.84 [65]. The PCL-5 has shown excellent temporal stability [62], reported a test–retest reliability coefficient of $r = 0.82$, indicating that the instrument produces stable scores over time when PTSD symptoms remain unchanged. Furthermore, PCL-5 demonstrates strong convergent validity through high correlations with established clinician-administered PTSD measures such as the Clinician-Administered PTSD Scale (CAPS). Correlations ranging from $r = 0.74$ to 0.85 have been reported, showing that the PCL-5 accurately measures PTSD symptom severity [62]. Also, PCL-5 demonstrates acceptable discriminant validity, with moderate correlations ($r = 0.31$–0.60) with measures of related but distinct constructs such as depression and anxiety. This indicates that while PTSD is related to other psychological disorders, the PCL-5 measures a distinct construct [62]. The scale had as Cronbach's alpha of 0.86 in this study. A 2022 retrospective study from the 2020 Artsakh (Nagorno-Karabakh) War used the PCL-5 to screen combat-exposed military service members in an inpatient residential treatment program [66].

Narrative exposure therapy

Narrative exposure therapy (NET) was delivered for eight sessions, each lasting approximately 90 minutes at an interval of 14 days between each session for four months. This was based on the NET manual 2nd revised and expanded edition by [1]. The first session was a group session which focused on psychoeducation by the principal investigator (clinical psychologist trained in NET administration) regarding trauma PTSD, and appetitive aggression. Subsequent sessions were run as individual sessions to ensure privacy, confidentiality and proper emotion processing by the principal investigator. During the second session, participants constructed a lifeline, symbolized by a rope with a coiled end; by placing stones and flowers on the rope, stones represented traumatic experiences, while flowers symbolized positive life events, arranged in chronological sequence. The third session involved the initiation of the life narrative, beginning at birth and progressing to the first traumatic event. The

fourth and subsequent sessions focused on rereading the narratives documented in earlier sessions while continuing the narration of subsequent life events, including traumatic experiences and acts associated with appetitive aggression. The final session involved a complete rereading of the narrative, followed by participant verification and signing of the document. After the 8th session at endline, participants were notified to meet as a group for an exercise where each participant spent approximately 40–45 minutes completing semi-structured interviews administered by research assistants who were previously used at baseline, designed to assess perceived changes in post-traumatic stress disorder symptoms and appetitive aggression following the NET intervention. NET was adapted for this study because it has been previously used in treatment of PTSD symptoms and appetitive aggression in female former child soldiers who were forcibly recruited during M23 insurgency in the Eastern DRC (Robjant et al. [67],).

Data analysis

Data were analyzed using Stata version 14. Descriptive statistics were used to summarize the study variables, with categorical variables presented as frequencies and percentages, and continuous variables summarized using means and standard deviations. The effectiveness of the intervention was evaluated using paired sample t-tests to compare participants whether the observed changes in PTSD and Appetitive Aggression scores were statistically significant. Prior to conducting the paired t-test, the normality of the difference scores was evaluated using skewness to verify that the data met the assumptions of parametric testing. Statistical significance was assessed at a p-value of less than 0.05, and corresponding confidence intervals were reported.

Ethical considerations

We received ethical approval from the Mbarara University research ethics committee (MUST-2023–823) and the study was registered and cleared by the Uganda National for Science and Technology (HS2949ES). Administrative clearance was sought from the Uganda chief of defense forces through joint staff human resource and the chief joint staff as well as the head of retirement exercise at Gaddaffi military barracks in Jinja to do baseline screening. All participants provided written informed before they were enrolled in the study and this was based on Helsinki norm which provides for respect of human dignity and rights, informed consent, independent ethical reviews and rights to withdrawal, after which they voluntarily agreed to participate. In adherence to COVID-19 risk management protocols, both participants and research assistants maintained appropriate social distancing, and all other Ministry of Health standard operating procedures (SOPs) were strictly observed during data collection. Each participant received five thousand Ugandan shillings as compensation for their time taken to participate in the baseline screening. At baseline participants who were found with signs and symptoms of PTSD and appetitive aggression were called on phone which they had provided on questionnaire, arrangements were made to have them undergo treatment in private rooms to ensure confidentiality. After the period of four months, they consented again to fill in the interview guide to get the outcome results.

Results

Sample characteristics

The 70 participants had a mean age of 44.9 years (SD = 7.81) and mean length of service of 21.8 years (SD = 8.22). Most participants were male (93%), married, and non-commissioned officers, with 59% having lower or upper secondary education or higher. At baseline, 26% had PTSD only, 57% had appetitive aggression only, and 17% had both, with none having neither symptom.

At endline, these reduced to 1, 13, and 9%, respectively, while 77% had neither PTSD nor appetitive aggression, indicating an overall reduction in symptoms.

(Table 1).

The effectiveness of narrative exposure therapy in the management of PTSD and AA among Ugandan soldiers retiring from active service (*n* = 70)

PTSD symptoms decreased significantly from baseline to endline, from a mean of 23.16 (SD = 2.00) to 17.34 (SD = 1.42), representing a mean reduction of 5.81 points, $t(69) = 3.91$, $p < 0.001$, corresponding to a moderate effect size (Cohen's $d = 0.47$). Appetitive aggression scores also decreased significantly, from a mean of 33.26 (SD = 0.89) at baseline to 14.30 (SD = 1.18) at endline, representing a mean reduction of 18.96 points, $t(69) = 11.84$, $p < 0.001$, with a large effect size (Cohen's $d = 1.41$) (Table 2). The magnitude of the standardized pre–post change was therefore substantially larger for appetitive aggression than for PTSD symptoms. Individual-level plots

Table 1 Descriptive statistics of the sociodemographic characteristics of the participants (*n* = 70)

Characteristic	N or mean (SD)	%
Age (Mean/SD)	44.9 (7.81)	
Length of Service (Mean/SD)	21.8 (8.22)	
Sex		
Male	65	93
Female	5	7
Level of Education		
Primary	29	41
Lower Secondary	21	30
Upper Secondary and above	20	29
Marital Status		
Married	65	73
Single	5	7
Rank		
Commissioned Officers	8	11
Senior non-commissioned officers	30	43
Junior non-commissioned officers	32	46
Audit Categories		
Low risk	55	79
Moderate to Hazardous	15	21
DAST Categories		
Low Levels	63	90
Optimal Substantial	5	7
Substance use problem	2	3
Depression Categories		
Not Depressed	49	70
Depressed	21	30
Endline symptoms		
PTSD only	1	1
AA only	9	13
Both PTSD and AA	6	9
Neither	54	77
Baseline symptom		
PTSD only	18	26
AA only	40	57
Both PTSD and AA	12	17
Neither	0	0

Note: n-Frequency

Table 2 Results of a paired sample t-test comparing pre and post mean scores of PTSD and appetitive aggression among retiring soldiers following the Narrative exposure therapy intervention

Variable	Pre-NEC	Post-NEC			
	M(SD)	*M(SD)*	*t(df)*	*P*	*Cohen's d*
PTSD, Total Score	23.16 (2.003)	17.34 (1.42)	3.91(69)	0.0001	0.47
Appetitive Aggression, Total Score	33.26 (0.89)	14.3 (1.18)	11.84 (69)	<0.001	1.41

Note: M-Mean, SD- Standard deviation, *t* – test statistic, df- degrees of freedom

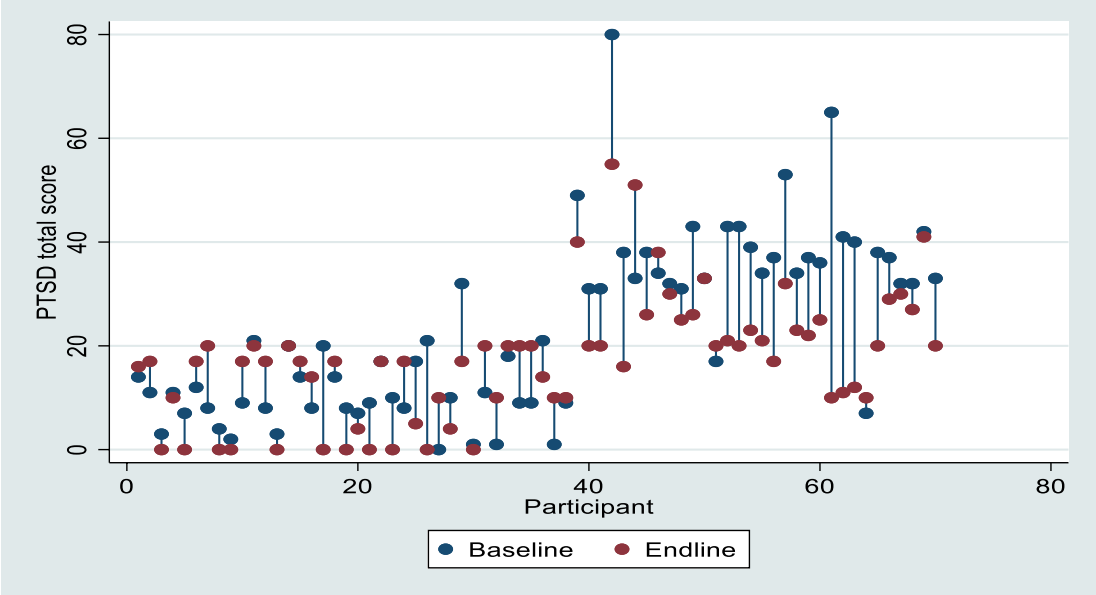


Fig. 1 Individual pre-post changes in PTSD symptoms

further illustrate the extent and consistency of these pre–post changes across participants for PTSD symptoms and appetitive aggression (Figs. 1 and 2).

Post hoc analysis for comparison of pre–post changes

An exploratory post hoc analysis examined whether pre–post changes differed by baseline symptom profile. At baseline, 18 participants (25.7%) had PTSD only, 40 (57.1%) had appetitive aggression (AA) only, and 12 (17.1%) had both. Among participants with PTSD only, PTSD symptoms decreased more than among those with AA only (mean change: −12.67 vs. −1.63; $p=0.009$, $d=0.95$). Conversely, AA decreased more among participants with AA only than those with PTSD only (mean change: −24.08 vs. −6.72; $p<0.001$, $d=1.47$). Overall, reductions were greater for the symptom domain present at baseline (Table 3).

Discussion

Following the implementation of Narrative Exposure Therapy (NET), participants demonstrated meaningful reductions in both post-traumatic stress disorder (PTSD) symptoms and appetitive aggression from baseline to endline. Levels of PTSD symptom severity and appetitive aggression were consistently lower after completion of the intervention, suggesting that NET was associated with improved mental health outcomes among this group of retiring soldiers. Importantly, to our knowledge, this study represents the first evaluation in Uganda of

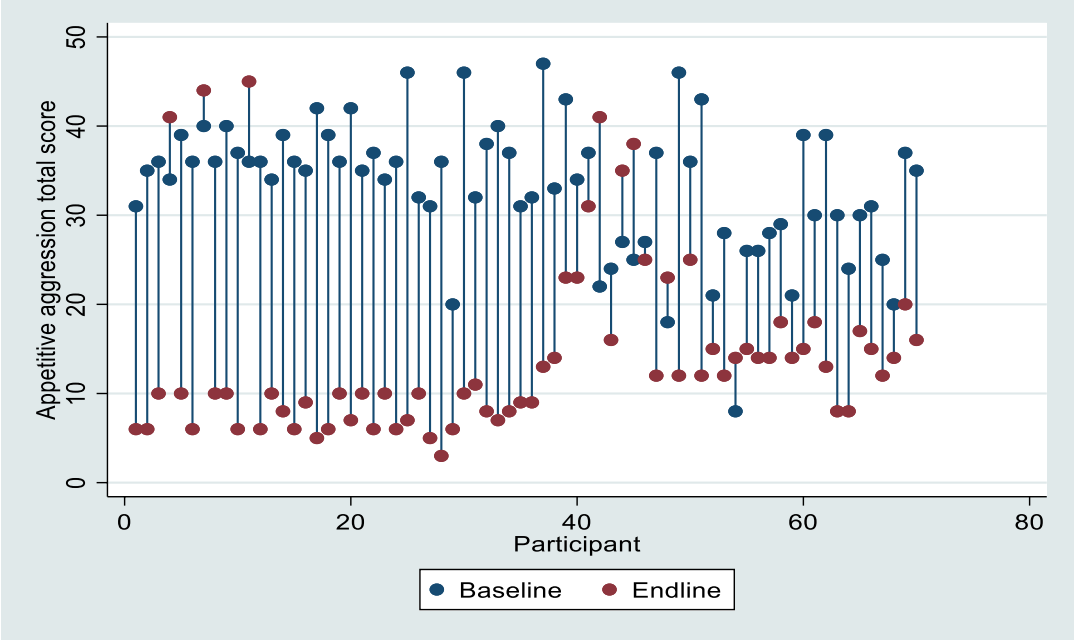


Fig. 2 Individual pre-post changes in appetitive aggression

Table 3 Exploratory post hoc analysis for comparison of pre–post changes by baseline symptom profile

Outcome	Baseline profile	n	Mean change (SD)	Between-group difference (95% CI)	Welch t (df)	p	Cohen's d
PTSD symptoms	PTSD only	18	−12.67 (15.07)	−11.04 (−19.04, −3.04)	−2.85 (23.68)	0.009	0.95
AA	PTSD only	18	−6.72 (9.20)	17.35 (11.38, 23.33)	5.85 (44.80)	<0.001	1.47

the effectiveness of NET for addressing both PTSD and appetitive aggression among military personnel, and specifically among individuals transitioning out of active service. These findings contribute novel evidence to the limited body of trauma-focused intervention research within military populations in low-resource settings.

The findings from this study are consistent with a growing body of evidence demonstrating the effectiveness of Narrative Exposure Therapy (NET) in reducing both post-traumatic stress disorder (PTSD) symptoms and appetitive aggression among trauma-exposed populations. Previous studies have shown NET to be highly effective in addressing PTSD and aggressive tendencies that develop in the context of repeated and severe trauma [68]. In particular, the application of NET among former child combatants and ex-soldiers has been associated with reductions in fear-based and aggressive behavior, while also supporting psychological recovery and social reintegration in post-conflict settings (Hermenau et al. [69],). NET has also demonstrated effectiveness among survivors of planned violence and extreme human rights violations, including torture and prolonged persecution [70, 71]. Its utility has further been documented among individuals with complex trauma histories, including war survivors and refugees, where NET has been shown to reduce trauma-related symptoms and improve overall mental health functioning [5, 72–74]. Importantly, NET has also been applied within forensic and offender rehabilitation settings, where it has been effective in addressing the co-occurrence of traumatic victimization, PTSD symptoms, and appetitive aggression linked to repeated exposure to violence [75]. Evidence from Northern Uganda further supports these findings, with studies among former child soldiers showing greater reductions in PTSD symptoms following NET, underscoring its relevance for conflict-affected populations in similar contexts [68]. Existing literature indicates that NET is both feasible and effective in addressing trauma spectrum disorders among individuals exposed to multiple and complex traumatic events, particularly in low- and middle-income and post-conflict settings. The current study extends this evidence by demonstrating comparable benefits among retiring military personnel in Uganda, reinforcing the potential role of NET in reducing trauma-related symptoms

and aggressive behavior during the transition from military to civilian life [1]; Robjant et al. [4],). Although perpetrator-related experiences were addressed when they emerged during participants' narratives, we used standard NET rather than FORNET. The intervention therefore did not systematically incorporate FORNET-specific procedures designed to address violent experiences that may have been perceived as rewarding. This distinction may be particularly relevant when interpreting changes in appetitive aggression. Future studies could examine whether FORNET, with its more explicit focus on perpetrator-related and potentially rewarding violent experiences, offers additional benefits for military populations with high levels of appetitive aggression.

The substantially larger reduction in appetitive aggression compared with PTSD symptoms is noteworthy. One possible explanation is that appetitive aggression among soldiers may be particularly responsive to changes in both the psychological meaning and environmental reinforcement of violence. In combat settings, perpetrating violence can acquire rewarding or exciting qualities, and appetitive aggression may serve an adaptive function by facilitating violent behavior in environments where such behavior is associated with survival, military duties, or social reinforcement [23, 68, 76]. Consistent with the potential importance of the military environment, previous research among Burundian combatants found higher appetitive aggression among active soldiers than among ex-combatants, even after accounting for relevant predictors [77]. Thus, the transition from active military service in our participants may have reduced exposure to contexts in which aggressive behavior was reinforced. NET and its adaptation for former combatants (FORNET) may additionally reduce appetitive aggression by enabling individuals to reconstruct and contextualize traumatic and perpetrated violent experiences within a coherent autobiographical narrative. Previous randomized trials among former combatants have demonstrated reductions in both appetitive aggression and posttraumatic stress following narrative exposure-based interventions (Hermenau et al. [22], [19, 78]). Notably, Koebach et al. [78] reported a very large within-group reduction in appetitive aggression, suggesting that substantial changes in appetitive aggression following this type of intervention are plausible.

Furthermore, the post hoc analysis showed that treatment response varied according to participants' baseline symptom profiles. Participants with PTSD only experienced a significantly greater reduction in PTSD symptoms than those with AA only (mean change −12.67 vs. −1.63; $p=0.009$; $d=0.95$). Conversely, participants with AA only experienced a significantly greater reduction in appetitive aggression than those with PTSD only (mean change −24.08 vs. −6.72; $p<0.001$; $d=1.47$). The reduction in PTSD symptoms is consistent with previous evidence supporting NET among trauma-exposed and conflict-affected populations. Meta-analytic evidence has found significant reductions in PTSD symptoms following NET, including among refugees and survivors of multiple traumatic experiences [79, 80]. A randomized controlled trial in eastern Democratic Republic of Congo found that FORNET significantly reduced appetitive aggression, current violent behaviour and post-traumatic stress compared with treatment as usual [78]. Although the present study used standard NET rather than FORNET, the findings suggest that narrative exposure-based approaches may have relevance for both trauma-related symptoms and aggression among conflict-exposed military populations. PTSD symptoms, in contrast, may remain persistent because they are associated with cumulative exposure to traumatic experiences and may continue after removal from the combat environment [68, 81]. Nevertheless, the difference in effect sizes in the present study should be interpreted cautiously. PTSD and appetitive aggression were assessed using different instruments with different distributions and variability, and the larger standardized effect for appetitive aggression does not necessarily demonstrate that NET has a stronger therapeutic effect on appetitive aggression than on PTSD. Moreover, because participants were simultaneously transitioning out of active military service, the observed reduction cannot be attributed to NET alone. Further controlled studies are needed to determine whether this differential pattern reflects the effects of NET, retirement from active service, measurement characteristics, or a combination of these factors.

Some limitations should be considered when interpreting the findings of this study. First, the study population was restricted to soldiers who had recently retired from active service in Uganda. As a result, the findings may not be directly generalizable to military personnel who remain in active service, whose experiences, exposures, and support systems may differ.

Second, the study employed a pre–post intervention design without a control group. While this design allowed for the assessment of changes over time, it limits the ability to attribute observed improvements solely to the intervention. Other factors occurring alongside the intervention such as natural recovery, changes in life circumstances following retirement, or external support may also have influenced the outcomes. Consequently, the effects observed in this study should be interpreted with caution, and future research using controlled designs would be valuable in strengthening causal inferences. Also, the post-intervention assessment was done one week immediately after completing Narrative Exposure Therapy (NET) which could have captured only the immediate treatment effects thus providing little information about the durability of the observed improvements. Despite these limitations, the study has several important strengths. To our knowledge, this is the first study in Uganda to evaluate the effectiveness of Narrative Exposure Therapy for both post-traumatic stress disorder and appetitive aggression among retiring military personnel, addressing a significant gap in the literature. The study focused on a clinically relevant and underserved population undergoing a critical life transition, a period during which mental health needs are often heightened. In addition, the intervention was delivered using a structured, evidence-based therapeutic approach by trained personnel, enhancing the internal validity of the findings. The use of standardized and validated assessment tools further strengthens confidence in the observed changes. These strengths support the relevance of the findings and provide a strong foundation for future controlled studies and for the potential integration of trauma-focused interventions within military and veteran mental health services in Uganda.

Conclusion

This study provides evidence that Narrative NET is an effective intervention for reducing post-traumatic stress disorder symptoms and appetitive aggression among retired soldiers in Uganda. The structured, trauma-focused nature of NET enables individuals to safely recount, process, and integrate traumatic experiences within a supportive therapeutic environment. Through this process, participants are better able to make sense of their experiences, leading to reduced psychological distress and improved emotional well-being. Beyond individual symptom reduction, the observed improvements suggest that NET may also support smoother social and psychological reintegration of retired soldiers as they transition from military to civilian life. Given the high burden of trauma exposure among military personnel, these findings highlight the potential value of integrating NET into the UPDF retirement and post-service support framework, particularly for individuals with significant trauma histories. Incorporating trauma-focused interventions such as NET at the point of retirement may help address unmet mental health needs and promote longer-term recovery and community reintegration.

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Author contributions Conceptualization- DMB, SA, GZR and HEA. Writing the first draft DMB, Review and editing SA, GZR, HEA & JN, Supervision- SA and GZR, Acquiring AAS tool- HEA.

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Data availability The datasets generated and/or analyzed during the current study are not publicly available due to research ethics board restrictions but are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate Clearance to conduct research was obtained from the Research Ethics Committee of Mbarara University of Science and Technology (MUST-2023–823) and the study was registered with and cleared by the Uganda National for Science and Technology (HS2949ES). All participants provided written informed before they were enrolled in the study and this was based on Helsinki norm which provides for respect of human dignity and rights, informed consent, independent ethical reviews and rights to withdrawal.

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

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