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POST-TRAUMATIC STRESS DISORDER, MAJOR DEPRESSIVE DISORDER AND GENERALISED ANXIETY DISORDER, AMONG UNIVERSITY STUDENTS FOLLOWING A TERRORIST ATTACK IN KENYA

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FOLLOWING A TERRORIST ATTACK IN KENYA**

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**ABSTRACT**

**Background:** Little research exists in Sub-Saharan Africa on the rates of mental disorders following terror attacks. Available studies have examined Post-Traumatic Stress Disorder (PTSD) only. This study sought to document the burden of PTSD, Major Depressive Disorder (MDD) and Generalized Anxiety Disorder (GAD) among survivors of the Garissa University College terror attack that occurred in North Eastern Kenya in 2015.

**Methods:** This was a retrospective chart review of medical records of students screened for psychopathology following the attack. Screening for the terror attack related PTSD, for MDD and for GAD was done using the PTSD Checklist for Diagnostic and Statistical Manual 5 (PCL-5), the Patient Health Questionnaire -9 (PHQ-9) and the Generalized Anxiety Disorder 7 – item Scale (GAD-7), respectively. Screening was conducted 7 weeks after the attack.

**Results:** A total of 552 subjects were screened of whom 385 (69.7%) were male. Two hundred and fifty eight (46.7% [95% CI: 42.5, 50.9]) participants met criteria for a probable PTSD. Two hundred and five (37.1% [95%CI: 33.1, 41.2]) screened positive for MDD while 231 (41.8% [95%CI: 37.7, 46.0]) had probable GAD.

**There were high rates of co-occurrence of PTSD, MDD and GAD with 139 (25.1%) participants screening positive for all three disorders.**

**Conclusions: The results of this study show a high mental health impact upon survivors of the attack. These findings have implications for the planning of interventions in the aftermath of terror attacks in Kenya.**

## INTRODUCTION

The Garissa University College terror attack occurred on 2<sup>nd</sup> April 2015. During the onslaught, gunmen stormed the college killing scores of students. This was one of the bloodiest attacks in Kenya. Media reports indicated that 147 students were killed, and dozens wounded. More than 550 students were evacuated. Terror attacks like this one, whose aim is to attain political, social-economic or religious goals through fear and intimidation (1) have a particularly devastating impact on the mental health of victims. This is because such acts are often unpredictable, cause disruptions to societal normalcy and safety and are associated with human intent (2). Elevated rates of Post-Traumatic Stress Disorder (PTSD) (3,4), Generalized Anxiety Disorder (GAD) (5,6), Major Depressive Disorder (MDD) (3,6) and substance use (7) have been documented in the aftermath of such events.

PTSD, a well-defined and recognized psychiatric consequence of exposure to potentially traumatic events, has particularly been well investigated following terror attacks. The disorder is characterized by symptoms of intrusion; persistent avoidance of stimuli; negative alterations in cognitions and mood and marked alterations in arousal, all associated with the traumatic event (American Psychiatric Association, 2013). Reports however indicate rates of PTSD as low as 2.7% (9) and as high as 69.0% (3). This wide variation renders such findings difficult

to interpret and to apply to our current setting.

Much less has been done regarding prevalence rates of MDD and anxiety disorders post trauma, yet the occurrence of these disorders has been linked to exposure to stressful life event (10). Further, both disorders are associated with significant morbidity and mortality (11,12). Available data indicate rates of depression as low as 9.5% (13) and as high as 40.6% (3). One study reported rates of GAD following a terror attack to be 26.9% (6).

Despite prior reports indicating the adverse psychiatric consequences of terror attacks, little has been done to investigate the mental health outcomes of survivors following terror attacks in Sub-Saharan Africa. Available studies narrowly focus on PTSD (4). The current study documented the burden of PTSD, MDD and GAD following the Garissa University College terror attack. Such data has the potential to guide future interventions in response to events of terrorism in our setting.

## MATERIALS AND METHODS

**Aim:** The aim of this study was to establish the prevalence of probable PTSD, probable MDD and probable GAD among survivors of the Garissa University College terror attack.

**Study Design:** This was a retrospective chart review of medical records of survivors transferred to the Moi University Main Campus following the terror attack.

**Study Setting:** Screening for psychopathology was conducted at the main campus of Moi University in western Kenya, seven weeks after the attack. This was the campus to which survivors of the terror attack were transferred to. The Garissa University College was at the time a constituent college of Moi University.

**Study Population:** A total of 552 survivors completed self-report instruments upon arrival at the Moi University main campus. These were scored and filed by a team of psychologists. The records for each student therefore included completed and scored screening tools.

**Measures & Instruments:** The PCL-5 (14) was used to screen for symptoms of PTSD related to the terror attack. The PCL-5 is a 20-item self-report tool that assesses for PTSD symptoms over the past month and whose items correspond with the Diagnostic & Statistical Manual -5 (DSM-5) criteria for PTSD. It allows for screening and monitoring of PTSD symptoms and for a provisional PTSD diagnosis to be made. Respondents are asked to rate how bothered they have been by each item in the past month on a 5-point scale as follows: 0"- Not at all," 1 - "A little bit, 2 - "Moderately," 3 - "Quite a bit," and 4 - "Extremely." Items are summed to provide a total score. A provisional PTSD diagnosis is made if the sum of scores is greater than or equal to 33. The PCL-5 is a psychometrically sound measure of DSM-5 PTSD. It has been validated among military service members, undergraduate students (14) and also in a low income Sub-Saharan Africa setting (15).

Screening for MDD was conducted using the Patient Health Questionnaire-9 (PHQ-9) (16). It is a 9-item self-report instrument for screening, and assessing the severity of MDD, and examines for symptoms over the past two week period. Each of the 9 items is rated as follows: 0 – “not at all”, 1 – “Several days”, 2 –

“More than half the days”, 3 – “Nearly every day”. Interpretation of the total scores is as follows; 0-4 minimal depression, 5-9 mild depression, 10-14 moderate depression, 15-19 moderately severe depression, and 20-27 severe depression. A score of 10 and above (moderate, moderately severe and severe depression) was considered a positive screen for MDD in our study (16). Such scores have been shown to have a sensitivity of 88% and a specificity of 88%.The PHQ-9 has excellent reliability and validity (16). The PHQ-9 has been validated in a low income Sub-Saharan Africa setting (17).

Screening for GAD was done using the GAD-7 scale (18) which is a valid and efficient tool for screening and measuring the severity of GAD. It is a seven item self-report instrument that examines for symptoms over the past two week period. Each item is rated on a 4-point scale as follows: 0 – “not at all”, 1 – “Several days”, 2 – “More than half the days”, 3 – “Nearly every day”. Total scores are interpreted as follows: 0-4 minimal GAD; 5-9 mild GAD; 10-14 moderate GAD; 15-21 severe GAD. A score of 10 and above corresponding to moderately severe and severe GAD was considered probable GAD in our study (18). Such scores have been shown to have a sensitivity of 89% and a specificity of 82% (18). The GAD-7 has been validated in a low income Sub-Saharan Africa setting (17).

**Study Procedure:** Data was extracted from the medical records and transferred onto standard data collection forms. This was followed by entry into a Red Cap Database (19).

**Data Analysis:** The medical records were stored in a secured locker. Data obtained was verified, entered into a password protected database and analyzed using STATA version 14. Scores for the different tools were summarized using means and standard

deviations. Categorical data was summarized using frequencies and percentages and presented using frequency tables. Association between gender and PTSD, MDD and GAD was assessed using the chi square test. All analyses were conducted at the 95% level of significance.

**Ethical approval:** The study protocol was reviewed and approved by the Institutional Research and Ethics Committee of Moi University College of Health Sciences/ Moi Teaching and Referral Hospital before commencing data abstraction. We requested

for waiver of consent as we did not interview any human subject, and this was approved.

## RESULTS

**Distribution of probable PTSD, probable MDD and probable GAD by gender:** A total of 552 subjects were screened of whom 385 (69.7%) were male. Compared to those who screened negative, those screening positive for GAD were significantly more likely to be female (Table 1).

**Table 1**  
*Distribution of probable PTSD, probable MDD and probable GAD by gender*

Gender	PTSD		Chi-square p-value
	No	Yes	
Male	212 (55.1)	173 (45.0)	0.177
Female	80 (48.8)	84 (51.2)	
MDD			
Male	246 (63.9)	139 (36.1)	0.433
Female	99 (60.4)	65 (39.6)	
GAD			
Male	241 (62.6)	144 (37.4)	0.001
Female	77 (47.0)	87 (53.0)	

**Prevalence of probable PTSD, probable major depression and probable GAD:** Two hundred and fifty eight (46.7% [95% CI: 42.5, 50.9]) participants met criteria for probable PTSD. Two hundred and five (37.1% [95%CI: 33.1, 41.2]) screened positive for MDD while 231

(41.8% [95%CI: 37.7, 46.0]) had probable GAD (Table 2). There were high rates of co-occurrence of PTSD, MDD and GAD with 139 (25.1%) participants screening positive for all three disorders (Table 3).

**Table 2**  
*Prevalence of probable PTSD, probable MDD and probable GAD*

Disorder	Tool/ Cut-off value	Mean scores	SD	Frequency* (n=552)	%
PTSD	PCL-5 ( $\geq 33$ )	34.98	19.75	258	46.7
MDD	PHQ-9 ( $\geq 10$ )	8.51	6.80	205	37.1
GAD	GAD-7 ( $\geq 10$ )	8.44	5.83	231	41.8

\*There was co-occurrence of PTSD, MDD and GAD among the participants. The frequency of these disorders is therefore more than 552.

**Table 3**  
*Co-occurrence of PTSD, MDD and GAD*

<b>Co-occurrence pattern</b>	<b>Frequency (n=552)</b>	<b>%</b>
Probable PTSD and probable MDD	159	28.8
probable PTSD and probable GAD	176	31.9
probable MDD and probable GAD	171	31.0
Probable PTSD, probable MDD and probable GAD	139	25.1

## DISCUSSION

The finding that 46.7% of students who were survivors of the Garissa terrorist attack met criteria for probable PTSD 7 weeks after the incident is largely higher than rates documented among groups exposed to acts of terrorism in the West. Following the September 11<sup>th</sup> terrorist attack in the US, rates of probable PTSD ranging from 2.7 to 11.2% 1-4 months after the attack were reported among participants living within the vicinity of the World Trade Center (5,9,13).

The higher rates in our study compared to those conducted in the Western world are likely a reflection of cultural differences in responses to trauma. The individualism-collectivism cultural construct has been studied and suggested or found to account for differences in PTSD development and expression (24,25). Individualistic cultures (typically Western ones) are characterized by importance in maintaining a sense of self while in collectivist societies (non-Western ones), group membership is central to the concept of self, and wellbeing is derived from successfully fulfilling social obligations (22). Due to the importance attached to communal ties, Jayawickreme et al (20) argued that more distress is experienced in collectivist compared to individualist societies following traumatic events that disrupt communities. This could explain the high rates of PTSD seen following the Garissa terror attack being that group ties were disrupted and ours is a largely collectivist society.

Also, certain trauma appraisal patterns in collectivist societies may increase PTSD risk. For example, Engelbrecht & Jobson (24) reported collectivist societies to attribute trauma to fate and to supernatural beings. This has been associated with an external locus of control over events which has been linked to increased distress following trauma (25).

In the non-Western world, rates approaching ours or higher, have been documented. Fekih-Romdhane et al (3) documented rates of probable PTSD of 68.6% 4-6 weeks following a terrorist attack in Tunisia while Shalev & Freedman (26) reported a 36.8% rate of PTSD at 4 months following a series of terrorist attacks. These findings offer further support for the observation that higher rates of PTSD are seen among non-Western compared to Western populations (27).

The finding that 37.1% of participants in our study screened positive for probable MDD is consistent with rates of probable MDD obtained from a study in Tunisia (40.6%) following a terrorist attack at a museum (3). Our findings were however higher than those obtained in the Western world. In the 1-4 month period post 9/11, rates of depression ranging from 9.7% to 17.7% were reported (16, 35). The prevalence of probable GAD in our study (41.8%) was similarly higher than that reported elsewhere. In the aftermath of the 9/11 attack, Jordan (28) reported a 26.9% prevalence rate of probable GAD, 1 to 4 months following the terror attacks.

The socio-cultural mechanisms likely at play in producing cross-cultural differences in PTSD and discussed above are also likely involved in the higher MDD and GAD rates seen in our study. Additionally, MDD and GAD following exposure to traumatic events have been linked to socio-economic disadvantage (29,30) a situation more likely in our setting given ours is a lower income country (31).

There was considerable co-occurrence of the three disorders indicating significant levels of psychopathology among the survivors. The documented high mental health impact following the Garissa University College attack is not surprising. The manner in which the Garissa massacre occurred was horrific. The students were lured out of their rooms, asked to lie face down and shot dead execution style. Others were taken hostage asked to call their parents and later shot. Another lot had their throats slit. A few survivors watched the ordeal in hiding while the rest fled to safety. It has been argued that the Garissa attack displayed a new level of cruelty never seen before in other of the Al Shabaab attacks.

Probable GAD was associated with gender in our study. This is consistent with studies showing GAD in the general population and among those exposed to trauma to be associated with being female (32,33). Gender differences in anxiety have been investigated and reported to be related to underlying differences in cognitive patterns (34) as well as neuro-anatomical characteristics (35).

Probable PTSD and probable MDD were not associated with gender in our study. Even though studies have reported PTSD to be associated with being female (36), perception of distress has been shown to account for this difference. Frans, Rimmo, Aberg, & Fredrikson (37) for example reported that for

a given level of reported distress, women and men had similar odds of developing PTSD following trauma. It could be then in our study that levels of subjective distress were similar across the genders.

A major limitation of the study was incomplete socio-demographic data, precluding detailed analyses of the correlates of probable PTSD, MDD and GAD among survivors of the terror attack.

## CONCLUSION

The results of this study show a high mental health impact upon survivors of the Garissa University College attack. These findings have implications for planning of interventions in the aftermath of similar attacks in our setting. Further research would be useful in increasing our understanding of the significantly high rates of probable PTSD, probable MDD and probable GAD seen in our study.

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