

Title: Efficacy of Psychosocial Group Treatment for Post-traumatic Stress Disorder among Genocide Survivors in Rwanda, 25 Years After 1994 Genocide Against Tutsi.

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Abstract

Background: Prior studies indicated that post-traumatic stress disorder is becoming a global health concern even though still poorly known and treated. In the aftermath of 1994 Genocide against Tutsi, studies found high rates of depressive and anxious symptoms along with PTSD among genocide survivors. Due to the highest cruelty in which the Genocide was committed, genocide survivors still need high special humanitarian services, of those including specialized health care services. The aim of this study was to assess the efficacy of psychosocial group therapies created by AVEGA Agahozo in reducing PTSD symptoms among Genocide survivors in Rwanda, 25 years after 1994 Genocide against Tutsi.

Methods: We conducted a comparative cross-sectional study design with a sample of 98 genocide survivors who received group therapy by AVEGA Agahozo. We used a multi-stage random sampling method to select participants and 7 trained psychologists interviewed genocide survivors about their PTSD status before and after treatment using Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. The analysis was performed using SPSS version 17.1.

Results: The results showed that women were 97.96% and men presented 2.04% of all participants because AVEGA Agahozo mainly focuses on helping women survivors who lost their husbands in Genocide and previous findings also concluded that women are very prone to suffer from PTSD than men. Paired t-test results showed significant differences between symptoms, before and after treatment ($P < 0.001$ in all pairs). Cohen's d results also showed high effect sizes ($d > 0.5$), only in pair 8 where the difference appears to be less significant ($d = 0.28$). The descriptive statistics showed that the severity of PTSD symptoms dramatically reduced after treatment. But this difference of severity is only statistically significant among five (5) PTSD symptoms.: (Marked physiological reactivity after exposure to trauma-related stimuli [$P = 0.045$, $x^2 = 38.111$]; inability to recall key features of the traumatic event [$P < 0.001$, $x^2 = 56.309$]; persistent negative trauma-related emotions [$P = 0.013$, $x^2 = 43.184$]; self-destructive or reckless behavior [$P = 0.041$, $x^2 = 38.535$]; hypervigilance [$P = 0.020$, $x^2 = 41.596$].

Conclusion: Psychosocial group therapies created by AVEGA Agahozo effectively alleviate post-traumatic stress disorder symptoms and severity among genocide survivors.

Background

Post-traumatic stress disorder (PTSD) is mainly characterized by exposure to a traumatic event in which the "person experienced, witnessed, or was confronted with a terrifying event or events that may cause death, severe injury, physical harm or threat of self or others [1]. Many people who develop PTSD at the first onset will recover without the use of any treatment a few months later, however, in a large subgroup (30–40%) the symptoms persist, repeatedly for many years [2],[3]. A study conducted with World War II [4] and Holocaust survivors [5] found that the suffering lasts for decades after the traumatic event has ended [6]. In the aftermath of 1994 Genocide against Tutsi, genocide survivors showed high rates of mental health and psychosocial problems due to the inconceivable, dehumanized brutality that the majority of them had been exposed or witness to [7]. In the census conducted by the Ministry of Local Government and the Ministry of Health in 2002, the findings showed that the prevalence of PTSD in genocide survivors was around 87.4% [8]. A recent study conducted 25 years after the Genocide found that genocide survivors still present a high prevalence of post-traumatic stress disorder notably in women survivors [9]. And most of them are not receiving the appropriate

treatment to help them recovering from PTSD. AVEGA Agahozo is one of the institutions in Rwanda which is trying to help genocide survivors to recover from PTSD by giving them PTSD group treatments. They have professional psychologists checking on them regularly and give them any psychosocial assistance they need to thrive. They also help them to fix their personal issues including access to other health care services to those who have chronic diseases caused by Genocide. AVEGA Agahozo has created different group therapies in almost all districts of Rwanda. And many genocide survivors have profoundly confirmed that group therapies have helped them to recover from PTSD and regained hopes for living a better life. There were no previous studies that evaluated or analyzed the efficacy of these therapeutic groups in healing PTSD. The present study was designed to analyze the efficacy of these psychosocial group therapies created by AVEGA Agahozo in reducing PTSD symptoms and severity among Genocide survivors.

Methods

Research design

We used a comparative cross-sectional study design to analyze the efficacy of psychosocial group therapies created by AVEGA Agahozo. According to the DSM-5 criteria for PTSD (Table 1), 20 symptoms before and after treatment were compared to analyze the efficacy of psychosocial group therapy in reducing PTSD symptoms among genocide survivors. The genocide survivors were asked how they felt before joining the psychosocial group therapy and how they felt after treatment, then after the records were compared to assess the change in PTSD symptoms and severity before and after treatment. The severity of symptoms was measured by choosing the intensity of reoccurrence or re-experience of the symptoms. The intensity of PTSD symptoms severity was categorized into 6 levels (Not at all, very slightly, slightly, moderately, quite a bit and extremely) (Table 4).

Description of group therapy in this study

In this study, group therapies represent the psychosocial therapeutic groups created by AVEGA Agahozo to help genocide survivors to recover from PTSD. AVEGA Agahozo has several numbers of psychologists working in daily basis with genocide survivors. They are the staff of AVEGA Agahozo which is an association of the widows of Genocide. It is a Rwandan association formed to help widows, orphans and others who lost family members in the 1994 Genocide. AVEGA Agahozo was founded in October 1995 by women who had survived the killings but lost their husbands. As one of the mission of this association, AVEGA Agahozo generally helps genocide survivors who are suffering from different chronic health conditions. And that is where started the idea of creating group therapies to help widow genocide survivors to recover from PTSD. These group therapists teach genocide survivors new coping skills on how to manage their symptoms, reduce painful memories, overcome their sense of helplessness and hopelessness, develop healthy lifestyle habits, manage anxiety and anger, think positively, give a hand to others, and move on with their lives. The therapists ensure that every group therapy is secured with emotional safety, confidentiality, support, and a common goal (of recovering from PTSD), to help group members having a sense of belonging, acceptance and feel free to share their testimonies, strengths, and weaknesses throughout the healing journey. This makes genocide survivors feel less isolated knowing how to deal with the trauma. Each group therapy had 9 to 18 participants. All group therapies lasted for a period of 6 to 30 months depending on how long the members showed a tremendous recovery from PTSD. All group therapies included in this study were created and closed within the years from 2016 to 2019. The range of age mean of group members was 43-64 years. The group therapy sessions lasted usually for one to two hours, and they were

repeatedly happening once to twice a week depending on how the group members needed the support to help them recover from PTSD.

Participants

Participants were 98 genocide survivors who were suffering from PTSD and who received psychosocial group treatment by AVEGA Agahozo. The age range of participants was 43 to 64 years. These group therapies were located in ten (10) districts of Rwanda (Bugesera, Gisagara, Huye, Gakenke, Rulindo, Musanze, Nyamasheke, Karongi, Kayonza, and Ngoma).

Inclusion criteria: (1) Participants were genocide survivors; (2) Participants were born prior to genocide, (3) Participants suffer from PTSD; (4) Participants were able to recall what happened to them during the Genocide (5) Participants experienced at least one traumatic event during the Genocide; (6) Participants had received PTSD group treatment under the supervision of AVEGA Agahozo within the years from 2016 to 2019, and (7) Participants were no longer receiving psychosocial group therapy.

Exclusion criteria: (1) Those people who are not genocide survivors; (2) who were born after Genocide, (3) who do not suffer from PTSD; (4) who did not experience traumatic events during the Genocide; and (5) who did not receive PTSD group treatment under the supervision of AVEGA Agahozo within the years from 2016 to 2019.

Subjects sampling and selection

We used a multi-stage random sampling method to select 98 participants. We firstly selected 10 districts (Bugesera, Gisagara, Huye, Gakenke, Rulindo, Musanze, Nyamasheke, Karongi, Kayonza and Ngoma) randomly among 14 districts which had graduated group therapies created and supervised by AVEGA Agahozo. In each selected district, one sector was selected, thereafter; in each selected sector one group therapy was selected. In each selected group therapy, ten genocide survivors precisely were randomly selected to participate in the study but if the members of group therapies were less than 10, all of the members were selected to participate in the study. All genocide survivors who met the inclusion criteria were given equal chance to participate in the study. Microsoft Excel was used to sort randomly the names of participants to participate in the study using a sampling frame containing all the names of genocide survivors in each psychotherapy group.

Data collection

Seven psychologists collected data in October, 2019 from 10 selected districts of Rwanda (Bugesera, Gisagara, Huye, Gakenke, Rulindo, Musanze, Nyamasheke, Karongi, Kayonza and Ngoma). One week before collecting data, we recruited 7 psychologists and trained them to have the same understanding of the study methodology and objectives. Twenty psychologists submitted their copies of degrees and CV, then after we reviewed their documents and chose those who were more closely to fit the requirements. Selected psychologists had experience of two years and more in conducting trauma focused therapies. The training was conducted online because the psychologists were located in different areas of the country. All data collection sites were nearby health centers that in case the interviewees re-experienced the occurrence of the traumatic events, they would have received emergency care services from the health centers. Each site was supervised by the psychologist who led the group therapy since when it was created. And the research team coordinated all the research work. The interviews included open ended and close questions. The psychologists explained clearly the objectives of

the study to the participants before they started interviews, then after they carefully interviewed 98 genocide survivors who met the inclusion criteria using a questionnaire which was designed in reference of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. The interview lasted between 30-60 minutes. The participants had to sign a consent form before they participated in the study and they were allowed to stop or withdraw from the interview whenever they felt uncomfortable. We collected the information on demographic characteristics of participants, description of group therapy, symptoms identified before treatment and symptoms identified after treatment. To increase the quality control of the study, we involved the psychologists to conduct the interview and did piloting as to test and adjust the questionnaire before it was fully certified for use. The psychologists were mostly trusted by the participants and they knew how to handle any situation that might cause trauma reoccurrence during the interviews. This was not only demonstrated that the target population understood the questions in the same way as the researchers but also offered an opportunity to identify errors in the questionnaire. Then after, the questionnaire was given to the second reader to find out if it was well designed for the study.

Statistical analyses

We used SPSS 17.1 to enter the data into the database and performed analysis. We used the following five statistical methods to analyze the data:

Descriptive statistics

Descriptive statistics were used to compare PTSD symptoms severity before and after treatment. Percentages of participants in each category of severity intensity were calculated and compared before and after treatment to assess if there is any difference.

Chi-square test

Chi-square test was used to test the significance of differences between PTSD symptoms severity before and after treatment.

Paired t-test

Paired t-test was used to assess the efficacy of group therapy in reducing PTSD symptoms. Mean differences, standard deviations, standard error means, 95% confidence intervals, t-test results, p-values helped to identify the differences between PTSD symptoms severity before and after treatment. To calculate t-test results the means and standard deviations of twenty symptoms of PTSD (According to DSM5) were compared in pairs before and after treatment. *Pair1*: represents 1st symptom severity before and after treatment, *Pair2*: represents 2nd symptom severity before and after treatment, *Pair3*: represents 3rd symptom severity before and after treatment, *Pair 4*: represents 4th symptom severity before and after treatment, *Pair 5*: represents 5th symptom severity before and after treatment, *Pair6*: represents 6th symptom severity before and after treatment, *Pair7*: represents 7th symptom severity before and after treatment, *Pair8*: represents 8th symptom severity before and after treatment, *Pair 9*: represents 9th symptom severity before and after treatment, *Pair 10*: represents 10th symptom severity before and after treatment, *Pair11*: represents 11st symptom severity before and after treatment, *Pair12*: represents 12nd symptom severity before and after treatment, *Pair13*:

represents 13th symptom severity before and after treatment, *Pair 14*: represents 14th symptom severity before and after treatment, *Pair 15*: represents 15th symptom severity before and after treatment, *Pair 16*: represents 16th symptom severity before and after treatment, *Pair 17*: represents 17th symptom severity before and after treatment, *Pair 18*: represents 18th symptom severity before and after treatment, *Pair 19*: represents 19th symptom severity before and after treatment, and *Pair 20*: represents 20th symptom severity before and after treatment (Table 5).

Cohen's d test

Cohen's d test was used to assess the significance of differences between symptoms severity before and after treatment by comparing the magnitude of effect sizes. The interpretation of these effect sizes refer to three categories based on benchmarks suggested by Cohen [10]. When $d = 0.2$, it means that effect size is *small*, when $d = 0.5$, it means that effect size is *medium* and when $d = 0.8$, it means that effect size is *large*. Cohen's d in between-subject designs can be readily interpreted as a percentage of the standard deviation, such that a Cohen's d of 0.5 means the difference equals half a standard deviation.

Formula: Cohen's d (d) = Mean difference (X)/Standard deviation (SD)

Results

Social-demographic characteristics of participants

The majority of participants were female, presenting 97.96% (96). Male presented only 2.04% (2) of all participants (Table 2). 13.27% (13) of all participants are single mothers, 14.29% (14) are legally married, 3.06% (3) are illegally married, 1.02% (1) of them are divorced, 5.1% (5) are separated, 61.22% (60) are widows, 1.02% (1) is widower and 1.02% (1) is legally remarried (Table 3). 5.10% (5) of the participants are situated in the age group of 30-40years, 31.63% (31) are aged of 41-50years, 38.78% (38) of the participants were situated in the age group of 51-60 years and 24.49% (24) of them were 61 year old and above (Table 3). 69.39% (68) are crop farmers, 7.14% (7) of them are farmers, 1.02% (1) is student, 15.31% (15) do not have job, 5.10% (5) are too old and cannot work, and 1.02% (1) is a self -worker and 1.02% (1) of them cooks in the restaurant (Table 3).

Efficacy of group therapy in reducing PTSD symptoms and severity

Descriptive statistics showed that the severity of PTSD symptoms was noticeably reduced after the treatment but chi-square results showed that the differences were statistically significant for only five (5) PTSD symptoms: (Marked physiological reactivity after exposure to trauma-related stimuli [$P=0.045$, $\chi^2=38.111$]; inability to recall key features of the traumatic event [$P<0.001$, $\chi^2=56.309$]; persistent negative trauma-related emotions [$P=0.013$, $\chi^2=43.184$]; self-destructive or reckless behavior [$P=0.041$, $\chi^2=38.535$]; and hypervigilance [$P=0.020$, $\chi^2=41.596$] (Table 4). Paired t-test and Cohen's d results showed significant differences between symptoms, before and after treatment; [Pair 1: ($t=15.054$, $P<0.001$, $d=1.52$), Pair 2: ($t=14.003$, $P<0.001$, $d=1.41$), Pair 3: ($t=15.599$, $P=0.000$, $d=1.58$), Pair 4: ($t=13.444$, $P<0.001$, $d=1.33$), Pair 5: ($t=10.330$, $P<0.001$, $d=1.04$), Pair 6: ($t=8.883$, $P<0.001$, $d=0.90$), Pair 7: ($t=8.265$, $P<0.001$, $d=0.84$), Pair 8: ($t=2.785$, $P=0.006$, $d=0.28$), Pair 9: ($t=19.613$, $P<0.001$, $d=1.98$), Pair 10: ($t=10.543$, $P<0.001$, $d=1.07$), Pair 11: ($t=4.933$, $P<0.001$, $P=0.001$, $d=1.51$), Pair 12: ($t=14.902$,

$P < 0.001$, $d = 1.51$), Pair 13: ($t = 14.074$, $P < 0.001$, $d = 1.42$), Pair 14: ($t = 12.471$, $P < 0.001$, $d = 1.27$), Pair 15: ($t = 12.282$, $P < 0.001$, $d = 1.25$), Pair 16: ($t = 12.935$, $P < 0.001$, $d = 1.31$), Pair 17: ($t = 11.860$, $P < 0.001$, $d = 1.20$), Pair 18: ($t = 12.228$, $P < 0.001$, $d = 1.23$), Pair 19: ($t = 13.051$, $P < 0.001$, $d = 1.32$), Pair 20: ($t = 11.694$, $P < 0.001$, $d = 1.18$)] with p-values less than 0.001 ($P < 0.001$) in all 20 pairs representing 20 PTSD symptoms (Table 5).

Discussion

To the best of our knowledge, only a few studies examined the mental health status of the Rwandan population in the aftermath of the Genocide, however, all findings showed that the percentages of those who suffer from mental health disorders, mainly depression and PTSD are very high [11][12][13]. As a result of the inhumane atrocity in which the genocide was committed, genocide survivors still require special quality care services notably appropriate health care services [14]. The main objective of this study was to analyze the efficacy of psychosocial group therapies created by AVEGA Agahozo in reducing PTSD symptoms among Genocide Survivors. According to the results found after performing analysis, demographic statistics indicated that women were 97.96% (96) of all participants and men presented only 2.04% (2) (Table 2). In terms of demographic variables, female gender is a commonly reported risk factor in the development of symptoms of depression and PTSD [15][16][17]. Previous findings consistently concluded that women are very prone to suffer from PTSD than men [18][19][20]. This difference in prevalence is also explained by how men were mostly targeted by perpetrators and were killed in Genocide than women. In 2004, Amnesty International showed that the widows were 10 times more than widowers, about 50,000 widows of the genocide [21]. A study conducted 25 years after the Genocide also found a very high prevalence rate of post-traumatic stress disorder among survivor mothers [9]. AVEGA Agahozo also mainly focuses on helping widows than widowers. 94.9% (93) of all participants are 41 year and above (Table 2). That means that they were around 16 year old during the Genocide. Previous studies found that genocide survivors who were between the ages of 11 and 20 during the genocide are at the highest risk for PTSD [22]. All participants witnessed different traumatizing events that they went through during 1994 Genocide perpetrated against Tutsi and most of them experienced more than one traumatic event. Descriptive statistics showed that the severity of PTSD symptoms was dramatically reduced after treatment. However, these severity differences were only statistically significant for 5 PTSD symptoms: (Marked physiological reactivity after exposure to trauma-related stimuli; inability to recall key features of the traumatic event; persistent negative trauma-related emotions; self-destructive or reckless behavior and hypervigilance (Table 5). Paired t-test and Cohen's d results showed significant differences between symptoms severity before and after treatment with p-values less than 0.001 ($P < 0.001$) in all 20 pairs representing 20 PTSD symptoms (Table 5). According to the results mentioned above, the present study concluded that the group therapy is effective to reduce the severity and symptoms of PTSD among Genocide survivors. These group therapies helped the genocide survivors to relieve the PTSD symptoms and regain hopes for a bright future. These results support the previous studies that stated that trauma centered group therapy effectively heals PTSD among a large number of combat veterans and non-military trauma victims of cruel violence and other disasters (like earthquake and hurricane) [23]. Based on the existing research, group treatment for PTSD appears to be an effective approach, although meta-analytic findings suggest that it is not as effective as individual therapy [24], thus further research should compare the effectiveness of group treatment and individual treatment. Most genocide survivors who suffer from PTSD do not go to the hospital to seek health care services and mental health disorder is one of the risks that might develop the complications of other diseases that can permanently harm the lives of genocide survivors. Prior study findings revealed that post-traumatic stress disorder, major

depression disorder, and traumatic brain injuries can have long-lasting, and surging consequences such as substance abuse, suicide attempts, unhealthy behaviors, physical health problems, mortality, diminished productivity, and unemployment [25]. Children of trauma victims suffering from PTSD symptoms are also more likely to develop PTSD [26]. Some research findings consistently found that PTSD may persist longer after a traumatic event happened [2][3][4][5][6]. Post-traumatic stress disorder is still a substantial public health concern in Rwanda, and enabling people to have access to quality care for those who need it should be a national priority [22]. Thus, despite the great work made by the government of Rwanda to actively support reconciliation and reduce trauma, the magnitude of trauma among the Rwandan population remains essential over a decade after the Genocide [27]. Based on the findings of this study, we strongly recommend the use of group therapy for helping genocide survivors to recover from PTSD and improving their mental health and quality of life.

Limitations

There were some limitations while conducting this study. Firstly, the study did not assess the effect of group therapy longevity in healing PTSD symptoms. Secondly, the study did not assess how the intensity of traumatic events was associated with PTSD severity. Thirdly, the study used a small sample size due to the absence of many group therapies meeting inclusion criteria. Fourthly, the study did not analyze the effect of gender in recovering from PTSD because the sample was not proportionally distributed by gender.

Strengths

The interviews with participants were conducted by qualified psychologists and Diagnostic and Statistical Manual of Mental Disorders was used to diagnose the symptoms of PTSD among genocide survivors. This increased the accuracy and quality of data that were included in the analysis.

Conclusion

Psychosocial group therapies created by AVEGA Agahozo are effective in reducing PTSD symptoms and severity among genocide survivors.

Abbreviations

PTSD (Post-traumatic stress disorder)

DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, fifth edition)

AVEGA Agahozo (Association des veuves du Genocide, Agahozo)

Declarations

Ethics approval and consent to participate

This study has been approved by the research committee of Ningxia Medical University and AVEGA Agahozo after rigidly reviewed the design and intervention plan and evaluated the potential risks and possible harm to people involved in the research. All methods were performed in accordance with the relevant guidelines, regulations and principles of conducting research involving human subjects. All participants were allowed to

withdraw from the study whenever they felt like they wanted to end the interview. Participation in this study was voluntary. All participants received informed consent before they participated in the study and the participation was approved by signing the consent form. All information was confidential and no names were mentioned in this study.

Consent for publication

Non-applicable

Availability of data and materials

The data analyzed and included in this study are accessible from the corresponding author after presenting a reasonable demand.

Competing interests

All authors declare no conflict of Interest

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This study was partially supported by Ningxia Medical University. The funders did not participate in the conduct of the study, data collection, data entry, data analysis, preparedness of the manuscript and submission.

Authors' contributions

SIMBI checked the accuracy and quality of data, entered data in the database, performed the statistical analysis and drafted the manuscript. Seven psychologists (Names mentioned in the acknowledgement) collected the data (conducted the interviews), and all authors designed the study and revised the manuscript before submission.

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Tables

Table 1: DSM-5: Criteria for PTSD

1. **The person was exposed to: death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence**
2. **Intrusion symptoms (1/5 symptoms needed)**
 1. Recurrent, involuntary and intrusive recollections (children may express this symptom in repetitive play)
 2. Traumatic nightmares (children may have disturbing dreams without content related to trauma)
 3. Dissociative reactions (e.g. flashbacks) which may occur on a continuum from brief episodes to complete loss of consciousness (children may re-enact the event in play)
 4. Intense or prolonged distress after exposure to traumatic reminders
 5. Marked physiological reactivity after exposure to trauma-related stimuli
3. **Persistent avoidance of stimuli associated with the trauma Persistent effortful avoidance of distressing trauma-related stimuli after the event (1/2 symptoms needed):**
 6. Trauma-related thoughts or feelings
 7. Trauma-related external reminders (e.g. people, places, conversations, activities, objects or situations)
4. **Negative alterations in cognitions and mood that began or worsened after the traumatic event (2/7 symptoms needed)**
 8. Inability to recall key features of the traumatic event (usually dissociative amnesia; not due to head injury, alcohol or drugs) (C3 in DSM-IV)
 9. Persistent (& often distorted) negative beliefs and expectations about oneself or the world (e.g. "I am bad," "the world is completely dangerous")(C7 in DSM-IV)
 10. Persistent distorted blame of self or others for causing the traumatic event or for resulting consequences (new)
 11. Persistent negative trauma-related emotions (e.g. fear, horror, anger, guilt, or shame) (new)
 12. Markedly diminished interest in (pre-traumatic) significant activities (C4 in DSM-IV)
 13. Feeling alienated from others (e.g. detachment or estrangement) (C5 in DSM-IV)
 14. Constricted affect: persistent inability to experience positive emotions (C6 in DSM-IV)
5. **Alterations in arousal and reactivity that are associated with the traumatic event E. Trauma-related alterations in arousal and reactivity that began or worsened after the traumatic event (2/6 symptoms needed)**
 15. Irritable or aggressive behavior (revised D2 in DSM-IV)
 16. Self-destructive or reckless behavior (new)
 17. Hypervigilance (D4 in DSM-IV)
 18. Exaggerated startle response (D5 in DSM-IV)
 19. Problems in concentration (D3 in DSM-IV)
 20. Sleep disturbance (D1 in DSM-IV)
 - a. **Persistence of symptoms (in Criteria B, C, D and E) for more than one month**
 - b. **Significant symptom-related distress or functional impairment**
 - c. **Not due to medication, substance or illness**

Table 2: Demographic characteristics of participants and selection

Age and gender of participants

	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
30-40	0	0.00	5	5.10	5	5.10
41-50	0	0.00	31	31.63	31	31.63
51-60	0	0.00	38	38.78	38	38.78
61 and above	2	2.04	22	22.45	24	24.49
Total	2	2.04	96	97.96	98	98.00

Marital status of the participants

	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Single mother	0	0.00	13	13.27	13	13.27
Legally married	1	1.02	13	13.27	14	14.29
Illegally married	0	0.00	3	3.06	3	3.06
Divorced	0	0.00	1	1.02	1	1.02
Separated	0	0.00	5	5.10	5	5.10
Widow	0	0.00	60	61.22	60	61.22
Widower	1	1.02	0	0.00	1	1.02
Legally remarried	0	0.00	1	1.02	1	1.02
Total	2	2.04	96	97.96	98	98.00

The profession of participants

	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Crop farmer	2	2.04	66	67.35	68	69.39
Farmer	0	0.00	7	7.14	7	7.14
Student	0	0.00	1	1.02	1	1.02
I don't have a job	0	0.00	15	15.31	15	15.31
Very old and cannot work	0	0.00	5	5.10	5	5.10
Self-worker	0	0.00	1	1.02	1	1.02
Cook in the restaurant	0	0.00	1	1.02	1	1.02
Total	2	2.04	96	97.96	98	98.00

Table 3: Subjects sampling procedures

Group therapy	District	Sector	Cell	Village	Total Population	Selected Participants
1	Gakenke	Rushashi	Kageyo	Nganze	14	10
2	Rulindo	Kinzuzi	Mucembezo	Gatarage	14	10
3	Musanze	Muhoza	Kigombe	Ndurume	9	9
4	Gisagara	Kibirizi	Kibirizi	Torero	18	10
5	Huye	Ngoma	Matyazo	Rusisiro	9	9
6	Kayonza	Mukarange	Bwiza	Abisungane	12	10
7	Bugesera	Nyamata	Nyamata Ville	Nyamata1	15	10
8	Ngoma	Remera	Bugesera	Agatare	12	10
9	Ngororero	Nyange	Gaseke	Ngobagobo	15	10
10	Nyamasheke	Kagano	Ninzi	Gikuyu	16	10
Total					134	98

The above table shows the age, gender, marital status and occupation of participants along with participants' selection

Table 4: The efficacy of Group therapy in reducing PTSD symptoms and severity among Genocide survivors

	treatment	Pre-	Post-treatment		Chi-square	P-value/2-sided
• 1. Recurrent, involuntary and intrusive recollections						
PTSD Symptom severity	Frequency	Percentage	Frequency	Percentage		
Not at all	1	1.0	24	24.5		
Very slightly	3	3.1	32	32.7		
Slightly	7	7.1	17	17.3		
Moderately	11	11.2	10	10.2	30.523	0.205
Quite a bit	15	15.3	3	3.1		
Extremely	61	62.2	12	12.2		
Total	98	98.0	98	98.0		

• 2. Traumatic nightmares						
Not at all	4	4.1	24	24.5		
Very slightly	2	2.0	30	30.6		
Slightly	2	2.0	23	23.5		
Moderately	12	12.2	6	6.1	20.370	0.727
Quite a bit	16	16.3	7	7.1		
Extremely	62	63.3	8	8.2		
Total	98	98.0	98	98.0		

1. Dissociative reactions						
Not at all	1	1.0	21	21.4		
Very slightly	1	1.0	29	29.6		
Slightly	4	4.1	24	24.5		
Moderately	11	11.2	8	8.2	18.083	0.839
Quite a bit	23	23.5	7	7.1		
Extremely	58	59.2	9	9.2		
Total	98	98.0	98	98.0		

1. Intense or prolonged distress after exposure to traumatic reminders						
Not at all	2	2.0	23	23.5		

Very slightly	2	2.0	27	27.6		
Slightly	7	7.1	15	15.3		
Moderately	7	7.1	14	14.3	18.988	0.798
Quite a bit	20	20.4	10	10.2		
Extremely	60	61.2	9	9.2		
Total	98	98.0	98	98.0		

1. Marked physiological reactivity after exposure to trauma-related stimuli

Not at all	9	9.2	42	42.9		
Very slightly	6	6.1	26	26.5		
Slightly	11	11.2	14	14.3		
Moderately	16	16.3	5	5.1	38.111	0.045
Quite a bit	14	14.3	4	4.1		
Extremely	42	42.9	7	7.1		
Total	98	98.0	98	98.0		

• 6. Trauma-related thoughts or feelings

Not at all	13	13.3	39	39.8		
Very slightly	3	3.1	21	21.4		
Slightly	7	7.1	13	13.3		
Moderately	11	11.2	7	7.1	37.017	0.058
Quite a bit	20	20.4	3	3.1		
Extremely	44	44.9	15	15.3		
Total	98	98.0	98	98.0		

1. Trauma-related external reminders (e.g. people, places, conversations, activities, objects or situations)

Not at all	18	18.4	48	49.0		
Very slightly	5	5.1	15	15.3		
Slightly	6	6.1	12	12.2		
Moderately	5	5.1	7	7.1	36.563	0.063
Quite a bit	19	19.4	2	2.0		
Extremely	45	45.9	14	14.3		
Total	98	98.0	98	98.0		

- **8. Inability to recall key features of the traumatic event (usually dissociative amnesia; not due to head injury, alcohol or drugs)**

Not at all	62	63.3	68	69.4		
Very slightly	4	4.1	10	10.2		
Slightly	9	9.2	8	8.2		
Moderately	3	3.1	4	4.1	56.309	0.000
Quite a bit	8	8.2	4	4.1		
Extremely	12	12.2	4	4.1		
Total	98	98.0	98	98.0		

- **9. Persistent (& often distorted) negative beliefs and expectations about oneself or the world**

Not at all	4	4.1	74	75.5		
Very slightly	3	3.1	13	13.3		
Slightly	9	9.2	2	2.0		
Moderately	6	6.1	1	1.0	15.193	0.937
Quite a bit	20	20.4	5	5.1		
Extremely	56	57.1	3	3.1		
Total	98	98.0	98	98.0		

- **10. Persistent distorted blame of self or others for causing the traumatic event or for resulting consequences**

Not at all	14	14.3	44	44.9		
Very slightly	2	2.0	20	20.4		
Slightly	10	10.2	10	10.2		
Moderately	13	13.3	12	12.2	27.503	0.331
Quite a bit	22	22.4	4	4.1		
Extremely	37	37.8	8	8.2		
Total	98	98.0	98	98.0		

- **11. Persistent negative trauma-related emotions (e.g. fear, horror, anger, guilt, or shame)**

Not at all	9	9.2	42	42.9		
Very slightly	1	1.0	25	25.5		
Slightly	5	5.1	15	15.3		

Moderately	5	5.1	3	3.1	43.184	0.013
Quite a bit	15	15.3	8	8.2		
Extremely	63	64.3	5	5.1		
Total	98	98.0	98	98.0		

- **12. Markedly diminished interest in (pre-traumatic) significant activities**

Not at all	13	13.3	72	73.5		
Very slightly	4	4.1	15	15.3		
Slightly	8	8.2	3	3.1		
Moderately	9	9.2	2	2.0	25.423	0.439
Quite a bit	16	16.3	4	4.1		
Extremely	48	49.0	2	2.0		
Total	98	98.0	98	98.0		

- **13. Feeling alienated from others (e.g. detachment or estrangement)**

Not at all	9	9.2	60	61.2		
Very slightly	4	4.1	16	16.3		
Slightly	4	4.1	7	7.1		
Moderately	5	5.1	5	5.1	21.263	0.678
Quite a bit	21	21.4	8	8.2		
Extremely	55	56.1	2	2.0		
Total	98	98.0	98	98.0		

- **14. Constricted affect: persistent inability to experience positive emotions**

Not at all	6	6.1	42	42.9		
Very slightly	3	3.1	21	21.4		
Slightly	7	7.1	16	16.3		
Moderately	11	11.2	6	6.1	30.819	0.195
Quite a bit	12	12.2	8	8.2		
Extremely	59	60.2	5	5.1		
Total	98	98.0	98	98.0		

- **15. Irritable or aggressive behavior**

Not at all	16	16.3	75	76.5		
Very slightly	8	8.2	8	8.2		
Slightly	11	11.2	4	4.1		
Moderately	16	16.3	6	6.1	28.518	0.285
Quite a bit	15	15.3	3	3.1		
Extremely	32	32.7	2	2.0		
Total	98	98.0	98	98.0		

• **16. Self-destructive or reckless behavior**

Not at all	13	13.3	75	76.5		
Very slightly	6	6.1	12	12.2		
Slightly	5	5.1	3	3.1		
Moderately	18	18.4	3	3.1	38.535	0.041
Quite a bit	16	16.3	1	1.0		
Extremely	40	40.8	4	4.1		
Total	98	98.0	98	98.0		

• **17. Hypervigilance**

Not at all	9	9.2	35	35.7		
Very slightly	3	3.1	30	30.6		
Slightly	10	10.2	17	17.3		
Moderately	6	6.1	3	3.1	41.596	0.020
Quite a bit	25	25.5	4	4.1		
Extremely	45	45.9	9	9.2		
Total	98	98.0	98	98.0		

• **18. Exaggerated startle response**

Not at all	7	7.1	37	37.8		
Very slightly	7	7.1	23	23.5		
Slightly	4	4.1	16	16.3		
Moderately	6	6.1	6	6.1	23.987	0.520
Quite a bit	19	19.4	6	6.1		
Extremely	55	56.1	10	10.2		

Total	98	98.0	98	98.0		
• 19. Problems in concentration						
Not at all	7	7.1	55	56.1		
Very slightly	4	4.1	16	16.3		
Slightly	9	9.2	10	10.2		
Moderately	8	8.2	6	6.1	20.787	0.704
Quite a bit	32	32.7	6	6.1		
Extremely	38	38.8	5	5.1		
Total	98	98.0	98	98.0		
• 20. Sleep disturbance						
Not at all	8	8.2	40	40.8		
Very slightly	1	1.0	14	14.3		
Slightly	7	7.1	13	13.3		
Moderately	9	9.2	14	14.3	28.848	0.270
Quite a bit	12	12.2	10	10.2		
Extremely	61	62.2	7	7.1		
Total	98	98.0	98	98.0		

Table 5: Paired t-test results for pre and post-treatment

Pairs		Paired Differences					t	df	P-value	Cohen's d
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval					
					Lower	Upper				
Pre-treatment	Post-treatment									
Pair 1	Recurrent, involuntary and intrusive recollections	2.520	1.657	.167	2.188	2.853	15.054	97	.000	1.52
Pair 2	Traumatic nightmares	2.592	1.832	.185	2.224	2.959	14.003	97	.000	1.41
Pair 3	Dissociative reactions	2.551	1.619	.164	2.226	2.876	15.599	97	.000	1.58
Pair 4	Intense or prolonged distress after exposure to traumatic reminders	2.378	1.791	.181	2.019	2.737	13.144	97	.000	1.33
Pair 5	Marked physiological reactivity after exposure to trauma-related stimuli	2.265	2.171	.219	1.830	2.701	10.330	97	.000	1.04
Pair 6	Trauma-related thoughts or feelings	1.990	2.218	.224	1.545	2.434	8.883	97	.000	0.90
Pair 7	Trauma-related external reminders	1.990	2.383	.241	1.512	2.468	8.265	97	.000	0.84
Pair 8	Inability to recall key features of the traumatic event	.500	1.778	.180	.144	.856	2.785	97	.006	0.28
Pair 9	Persistent (& often distorted) negative beliefs and expectations about oneself or the world	3.510	1.772	.179	3.155	3.865	19.613	97	.000	1.98
Pair 10	Persistent distorted blame of self or others for causing the traumatic event or for	2.061	1.947	.197	1.671	2.452	10.481	97	.000	1.06

	resulting consequences									
Pair 11	Persistent negative trauma-related emotions	2.857	1.894	.191	2.477	3.237	14.933	97	.000	1.51
Pair 12	Markedly diminished interest in (pre-traumatic) significant activities	3.041	2.020	.204	2.636	3.446	14.902	97	.000	1.51
Pair 13	Feeling alienated from others	3.051	2.146	.217	2.621	3.481	14.074	97	.000	1.42
Pair 14	Constricted affect: persistent inability to experience positive emotions	2.704	2.145	.217	2.274	3.134	12.478	97	.000	1.26
Pair 15	Irritable or aggressive behavior	2.469	2.006	.203	2.067	2.872	12.185	97	.000	1.23
Pair 16	Self-destructive or reckless behavior	2.888	2.210	.223	2.445	3.331	12.935	97	.000	1.31
Pair 17	Hypervigilance	2.367	1.976	.200	1.971	2.764	11.860	97	.000	1.20
Pair 18	Exaggerated startle response	2.418	1.958	.198	2.026	2.811	12.228	97	.000	1.23
Pair 19	Problems in concentration	2.663	2.020	.204	2.258	3.068	13.051	97	.000	1.32
Pair 20	Sleep disturbance	2.429	2.056	.208	2.016	2.841	11.694	97	.000	1.18

Table 5 shows mean, standard deviation, standard error mean, 95% confidence interval, t-test results, degree of freedom, p-values and Cohen'd effect sizes.