ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 12, Issue, 09, pp.13810-13814, September, 2020

DOI: https://doi.org/10.24941/ijcr.39672.09.2020

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE EFFECTIVENESS OF KIDNET IN REDUCING PTSD SYMPTOMS AMONG ADOLESCENT BOYS IN SELECTED SECONDARY SCHOOLS IN KENYA

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ARTICLE INFO

Article History:
Received 19th June, 2020
Received in revised form
17th July, 2020
Accepted 24th August, 2020
Published online 30th September, 2020

Key Words:
Effectiveness, KidNET,
PTSD symptoms,
Adolescents, Kenya.

ABSTRACT

Background: KidNET has demonstrated favourable outcomes in reducing PTSD symptoms and its comorbid disorders among adolescent refugees. However, the outcome of KidNET in reducing PTSD symptoms in non-refugee adolescents has not been documented. The purpose of this study was to investigate the effectiveness of KidNET in reducing PTSD symptoms among adolescents in secondary schools. **Methods:** A quasi-experimental research design was used to conduct the study. A total of 120 respondents took part in the study. The participants had a mean age of 15.84 years (SD = 1.01). A Socio-Demographic Questionnaire (SDQ) and the Child PTSD Symptom Scale-V-Self Report (CPSS-V-SR) was used to assess for PTSD symptoms. **Results:** Independent groups' t-tests were used to detect significant mean differences whilst Cohen D (d) was used to determine effect sizes. At endline, a between-groups t-test showed a medium effect size (d=0.68). A significant difference between the groups was also established at p=0.001. The findings further showed that 38.3% of the participants in the experimental group vs 8.3% in the control group reported a reduction of PTSD symptoms from mild/moderate symptoms at baseline to minimum PTSD symptoms at endline. The findings also showed that KidNET reduced PTSD symptoms in 81.7% of the experimental group. An analysis of the PTSD symptom criteria that showed significant symptom reduction in the criteria for: arousal and reactivity alterations, avoidance and, the criteria for mood and cognitive alterations. **Conclusion:** The findings showed that KidNET was effective in reducing PTSD symptoms among non-refugee boys in secondary schools.

Citation: ***Assumptor Mukangi, Dr. Stella Nyagwencha and Dr. Mary Mogute.*** **2020.** "The Effectiveness of Kid NET in Reducing PTSD Symptoms among Adolescent Boys in Selected Secondary Schools in Kenya", *International Journal of Current Research*, 12, (09), 13810-13814.

INTRODUCTION

The effects of PTSD are often long-term and affect every facet of life (Handley *et al*., 2015). PTSD affects the individuals' cognitive development and abilities as well as their emotional and behavioural regulation (Bernhard *et al*., 2018). PTSD has also been shown to cause dysregulation of one's neurobiology; cause physical comorbidities (such as cardiovascular disease, hypertension, obesity, and chronic musculoskeletal pain attachment), dysfunctional relationships, and a reduced lifespan (McFarlane, 2010). In adolescents, poor academic performance often signifies the impact of a stressful or traumatic life event on cognitive abilities (Sumner *et al*., 2017). Once adolescents present with PTSD, their mental resources are directed towards cognitive processing of the traumatic event, thus, leaving very limited cognitive processes assigned to learning, executive functioning, memory and processing speed resulting in a drastic cognitive decline (Sumner *et al*., 2017). Due to drastic cognitive decline, cognitive abilities reduce and so does academic performance (Strøm, Schultz, Wentzel-Larsen, & Dyb, 2016). The effects of poor academic performance leads to frustration and inevitably the adolescents drop out of school (Rumsey & Milsom, 2018). For these reasons, it is crucial to investigate the effectiveness of brief trauma focused interventions that are feasible in school settings. Narrative Exposure Therapy for children and adolescents (KidNET) is a child and adolescent version of Narrative Exposure Therapy (NET). KidNET is a type of brief Trauma Focused-Cognitive Behaviour Therapy (TF-CBT) designed for use with children and adolescents (Neuner, Catani *et al*., 2008). By using in-Vivo exposure and habituation as techniques, the child/adolescent comes up with a coherent non-fragmented autobiography which is effective in the treatment of PTSD (Neuner, Catani *et al*., 2008). KidNET has its origins in the neurocognitive theory of PTSD and particularly the theory of traumatic memory (Neuner, Catani *et al*., 2008). Unlike Cognitive Behavioural Therapy (CBT) interventions which take 12-sessions and require parental involvement, KidNET is a brief intervention shown

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to be effective with as little as four sessions. The intervention is completed in eight sessions which run from 90-120 minutes for those who have not experienced torture, and 8-12 sessions for those who have undergone torture (Neuner *et al*., 2002). To determine the number of sessions required, the severity of the PTSD symptoms and the setting are taken into consideration (Neuner *et al*., 2004). The intervention was initially developed to treat persons from low-income countries who had experienced war, conflict, organized violence, and multiple interpersonal traumas (Robjant & Fazel, 2010). However, it has been widely used to treat those residing in high-income countries as refugees who have experienced torture and war-induced PTSD (Robjant & Fazel, 2010). The construction of a non-fragmented trauma narrative is of paramount importance, the adolescent is required to come up with a lifeline which is used as a guide in constructing a coherent autobiography (Gwozdziewycs & Mehl-Madrona, 2013). The structure of the intervention is as follows:

In the first session, screening for PTSD takes place. A wide range of screening tools have been recommended providing a variety of instruments to choose from (Neuner *et al*., 2004). The second session encompasses the lifeline exercise. This session is crucial. The goal is to help the adolescent recall the important events of their autobiography (negative and positive, traumatic and non-traumatic) (Neuner *et al*., 2004).

The adolescent is given a rope or string which is used to symbolize their life from birth to current age. In the lifeline exercise, the adolescent is required to construct their autobiography by placing symbols on the rope or string. Flowers are placed to indicate positive events in the adolescent's life, stones are indicators of traumatic experiences, whilst candles signify the death of a loved one. All the symbols should have a variety of colours to choose from (Gwozdziewycs & Mehl-Madrona, 2013). The adolescent is also expected to produce a painting that reflects their lifeline alternatively, pictures can be taken to document this (Robjant & Fazel, 2010).

From the third session onwards, the symbols placed on the lifeline are used to guide the narrations. The adolescent is encouraged to come up with a coherent autobiography from the third session onwards (Neuner *et al*., 2002). The adolescent is also asked to construct their narratives to include the future. To accomplish this, the therapist encourages the adolescent to incorporate flowers to signify anticipated positive hopes and dreams so as to end the intervention on a positive note (Gwozdziewycs, 2013). In the last session, adolescent signs a testimony of their autobiography in the presence of witnesses (Neuner *et al*., 2004). With regards to the effectiveness of KidNET, research has shown that as few as four sessions are effective in treating PTSD. This was observed among Sudanese children and adolescents residing in a refugee camp in Uganda (Neuner *et al*., 2004). Despite four sessions being effective in reducing PTSD symptoms amongst refugee children and adolescents, the present study administered eight sessions to all the respondents. This number of sessions was also selected to ensure that the respondents got ample time to process the traumatic experiences they had encountered. The choice to administer eight sessions was also informed by the fact that respondents had mild and moderate PTSD symptoms and none presented with severe PTSD symptoms.

KidNET has cross-cultural utility. For instance, in a case-study in Uganda, KidNET was effective in the treatment of PTSD in a thirteen-year-old Somali refugee named Muhammed Ali. (Neuner *et al*., 2004). Muhammed's baseline scores on the Posttraumatic Stress Diagnostic Scale (PDS) was 36 (100%) and met the criteria for PTSD. Six months after treatment, Muhammed scored a third of his baseline score. 12 (33.33%). In Sri Lanka, researchers conducted a comparative study between KidNET and meditation-relaxation amongst Sri Lankan children aged 8-14 years (Catani *et al*., 2009). At the six-month follow-up, 81% of the KidNET group no longer met the criteria for PTSD in comparison to 71% of the meditation group. The findings showed that KidNET was more effective than meditation.

The final study which documented the effectiveness of KidNET was conducted in Germany, Ruf *et al*. (2010) among 26 refugees with an age range of 7-16 years. The respondents were living in exile at the time of the study and were randomly assigned to a Wait List (WL) group and a KidNET group. The results showed that PTSD symptom severity reduced by 60% in the KidNET group as compared to the WL group. The KidNET group also showed improved functioning.

These results remained stable at the 12-month follow-up. The findings demonstrated that KidNET was effective in treating PTSD in children as young as seven. This was consistent with the study by Mantini *et al*. (2017) which also found that NET was effective in treating 7-year-old refugee children residing in Canada. The aforementioned studies were conducted with refugees at different refugee centers and, are deemed as having high internal validity due to the methodological rigour associated with efficacy studies (Kodal *et al*., 2018).

METHODS

Participants: Eligible participants were recruited from a sample population of 269 adolescents selected from two boarding secondary schools in Machakos County. A total of 130 adolescents were selected for the study and provided assent to participate. An equal number of adolescents were assigned to the experimental group (n=65) and the control group (n=65). The attrition rate was 7.7%. From the recruited 130 respondents, 120 completed the study. The participants had an age range of 14-17 years. The mean age was 15.84 years (SD= 1.01). The respondents were compared with regards to their baseline sociodemographic variables (age, religion/denomination, caregiver, number of siblings, class, duration at the school and county of residence). There were no significant differences observed between the experimental group and the control group on all the socio-demographic variables at baseline (see Table 1). Table 1 shows the socio-demographic characteristics of the respondents. From the table, there was no significant difference established between the participants' socio-demographic variables and PTSD symptoms at $p>0.05$.

Measures

The Socio-Demographic Questionnaire (SDQ): The SDQ used was developed by the researcher. This included information on participants' age, religion/denomination, class,

Table 1: Socio-demographic Variables of the Sample

Variables	Total		Control		Experimental		P-value
	N = 120	%	N = 60	%	N = 60	%	
Age							
14 years	14	11.67	6	10	8	13.33	0.418
15 years	30	25	12	20	18	30	
16 years	37	30.83	22	36.67	15	25	
17 years	39	32.5	20	33.33	19	31.67	
Religion							
Catholic	32	26.67	12	20	20	33.33	0.188
Muslim	6	5	4	6.67	2	3.33	
Protestant	82	68.33	44	73.33	38	63.33	
Caregiver							
Guardian or Relative	1	0.83	0	0	1	1.67	0.582
Parents	105	87.5	54	90	51	85	
Single Parent	14	11.67	6	10	8	13.33	
Father	3	2.5	1	1.67	2	3.33	0.730
Mother	11	9.17	5	8.33	6	10	
Siblings							
None or one	34	28.33	14	23.33	20	33.33	0.255
Two to three	63	52.5	36	60	27	45	
Four or more	23	19.17	10	16.67	13	21.67	
Class							
Form 1	43	35.83	21	35	22	36.67	0.921
Form 2	43	35.83	21	35	22	36.67	
Form 3	34	28.33	18	30	16	26.67	
Months at school							
<=12	43	35.83	22	36.67	21	35	0.932
13-24	48	40	23	38.33	25	41.67	
24+	29	24.17	15	25	14	23.33	
County							
Machakos	36	30	19	31.67	17	28.33	0.557
Nairobi	68	56.67	35	58.33	33	55	
Other Counties	16	13.33	6	10	10	16.67	

The table shows that there was a significant mean difference between the experimental group and control group at endline at p=0.001. This implies that the two groups had significantly different means at endline with the experimental group having a reduction of mean in levels of PTSD symptoms as compared to the control group.

Table 2. Participants Levels of PTSD at Baseline, Midline and Endline (Between Groups)

Time Point	Group	PTSD Levels								PTSD Scores	
		Minimal		Mild		Moderate		Severe		Mean (SD)	P-value
		n	%	n	%	n	%	n	%		
Baseline	Control	0	0	25	41.7	35	58.3	0	0	22.98 (8.66)	0.426
	Experimental	0	0	23	38.3	37	61.7	0	0	24.20 (8.02)	
Midline	Control	15	25	21	35	22	36.7	2	3.3	19.68 (10.5)	0.880
	Experimental	17	28.3	18	30	19	31.7	6	10	19.35 (13.4)	
Endline	Control	5	8.3	17	28.3	33	55	5	8.3	24.25 (11.5)	0.001*
	Experimental	23	38.3	15	25	19	31.7	3	5	16.98 (12.2)	

From the table, there was no significant difference established between the participants' socio-demographic variables and PTSD symptoms at p>0.05.

Table 3. Cohen's D Effect Size (Within Groups)

Comparison	Control		Experimental	
	Cohen's D	Comparison of means	Cohen's D	Comparison of means
Baseline-Midline	0.34	t(59) = 2.24, p = 0.029*	0.4	t(59) = 3.66, p = 0.001*
Baseline-Endline	-0.12	t(59) = -0.73, p = 0.466	0.68	t(59) = 5, p = <0.001*
Midline-Endline	-0.41	t(59) = -3.04, p = 0.003*	0.18	t(59) = 1.43, p = 0.159

The table illustrates a comparison of within-group means and the effect sizes. The table shows that there was a medium effect size noted (d=0.68) between baseline and endline in the experimental group and a significant mean difference at the two-time points at p<0.001.

Table 4. PTSD Symptom Criteria (Between Groups)

Time point	Symptom Criteria	Cohen's D	p-value
Baseline	Arousal and	-0.18	0.35
Midline	Reactivity	-0.28	0.12
Endline	Alterations	-0.68	<0.01*
Baseline	Avoidance	0.17	0.38
Midline		0.07	0.71
Endline		-0.42	0.05*
Baseline	Intrusion	0.39	0.03*
Midline		0.1	0.57
Endline		-0.24	0.22
Baseline			0.88
Midline	Mood and Cognitive	-0.03	0.58
Endline	Alterations	0.09	0.01*
		-0.53	

Table 4 illustrates symptom reduction in the different PTSD symptom criteria. From the table, there was a significant reduction in the criteria for arousal and reactivity alterations, avoidance and the mood and cognitive alterations symptom criteria at p<0.05.

class, caregiver, the number of siblings the participants' had, duration the participants had been at the school, and County of residence the participants resided in during school holidays.

The Child PTSD Symptom Scale-V-Self Report (CPSS-V-SR): To assess for PTSD symptoms, respondents were administered the Child PTSD Symptom Scale-V-Self Report (CPSS-V-SR) (Foa *et al*., 2018). The instrument has a trauma screen section and a section on PTSD symptoms criteria that should be rated as per the index traumatic event that has affected the person the most. A total of 20 items are scored by adding the total number of scores for the instrument from 0-4. The 20 items are related to the DSM-V symptom criteria for PTSD namely: hyperarousal, re-experiencing, avoidance and changes in cognition and mood. The CPSS-V-SR has been shown to have good internal consistency (Cronbach's alpha α=0.92) and test-retest reliability of (r=0.80) (Foa *et al*. 2018).

Procedure: The researcher and assistants moved from class to class and explained to the students the requirements of the study. Those willing to partake in the study signed the assent form before they were screened. The researcher and assistants read each of the statements and allowed time for the respondents to fill out the forms. This was done to ensure that the respondents understood the questions. This procedure was also followed to make sure that the instruments were answered in the stipulated time frame of 30 minutes or less.

Data Analysis: The analysis was based on the 120 respondents who participated in the study from baseline to endline. Descriptive statistics and analyses were performed using SPSS version 21. To examine the effectiveness of KidNET in reducing PTSD symptoms. An independent t-test was used to compare the means of the experimental group with the means of the control group. Cohen's D (d) effect size was also used to detect effect size differences between the two groups. To assess reduction of symptoms by PTSD criterion a between-group means comparison and Cohen's D effect size were computed.

RESULTS

Effectiveness of KidNET in reducing PTSD symptomatology: Table 2 shows the participants levels of PTSD symptoms and their mean scores at baseline, midline and endline. The table shows that there was a significant mean difference between the experimental group and control group at endline at p=0.001. This implies that the two groups had significantly different means at endline. In this case, the PTSD mean score of the experimental group significantly reduced as compared to the means in the control group.

Investigate which PTSD criteria(s) would decrease

Table 4 illustrates a between-groups comparison of PTSD symptom criteria.

DISCUSSION

Study findings confirmed that KidNET was effective in reducing PTSD symptoms among adolescent boys in secondary schools. From the study, 81.7% of the respondents in the experimental group had reduced symptoms with a medium effect size observed. These findings were consistent with other studies which have documented the effectiveness of KidNET as an effective intervention in the reduction of PTSD symptoms (Neuner, Catani *et al*., 2008; Catani *et al*., 2009; Ruf *et al*., 2010). Study findings also showed that 38.3% of the respondents in the KidNET group no longer met the criteria for clinical PTSD diagnosis as compared to 8.3% of the respondents in the control group (who had minimum PTSD symptoms). This indicated that the experimental group improved more as compared to the control group as a result of the intervention. Significant mean differences were also observed in the experimental group at endline as compared to the control group. A within-group means comparison in the experimental group also showed that there was a significant mean difference in the experimental group at baseline and endline. This was also observed in the treatment effect statistics. This finding was inconsistent with the study by Catani *et al*. (2009) which showed that at 6-month follow up, 81% of the KidNET group no longer met the criteria for PTSD as compared to 38.3% in the present study. The difference in findings between the two studies can be attributed to time. In the present study endline was conducted at two months. Whilst in Catani's study, follow up was at 6-months.

With regard to the PTSD symptom criteria, the findings showed that there was a medium effect size and significant difference between the experimental group and the control group on arousal and reactivity alterations and, on mood and cognitive alterations. A small effect size and a significant difference was also noted between the experimental group and the control group on the avoidance symptom criteria. The PTSD symptom criteria that did not differ in the experimental group and the control group was that of intrusion symptoms where a small effect size was noted with no significant differences between the two groups. The current study had two strengths. Firstly, it contributed to the knowledge gap on the effectiveness of KidNET in the reduction of PTSD symptoms among non-refugee adolescents. Secondly, the results proved fruitful as was the case with refugee adolescents. The study had one weakness i.e. only boys' were used as respondents. Hence, future studies should incorporate both boys and girls if possible.

Conclusion

The findings indicated that KidNET was effective in the reduction of PTSD symptoms among non-refugee adolescents in secondary schools. These findings indicated that KidNET can also be used to reduce PTSD symptoms in non-refugee populations with medium effect sizes and significant mean differences can be obtained in non-refugee populations. The findings also showed that the majority of the respondents in the experimental group improved. This means that trauma therapists can incorporate KidNET in the treatment of PTSD symptoms among adolescents.

Key points

- KidNET was effective in treating and reducing PTSD symptoms among boys in secondary schools.

- KidNET reduced PTSD symptom criteria for: arousal and reactivity alterations, avoidance and, mood and cognitive alterations.

The Ministry of Health and the Ministry of Education should collaboratively work on implementing policies and programs that are effective and practical in treating PTSD among students in secondary schools such as KidNET. The Ministry of education should also employ trained trauma therapists in secondary schools so that students who present with PTSD can receive trauma-focused interventions to alleviate the symptoms.

Ethics

Approvals to conduct the study was obtained from Daystar University Ethics Board, the National Council for Science and Technology in Kenya NACOSTI, the Ministry of Education and from the School Administrators where the study was conducted.

Acknowledgements

Data Analyst Freda Wanjala, Research Assistants: Dorcas Mutuku, Mary Munyoli and Ruth Omondi.

Conflict of Interest: None declared.

Funding Statement: This study was self-funded by the researcher.

Glossary of Abbreviations

CBT	Cognitive Behaviour Therapy
CPSS-V-SR	Child PTSD Symptom Scale-V-Self Report
KidNET	Narrative Exposure Therapy for children and adolescents
NET	Narrative Exposure Therapy
PDS	Posttraumatic Stress Diagnostic Scale
PTSD	Post-Traumatic Stress Disorder
SDQ	Socio-Demographic Questionnaire
TF-CBT	Trauma-Focused Cognitive Behaviour Therapy
WL	Wait List

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