Reliability and factor structure of the IES-R among victims of violent conflict in a rural Ghana

Krafona, K. PhD[1]. and Appiah-Boateng, S. BSc[1]

University of Cape Coast

Cape Coast

Ghana

Department of Education and Psychology

Email: krafikof@gmail.com

Mobile: 0541078770

Correspondence should be sent to the first author

Abstract

The study sought to investigate the possibility of PTSD in a community that has been a conflict zone for many years. In particular, we wanted to investigate whether or not IES-R could be used. We wanted to determine the factor   structure of the IES-R in the community and finally to investigate whether any differences existed between males and females with regard to the possibility of PTSD amongst the people in the community. Purposive sampling was used to sample opinion leaders in the community. Secondly the multi-stage sampling method was used to select people from the various factions of the community. Finally the lottery method of simple random sampling was used to get to the households. The results indicated a high level of PTSD symptoms in the community. There was no significant difference between males and females with regard to possible PTSD symptoms. The internal consistence of .95for the IES-R was found to be useful for research and clinical work. Only two factor structure was found in the sample but with moderate correlation. The hyper-arousal subscale correlated highly with the intrusion subscale. Crohnbach alpha for the subscales were also high. Limitations in respect of item translation could have accounted for the two factor structure and therefore limits its generalisability.

Key words: Exploratory factor analysis, IES-R, PTSD.

Introduction

The impact of event scale (IES) was initially created for the study of individuals who were bereaved (Horowitz, Wilner & Alvarez, 1979). This was before the DSM-III was constructed and PTSD included in its list. At the time only two dimensions - avoidance and intrusion were included and were based on information processing model proposed by Horowitz (1982). The IES was criticised for not necessarily measuring trauma because the two dimensions correlated highly and also the scale did not include items relating to hyper-arousal (Beck, Grant, Read, Clapp, Coffey Miller et al., 2008).

Intrusive thoughts are generally the initial phase, followed by avoidance (Horowitz, 1982) and it has been argued that avoidance serves to regulate the negative effects of the intrusive thoughts (Brewin, Dalgleish , & Joseph, 1996). Hyper-arousal is an abnormal state of activation that occurs in the wake of traumatic or highly stressful events. With the advent of DSM-IV (1994), a third dimension of hyper-arousal was added and that led to the revision of the IES by Weiss and Marmar (1997). The IES-R has since been widely used among a number of different categories including whiplash (Sterling et al, 2005), victims of road traffic accidents (Creamer, Bell & Failla, 2003; Wu & Chan, 2004; Stallard and Smith, 2007; Beck, Grant, Read, Clapp, Coffey Miller et al., 2008), survivors of natural disaster (Joseph, 2000), survivors of war (Morina, Ehring & Priebe, 2013), survivors of arsenic poisoning (Asukai et al., 2002) and fire survivors (Gargurevich, Luyten, Fils, & Corveleyn, 2009).

In Africa, a study was attempted using the IES-R in Rwanda after the genocide event, and reported trauma-related reactions among the Rwandese children who survived the traumatic event(Dyregrov, Gupta, Gjestad & Mukanoheli, 2000).

The factor structure of the IES has ranged between one factor (Shevlin, Hunt & Robbins, 2000), and four factors (Andrews, Shevlin, Troops & Joseph, 2004). Similarly, the IES-R factor structure has varied between one factor (Wu & Chan, 2003), two factors (Creamer, Bell & Failla, 2003; Wu & Chan, 2004), three factors (Brunet, St-Hilaire, Jehel & Kind, 2003; Beck, Grant, Read, Clapp, Coffey, Miller & Palyo, 2008; Dawson, Ariadurai, Fernando, and Refuge (2007) and four factors (King, Orazem, Lauterbach, King, Hebenstreit, & Shalev, 2009; Gargurevich, Luyten, Fils, & Corveleyn, 2009). However, the study by Dawson et al was based on principal component analysis; nevertheless the interesting point about that study was the fact that intrusive and hyper-arousal items loaded on to the same factor supporting the Creamer et al's (2003) study that also used principal component analysis with varimax rotation. It is important to note, however, that many of the studies have used different types of population which may or may not account for the different factor structures.

In this study, we sought to study a community in Ghana that has been a conflict zone for many years. In particular, we wanted to investigate whether or not IES-R could be used. We wanted to determine the factor structure of the IES-R in this community and finally we wanted to investigate whether any differences existed between males and females with regard to the possibility of PTSD amongst them.

Methodology

Participants

The target population for the study included all the residents of Tuobodom, a conflict area in the Brong Ahafo region of Ghana. The community is divided into two factions.

The population included individuals that were directly or indirectly affected by the conflict. Both males and females who were 15 years and above were qualified to be included in the study. Three hundred participants were sampled. Out of the 300 participants were 20 key informants who were purposively sampled and they included two chiefs and four community elders from both factions, two Assembly members, two religious leaders, a representative from the Regional House of Chiefs (RHC), the District Chief Executive, the District Coordinating Director of the Techiman North District Assembly and seven settlers.

For the remaining 280 respondents, a multi-stage sampling procedure was employed. Stratified sampling was used but numbers were arbitrarily assigned to faction A (127) and 153 to faction B. The lottery type of the simple random sampling technique was employed to sample houses in each faction. In each house, the heads of the households or their representatives were interviewed by the second author. In a situation where the heads or their representatives were unwilling to take part in the study, the replacement method was employed. This was done to ensure fair representativeness.

Instrument

The IES-R (Weiss & Marmar, 1997) is a psychological instrument used to assess the post traumatic stress symptoms among people who have experienced traumatic events. The instrument has 22 questions that measure intrusion, avoidance and hyper-arousal. The questions are rated on a 5-point scale with the following correspondence: not at all (0 point), a little (1 point), moderately (2 points), a lot (3 points) and extremely (4 points). It has 3 subscales consisting of intrusion, avoidance and hyper-arousal. The reliabilities as determined by Crohnbach's alpha for the subscales have ranged from .87 to .92 for intrusion, .84 to .86 for avoidance and .79 and .91 for hyper-arousal (Creamer et al., 2003). Creamer, Bell and Failla (2003) have reported the full scale reliability score as .96.

Results

The demographic characteristics covered in this study were age, sex, level of education, and occupation of the participants. These are represented in Table 1.

Table 1

Demographic characteristics of participants

Characteristics	Frequency (N= 300)	Percentage (%)
Sex		
Male	180	60.0

Female	120	40.0
Age		
Below 19 years	11	3.7
20-29 years	59	19.7
30-39 years	109	36.3
40-49 years	62	20.7
50-59 years	23	7.7
60 and above	36	12.0
Level of education		
No formal education	74	24.7
Basic education	162	54.0
Secondary education	42	14.0
Post-secondary	8	2.7
Tertiary	14	4.7
Occupation		
Farming	145	48.3
Trading	74	24.7
Government employee	18	6.0
Other	63	21.0

Table 1 shows that majority of the participants were males. The age range of the participants for the study was from 15 years to 115 years. The community is dominated by middle aged people within 30 to 49 years age bracket. With respect to education, the residents of the community have relatively low level of education.

The educational level is reflected in the occupational distribution of the respondents. Farmers and traders were highly represented in the study. On the other hand, government employees were only 6% of the total respondents. Residents in other occupation such as artisans, drivers, footballers, and also the unemployed formed about 21%. This distribution may be ascribed to the reason that majority of them only have up to basic education and that they may only have basic farming and trading skills learnt from parents and other family members. Table 2 reports the means and standard deviations of the responses with respect to gender.

Table 2

Means and standard deviations of responses in relation to gender.

Sex	Mean	N	St. Dev.
Male	55.77	155	17.07
Female	54.39	116	19.27
Total	55.18	271	18.02

$t_{(269)} = .66$; $p > .05$.

There was no significant difference between the males and females.

Reliability
Internal consistency

A high Cronbach alpha of .95 was obtained for this study suggesting the IES-R could be used in Ghana both for research and clinical work.

Item-total correlations

The means, standard deviations and corrected item-total correlations of the IES-R are presented in table 3.

Table 3

Means, Standard deviations, and Corrected item-Total correlations for the IES-R items.

Items	Mean	S. D.	$r_{(tot)}$
1. Any reminder brought back feelings about it.	3.45	1.07	.76
2. I had trouble staying asleep.	3.15	1.20	.78
3. Other things kept making me think about it.	3.10	1.19	.78
4. I felt irritable and angry.	2.17	1.20	.70
5. I avoided letting myself get upset when I thought about it or was reminded of it.	2.17	1.19	.57
6. I thought about it when I didn't mean to.	2.80	1.31	.75
7. I felt as if it hadn't happened or wasn't real.	2.09	1.08	.63
8. I stayed away from reminders of it.	2.41	1.09	.62
9. Pictures about it popped into my mind.	3.07	1.19	.76
10. I was jumpy and easily startled.	2.29	1.19	.77
11. I tried not to think about it.	2.54	1.43	.58
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.	1.77	1.15	.57
13. My feelings about it were kind of numb.	2.16	1.10	.67
14. I found myself acting or feeling like I was back at that time.	2.73	1.29	.77
15. I had trouble falling asleep.	2.87	1.31	.73
16. I had waves of strong feelings about it.	2.89	1.26	.82
17. I tried to remove it from my memory.	2.41	1.18	.51
18. I had trouble concentrating.	2.42	1.27	.60
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	2.33	1.16	.78
20. I had dreams about it.	2.82	1.47	.65
21. I felt watchful and on-guard.	3.54	.99	.61
22. I tried not to talk about it.	2.32	1.17	.59

Note: $r_{(tot)}$ = corrected item-total correlation.

The total item means was 2.61 and ranged from 1.77 to 3.54 suggesting moderate to quite a bit distressing. Items 1, 2, 3, 9, and 21 were rated high. The item-total correlations ($r_{(tot)}$) ranged from .51 to .82 indicating a coherent scale. Item-total correlation of .30 is recommended as acceptable (Nunnally & Bernstein, 1994).

Factor analysis of the IES-R

The factor structure for the IES-R scale in this study was determined using principal axis factoring with oblique (Promax) rotation. The Kaiser-Meyer-Olkin (KMO) sampling adequacy score was .92 and the Bartlett's Test of Sphericity was significant ($X^2 = 543.0$ *df* $= 230$ *p* $<.001$).

The factor loadings of the items are reported in Table 4. Loadings less than .4 were suppressed. Two factors were extracted and there were no cross-loadings. The communalities of the items are also shown in the table.

Table 4

Factor loadings and communalities of items of the IES-R

Items	Factor 1	Factor 2	h^2
1. Any reminder brought back feelings about it.	.78		.65
2. I had trouble staying asleep.	.83		.70
3. Other things kept making me think about it.	.84		.72
4. I felt irritable and angry.	.66		.53
5. I avoided letting myself get upset when I thought about it or was reminded of it.		.75	.57
6. I thought about it when I didn't mean to.	.88		.71
7. I felt as if it hadn't happened or wasn't real.		.81	.67
8. I stayed away from reminders of it.		.82	.68
9. Pictures about it popped into my mind.	.89		.73
10. I was jumpy and easily startled.	.74		.64
11. I tried not to think about it.		.75	.58
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.		.55	.42
13. My feelings about it were kind of numb.		.86	.76
14. I found myself acting or feeling like I was back at that time.	.93		.77
15. I had trouble falling asleep.	.75		.60
16. I had waves of strong feelings about it.	.89		.79
17. I tried to remove it from my memory.		.85	.61
18. I had trouble concentrating.	.56		.39
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	.76		.67

20. I had dreams about it.	.76		.54
21. I felt watchful and on-guard.	.68		.44
22. I tried not to talk about it.		.69	.53
Variance	51.73%	13.78%	

Note: h^2 = communality

The communalities ranged from .39 to .79.

Factor one suggested intrusion and hyper-arousal (14 items) while factor two suggested avoidance (8 items). All the 6 items for hyper-arousal (4, 10, 15, 18, 19, and 21) loaded onto factor 1. There was a moderate correlation (.54) between factor 1 and factor 2. The two factors contributed 65.51 percent of the total variance.

To determine why the intrusive thoughts and hyper-arousal items loaded onto the same factor we looked at the relationship between the two factors. Pearson's correlation coefficient between the intrusive and hyper-arousal factors was found to be 0.83. Crohnbach's alpha for the subscales were .94, .89 and .92 for intrusion, hyper-arousal and avoidance respectively. Pearson's correlation was then computed to determine the relationship amongst all the three subscales. The outcome is reported in table 5.

Table 5
Pearson's correlation for the subscales

Subscales	Intrusion	Avoidance	Hyper-arousal
Intrusion	-	.49*	.83**
Avoidance		-	.54*
Hyper-arousal			-

** Correlation is significant at the .01 level (2-tailed)
- Correlation is significant at the .05 level (2-tailed)
-

Intrusion versus Avoidance and Avoidance versus hyper-arousal correlated moderately.

Discussion

The study aimed at assessing the reliability and factor structure of the IES-R among a sample of residents in a conflict zone in Ghana.

The high number of male respondents may be due to the fact that many females fled the community out of fear leaving majority of the males behind. The relatively low level of education may be attributed to the pockets of conflicts that erupt in the community from time to time.

With regard to scores on the instrument, there was no significant difference between the males and females. However it is important to note that the total score suggests a significant level of post traumatic stress symptoms among the participants. Creamer, Bell and Failla (2003) suggest a score of 33 and above as indicative of PTSD.

The high internal consistency obtained for the instrument is comparable to others (Creamer, Bell & Failla, 2003) reported for the scale. It also suggests that the instrument has utility for both research and clinical purpose in Ghana.

In respect of the factor structure for this study, the two factors support those reported by Creamer, Bell & Failla (2003) as well as Dawson, Ariadurai, Fernando, & Refuge (2007) although the populations are different. In both studies some of the items cross-loaded. That hyper-arousal and intrusive items form one dimension is of interest. The high correlation between the intrusive and hyper-arousal items seems to suggest that they are measuring about the same concept. With the exception of item 18 ("I had trouble concentrating") which had a relatively low loading, the others were high. It is important to mention that none of the items in this study cross-loaded. The reliabilities for the subscales were similar to that of Creamer, Bell and Failla (2003). Nevertheless, the finding adds to the debate as to how many factors are involved in the IES-R whether principal components, exploratory or confirmatory factor analysis are used. A major limitation of the study is the fact that the instrument had to be presented verbally especially for those without formal education.

In conclusion, the study investigated the reliability and factor structure of the IES-R among residents of a community that has experienced violent conflict in Ghana. A high level of post traumatic stress symptoms were reported were reported by the participants. The outcome of the study has implications for clinical work. There are many other conflict zones in Ghana and we recommend that a similar study be conducted to have a clear picture in relation to conflict and to inform policy with regard to mental health.

References

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders*. Washington, D.C.

Andrews, L., Shevlin, M., Troop, N., & Joseph, S. (2004). Multidimensionality of intrusion and avoidance: alternative factor models of the Impact of Event Scale. *Personality and Individual Differences, 36*, 431–446

Asukai, N., Kato, H., Kawamura, N., Kim, Y., Yamamoto, K., Kishimoto, J., et al., (2002). Reliability and validity of the Japanese-language version of the impact of event scale-revised (IES-R-J): Four studies of different traumatic events. *The Journal of Nervous and Mental Disease, 190*, 175-182

Beck, J. G., Grant, D. M., Read, J. P., Clapp. J. D., Coffey, S. F., Miller, L. M., & Palyo, S. A. (2008). The Impact of Event Scale-Revised: Psychometric properties in a sample of motor vehicle accident survivors. *Journal of Anxiety Disorders, 22,* 187–198. [PubMed: 17369016]

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of post-traumatic stress disorder. *Psychological Review,103*, 670–686.

Brunet, A., St-Hilaire, A., Jehel, L., King, S. (2003). Validation of a French version of the impact of event scale-revised. *Canadian Journal of Psychiatry.48*(1):56–61. [PubMed]

Creamer M, Bell R, Failla S. (2003). Psychometric properties of the Impact of Event Scale-Revised. Behaviour. *Research & Therapy ,41*:1489–1496. [PubMed: 14705607]

Dawson, J., Ariadurai, A., Fernando, A. & Refuge, N. (2007). Exploratory factor analysis of a Sri Lankan version of the Impact of Event Scale-Revised (IES-R-SL). Retrieved (date retrieved) from Psychekology website http://www.psychekology.com.au/research/.

Dyregrov, A., Gupta, L., Gjestad , R., & Mukanoheli, E. (2000). Trauma exposure and psychological reactions to genocide among Rwandan children. *J Trauma Stress. 13(1):*3-21. PMID:10761171 DOI: 10.1023/A:1007759112499.

Gargurevich, R., Luyten, P., Fils, J.f., & Corveleyn, J. (2009). Factor structure of the Impact of Event Scale -Revised in two different Peruvian samples. *Depression and Anxiety, 26*(8), E91-E98. doi:10.1002 /da.20430

Horowitz, M. J. (1976). *Stress response syndromes.*. New York: Jason Aronson.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine, 41*, 209–218. [PubMed: 472086]

Joseph, S. (2000). Psychometric evaluation of Horowitz's Impact of Event Scale: A review. *Journal of Traumatic Stress,13,*101–113. [PubMed: 10761177]

King, D. W., Orazem, R. J., Lauterbach, D., King, L. A., Hebenstreit, C. L., & Shalev, A. Y. (2009). Factor structure of post traumatic stress disorder as measured by the Impact of Event Scale-Revised: Stability across cultures and time. *Psychological Trauma: Theory, Research, Practice and Policy, 1* (3), 173-187.

Morina N, Ehring T, Priebe S (2013) Diagnostic Utility of the Impact of Event Scale–Revised   in Two Samples of Survivors of War. PLoS ONE 8(12):
       e83916.doi:10.1371/journal.pone.0083916

Nunnally*, J. C., & Bernstein, I. H. (*1994*). Psychometric theory (3rd ed.).* New York; McGraw-Hill.

Shevlin, M., Hunt, N., & Robbins, I. (2000). A confirmatory factor analysis of the
       Impact of Event Scale using a sample of world war two and Korean war veterans.
       Psychological Assessment, 12, 414–417.

Stallard, P., & Smith, E. (2007). Appraisals and cognitive coping styles associated with   chronic post-traumatic symptoms in child road traffic accident survivors. *Journal of   Child Psychology and Psychiatry, 48*, (2), 194-201

Weiss, D. S., & Marmar, C. R. (1997). The Impact of Event Scale- Revised. In: Wilson, J. P., &
       Keane, T. M., (editors.). *Assessing psychological trauma and PTSD: A handbook for
       practitioners.* New York: Guilford Press; 1997. p. 399-411

Wu, K. K., & Chan, K. S. (2003). The development of the Chinese version of Impact of Event
       Scale-Revised (CIES-R). *Social psychiatry and psychiatric epidemiology,38,* 94-98.

Wu, K. K., & Chan, K. S. (2004). Psychometric Properties of the Chinese Version of the Impact of Event Scale-Revised. *Hong Kong J Psychiatry, 14* (4):2-8