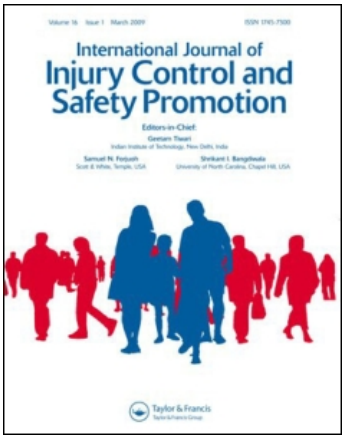

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Structural validity and reliability of the integrated conflict and violence scale

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Structural validity and reliability of the integrated conflict and violence scale

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The study validated structure stability, reliability and sub-scale distinctiveness of integrated conflict and violence scale (ICVS) and was cross-sectional; war-affected grade 5 school children participated. ICV internal factorial validity and reliability were evaluated; eigenvalue size and scree plots were used for factor selection. A variable retention factor load threshold of >0.30 was used: Cronbach's α tests confirmed reliability increments. Pair-wise Pearson correlation tests evaluated sub-scale distinctiveness. Gulu University granted ethical clearance. A total of 280 grade 5 children from 50 primary schools participated: 53% of them were males. Two factors accounted for 100% of variability in attitudes; 18 variables were retained. Expelled variables were: 'If I catch some one stealing my sugar cane I will fight' and 'a bully should be forgiven'. Sub-scale internal consistency reliability coefficients were 0.73 and 0.65, respectively and distinctiveness correlation coefficient was -0.06. The ICVS was validated using standard criteria. Emerging two-factor scale has acceptable psychometric properties especially factorial structure, internal consistency and sub-scale distinctiveness.

Keywords: conflict; violence; scale

Background

It has been suggested that long wars foster cultures of violence within societal sub-sectors like schools, organisations and homes (Jewkes, 2002). Northern Uganda has been in war for over 20 years. Violence is a leading injury mortality cause in the region with homes and schools as common violence locations (Lett, Kobusingye, & Ekwaru, 2006). Psycho-trauma is widespread, particularly in the childhood population (Bayard, Kaducu, Briwn, Oyok, & Sondorp, 2008; Magambo & Lett, 2004). A primary schools-based violence prevention curriculum, Mato-Oput 5 was developed and piloted in 2002/2003 as a response (Bbosa, Ocan, & Shanon, 2003a, 2003c). The curriculum posits violent behaviour reduction consequent upon attitude change (Mutto, 2005). Although plausible, much of the evidence in this regard is subjective and the specific dimension of attitudes and the validity of the measurements is unclear.

A critical step in the development of public health interventions like Mato-Oput 5 curriculum is formal evaluation (Mercy et al., 1993). It necessitates exposure specific indicators and measuring instruments (Atlas, Metson, Singer, Wu, & Gliklich, 2005). A new integrated conflict and violence scale (ICVS) was developed and piloted in 2002/2003 because existing scales (Dahlberg, Toal, & Behrens, 1999) lacked contextual relevance to Northern Uganda and Mato-Oput 5 curriculum: several focus group and key informant discussions had been conducted with school children and teachers for this purpose. Convenience, contextual relevance and psychometric soundness were key considerations. A schools' injury and violence surveillance form was also developed. The pilot study evaluated initial efficacy and utility indications. It showed positive attitudinal effects without significant corresponding behavioural changes (Mutto, 2005). It was not clear if this reflected true absence of short-term behavioural beneficial efficacy or an ICVS validity or reliability weaknesses. Moreover, inadequate statistical power, use of unvalidated attitudes scales and short follow-up were reported as key limitations (Mutto, 2005). These limitations need to be addressed.

The pilot study employed exploratory factor analysis to reduce the 32 original ICVS items to 18, using a conservative inclusion load threshold of 0.28 (Mutto, 2005). It did not assess ICVS validity and reliability. On its recommendation, the Mato-Oput 5 curriculum was updated in 2005 with the addition of a

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new problem solving learning area (Bbosa, Ocan, & Owor, 2003b, 2003d). The ICVS was also revised and set for validation. Recent examples of similar studies include validation studies of RhinoQOL (Mini-Rhinoconjunctivitis quality of life questionnaire) (Lu, Lee, Xiao, Sears, & Charters, 2003), H-DSS (Attitudes toward Handheld Decision Support Software Scale) (Ray et al., 2006), HRQL (Health Related Quality of Life) (Atlas et al., 2005), HAT-Qol (HIV-AIDS-targeted quality of life) (William & Judy, 1998) and the Injury Distress Index (IDI) (Victorson, Enders, Burnett, & Ouellette, 2008). IDI validation employed exploratory factor analysis with Kaiser criterion and scree plots as base for factor selection, rotated factor load threshold of 0.30 for item selection, and Cronbach's α coefficient threshold of 0.70 for internal consistence reliability coefficient acceptance, although Cohen (1998) recommends Pearson r coefficients of 0.10–0.29 as small, 0.30–0.49 as medium and 0.50–1 as large. This article discusses ICVS validation findings, specifically scale psychometric properties including factorial structure, internal consistency reliability and factorial distinctiveness.

Materials and methods

Design and procedure

A cross-sectional design was used.

Sample and sampling strategy

A purposive sample of 280 grade 5 children (10–16 years old) from 50 war-affected Northern Ugandan Schools participated. Independent research assistants administered the revised ICV scale. Ethical clearance was granted by the Gulu Education Authorities, Gulu University Faculty of Medicine Research Committee and Uganda National Council for Science and Technology.

Instrument development

The ICVS was developed and piloted in 2001/2002 as part of Mato-Oput 5 curriculum development. Several in-depth and focus group interviews had been conducted for this purpose. The original 32 four-point Likert-scaled items had been reduced to 18 by the 2002/2003 pilot study: the pilot did not evaluate the validity and reliability of the scale. The 18 items were refined for clarity in line with pilot recommendations and curriculum upgrade and increased to 20.

Statistical analyses

Specific psychometric properties of the revised ICVS assessed included:

(a) Internal factorial validity, i.e. underlying dimensions of attitudes captured by ICVS as well as the extent to which these dimensions measure attitudes towards conflict and violence. Factor retention was based on Kaiser Criterion, since ICVS items were moderate in number (Browne 1968, Catell & Jasper 1967, Linn 1968), and were confirmed through scree plots since the Kaiser Criterion has a tendency of overestimating number of reliable factors (Zwick & Velicer 1986). For structure parsimony, varimax rotation was performed.
(b) Reliability, i.e. internal consistency of items in emerging dimensions from the factor analysis, were tested using Cronbach's α.

Variables with rotated factor loadings <0.30 were successively removed from the model, upon which reliability tests were run. This series of factor analyses and reliability tests continued until all variables had at least one >0.30 rotated factor loading and reliability coefficients stabilised: this approach has been previously used (Mutto, 2005; Dahlberg et al., 1999; Bbosa et al., 2003b, 2003d). To test whether sub-scales measured distinct aspects of attitudes towards conflict and violence, individual scales scores were summed and assessed for inter sub-scale correlation using Pearson correlation tests. Non-significant correlations were indications of uniqueness.

Results

Sample characteristics

A total of 280 grade 5 children between 10 and 16 years of age participated: 55% of the samples were males. Overall, the mean age was 12.3 (SD = 1.2 years); mean ages of males and females were 12.3 (SD = 1.2 years) and 12.2 (SD = 1.2 years), respectively. Eight respondents were censored because of significant response errors.

Scale factorial structure and reliability

Two (2) factors (Table 1) were retained as principle on account of the Kaiser Criterion (Eigenvalues >1) and confirmatory scree plot: the 2 factors extracted 100% of the variability in children's attitudes responses.

Using inclusion rotated factor load threshold of 0.30, a total of 18 scale items (loading between 0.33 and 0.60) were retained. Table 2 presents the (varimax) rotated ICVS item loadings and their factorial internal consistency Cronbach's α coefficients: the 2 factors had α coefficients of 0.73 and 0.65, respectively. Factor 1 was about humane response to conflict/provocation and factor 2 about violent response to provocation.

The correlation between the two sub-scales, though significant, was small ($r = -0.06$).

Discussion

This study assessed the psychometric properties of the revised ICVS earlier developed (as part of Mato-Oput 5 curriculum evaluation) to measure children's attitudes towards conflict and violence. The ICVS was found to have acceptable psychometric properties, i.e.: factorial structure, internal consistency reliability and sub-scale distinctiveness as evidenced by item rotated factor loads that ranged between 0.33 and 0.60, Cronbach's α coefficients of 0.73 and 0.65 and Pearson correlation coefficient of −0.06; Cohen's recommendation was used as basis for interpreting the Pearson correlation coefficient.

The ICVS is bi-dimensional; the first dimension captures humane responses to provocation while the second captures violent responses to provocation. The first dimension relates to response to provocation grounded in values and morality. This dimension seemed congruent with Mato-Oput 5 learning areas on conscience, empathy, forgiveness, fairness, self-control and reconciliation. These learning areas address moral issues around the use of violence in conflict resolution. The second sub-scale had to do with violent responses to other people 's provocative/aggressive acts.

The findings show a good interface between ICVS and Mato-Oput 5 curriculum designed to change children's attitudes and beliefs regarding conflict and violence and teach non-violent conflict resolution methods. It teaches causes and consequences of conflicts and violence and non-violent conflict resolution methods. This knowledge is posited to modify children's attitudes towards conflict and violence in favour of non-violent conflict resolution, and ultimately reduce their injury and violence rates. While the knowledge–behaviour relationship continues to

Table 1. Eigenvalues by factor.

Factor	Eigenvalue	Difference	Proportion	Cumulative
	2.5618	1.1555	0.5629	0.5629
2	1.4063	0.72754	0.309	0.8719
3	0.67875	0.15043	0.1491	1.0211
4	0.52832	0.19467	0.1161	1.1372
5	0.33365	0.06863	0.0733	1.2105
6	0.26502	0.08125	0.0582	1.2687
7	0.18377	0.06683	0.0404	1.3091
8	0.11694	0.01003	0.0257	1.3348
9	0.10691	0.06526	0.0235	1.3583
10	0.04166	0.01402	0.0092	1.3674
11	0.02763	0.05566	0.0061	1.3735
12	−0.02803	0.05548	−0.0062	1.3673
13	−0.08351	0.02214	−0.0184	1.349
14	−0.10565	0.03475	−0.0232	1.3258
15	−0.1404	0.05369	−0.0309	1.2949
16	−0.19408	0.03174	−0.0426	1.2523
17	−0.22583	0.06374	−0.0496	1.2027
18	−0.28957	0.01516	−0.0636	1.139
19	−0.30473	0.02323	−0.067	1.0721
20	−0.32796	–	−0.0721	1

Table 2. Structure stability and sub-scale consistency reliability.

Scale items	No. of scale items	Coefficients/factor loadings: Factor loading	Uniqueness	Cronbach's α
Factor 1	14			0.73
I feel bad each time I fight with somebody		0.34602	0.88015	
It is wrong to fight someone who abuses your parents		0.37902	0.85136	
If your father loves your mum, he should not beat her		0.37433	0.85707	
Quarrels between school children should be handled by teachers		0.37865	0.85613	
A bully should be forgiven		0.36118	0.86557	
Boys should not touch girls breasts		0.33419	0.88154	
If my friend steals my book and returns it, I will forgive him/her		0.48997	0.75607	
If someone ambushes my friend, I will report him to the teacher		0.41668	0.82610	
I understand when my friends refuse to listen to my advice		0.41574	0.80670	
It is useful to send a girl to school		0.44043	0.80593	
Even if someone kicks me, I will not fight back		0.42040	0.80845	
If my friend abuses me, I will forgive him/her		0.51641	0.66718	
I feel sad for a pupil who is beaten		0.48951	0.75915	
I feel good when I forgive my friend		0.39851	0.80568	
Factor 2	4			0.65
If someone pinches me, I will try to get my bigger brother or sister to beat him or her		0.60264	0.62970	
If my friend tells a lie about me, I will fight		0.47172	0.77419	
If my friend steals my pen, I will fight		0.59001	0.64296	
People who have a quarrel should solve it by force		0.50938	0.72999	

generate debate, characteristics of the information provided and how it is presented remain areas for further research. Unlike many other educational campaigns, the Mato-Oput 5 curriculum is formally taught and supervised in class. Effectiveness evaluation might find interesting results. We find the two-scale dimensions relevant and appropriate for tracking the hypothesised Mato-Oput 5 attitudinal effects. The scale is promising and could find utility beyond children and the war context of Northern Uganda. The possibility of further development as a diagnostic or screening tool for at risk children as part of an early warning and intervention system could also be explored.

Our procedures are comparable with those in earlier studies including the validation of IDI using similar factor and variable retention criteria.

Limitations

The study was conducted on war-affected school children, which could limit its external validity. We recommend specific adaptations in other settings before use.

Conclusion and recommendations

The ICVS was validated using standard criteria for such scales. The emerging 18-item two-factor scale has acceptable psychometric properties especially factorial structure, internal consistency and sub-scale distinctiveness. It may also be necessary to test it in a none-war setting to determine its applicability in such settings. Its predictive validity and sensitivity to interventional effects may also require evaluation. If proved effective, this could have significant implications for the way health education and promotion will be approached in many countries. This might necessitate the clear definition of the issues of interest and where applicable, their underlying values, attitudes, causal pathways and behavioural end points and their development and packaging into formal education as a way of producing the desired value systems, attitudes and behaviours at a more macro levels.

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