Prevention/intervention for populations at high risk of engaging in violent behaviour

A systematic review of prevention and intervention strategies for populations at high risk of engaging in violent behaviour: update 2002–8

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Executive summary

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Executive summary

Background

Interpersonal violence is a major public health issue. It has been estimated that violence accounts for more than 1.6 million deaths worldwide each year and these fatal assaults represent only a fraction of all assaults that actually occur. Public concern about the level of interpersonal violence in society keeps the issue at the top of the political agenda in many Western countries, including the UK. Thus, the problem has serious and widespread consequences for the individual and for the wider society in physical, psychological, social and economic terms. A wide range of pharmacological, psychosocial and organisational interventions have been developed with the aim of addressing the problem. This review was designed to examine the effectiveness of these interventions when they are deployed in mental health and criminal justice populations.

Objectives

The objectives of the review were to (1) update a previous review that examined the evidence base up to 2002 for a wide range of pharmacological, psychosocial and organisational interventions aimed at reducing violence and (2) identify the key variables associated with a significant reduction in violence. The scope of the review was designed to be very broad so that a comprehensive portrayal of the current global literature could be obtained in order to inform future research, practice and policy.

Methods

Data sources

Evidence for the effectiveness of interventions in reducing violence was identified using both a comprehensive search strategy to interrogate 19 bibliographic databases and the checking of reference lists of identified reviews. The database searches covered the period from January 2002 to April 2008.

Inclusion criteria

The inclusion criteria for papers were purposefully broad to capture as wide-ranging a selection of relevant studies as possible. Studies had to evaluate an intervention aimed at reducing violence against other people. Participants had to be aged ≥ 17 years and either have a mental disorder, be offenders or have committed indictable offences. A study also had to report an outcome measure of violence either directly (e.g. reconviction for a violent offence) or indirectly through a proxy measure (e.g. a validated anger measure).

Data extraction

Data extraction was carried out independently by nine reviewers, with regular meetings to co-ordinate activity and to explicitly cross-check extracted data. Data from each study relating to study design, sample, setting, type of intervention, type of outcome and whether or not a statistically significant outcome was reported were extracted into a predefined Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) database. Details of outcomes, effect sizes and statistical analyses were independently extracted into an Microsoft Excel (Microsoft

Corporation, Redmond, WA, USA) spreadsheet by one of four reviewers and were cross-checked by one reviewer.

Data synthesis

A series of bivariate analyses, using either a chi-squared test or Spearman's rho test, were conducted to explore possible sources of variance in whether or not a study reported a statistically significant result. Six variables identified as having a significant association in this way were entered into a binary logistic regression.

Studies were included in meta-analyses (MAs) if they followed a randomised control trial (RCT) design and reported data that could be converted into odds ratios (ORs). For each MA, both a fixed- and a random-effects model were fitted, and both Q and I^2 estimates of heterogeneity were performed.

Meta-analyses are presented for all included RCTs combined and also subgrouped by the type of comparison (e.g. compared with placebo or active treatment), broad intervention groups (e.g. pharmacological vs psychosocial) and specific intervention groupings [e.g. cognitive behavioural therapy (CBT), selective serotonin reuptake inhibitor (SSRI)]. Further MAs were conducted on models incorporating identified modifiers.

Publication bias was investigated using a funnel plot.

Results

A total of 198 studies were identified as meeting the inclusion criteria: of these, 51 (26%) were RCTs. The non-RCTs were primarily (49%) single-group designs. The literature was highly diverse and included 94 distinct types of intervention and 55 different types of outcomes.

The population, setting and type of interventions studied differed between RCTs and non-RCTs, with RCTs reporting primarily pharmacological studies of people with mental disorders in community settings and non-RCTs evaluating primarily psychological interventions with offenders in penal institutions. Most studies (62%) were conducted in North America and a large proportion targeted males only (48%).

Bivariate analyses exploring possible sources of variance in whether or not a study reported a statistically significant result identified six variables with a significant association. An outcome was less likely to be positive if (1) the primary intervention was something other than a psychological or pharmacological intervention; (2) the study was conducted in an offenders' institution; (3) the comparator was another active treatment; (4) the comparator was treatment as usual (TAU); and (5) a between-groups design had been used. An outcome was more likely to be positive if it was conducted with people with a mental disorder (6). The variation attributable to these variables when added to a binary logistic regression was not large (Cox and Snell $R^2 = 0.12$) but not insignificant given the small number of variables included.

The pooled results of all RCTs with data suitable for MA suggested a statistically significant advantage for interventions over the various comparators [OR 0.59, 95% confidence interval (CI) 0.53 to 0.65, fixed effects; OR 0.35, 95% CI 0.26 to 0.49 random effects; 40 studies). However, there was high heterogeneity [$I^2 = 86\%$, $Q = 279$ (degrees of freedom, df = 39), $p < 0.0001$], indicating the need for caution in interpreting the observed effect.

Analysis by subgroups showed that most results followed a similar pattern with statistically significant advantages of treatments over comparators being suggested in fixed- and/or random-effects models but in the context of large heterogeneity. This was not true for analyses of SSRIs, in which no effect was shown and the heterogeneity was low [OR 0.80, 95% CI 0.38 to 1.68, fixed effects; OR 0.76, 95% CI 0.30 to 1.93 random effects; four studies, $I^2 = 31.6\%$, $Q = 4.38$ (df = 3), $p = 0.22$]. Analysis of an active primary intervention compared with TAU indicated a significant advantage for the active treatment using a fixed-effects model but not for a random-effects model with only moderate heterogeneity [OR 0.76, 95% CI 0.60 to 0.97, fixed effects; OR 0.70, 95% CI 0.43 to 1.14, random effects; eight studies, $I^2 = 68.8\%$, $Q = 22.45$ (df = 7), $p = 0.002$]. The subgroup analysis of CBT as a primary intervention also showed a statistically significant advantage under a fixed- but not a random-effects model (OR 0.61, 95% CI 0.42 to 0.88, fixed effects; OR 0.61, 95% CI 0.37 to 0.99, random effects, seven studies); however, heterogeneity was low in this subgroup analysis [$I^2 = 21.6\%$, $Q = 7.65$ (df = 6), $p = 0.26$].

Two further subgroup analyses reported a statistically significant advantage for the primary intervention with moderate heterogeneity: atypical antipsychotic drugs (OR 0.21, CI 0.16 to 0.27, fixed effects; OR 0.24, CI 0.14 to 0.43, random effects; 10 studies, $I^2 = 72.2\%$, $Q = 32.4$ (df = 9), $p < 0.0001$) and psychological interventions [OR 0.63, CI 0.48 to 0.83, fixed effects; OR 0.53, CI 0.31 to 0.93, random effects; nine studies, $I^2 = 62.1\%$, $Q = 21.1$ (df = 8), $p = 0.007$].

The decision to set broad parameters to the review had the intended benefit of comprehensiveness in terms of capturing a very wide range of relevant studies, but inevitably resulted in a very heterogeneous group of studies, and this heterogeneity inhibits both robust MA and the clear application of findings to establishing improvements in clinical practice. Nevertheless, a number of noteworthy trends are emerging.

A funnel plot of the studies included in the overall MA produced an asymmetric distribution that was suggestive of publication bias. The pattern is consistent with, in particular, the rejection of smaller analyses with negative outcomes. This would be consistent with biases observed in other literatures and would not be an unexpected finding, notably in the context of a comprehensive search of the literature such as the one carried out here.

Conclusions

Results from this review show small-to-moderate effects for CBT for all psychological interventions combined and larger effects for atypical antipsychotic drugs, with relatively low heterogeneity. There is also evidence that interventions targeted at mental health populations, and particularly male groups in community settings, are well supported as they are more likely to achieve stronger effects than interventions with the other groups.

The research literature on interventions to reduce violence continues to grow rapidly in quantity, but the focus of research has shown no strong indication of a coalescence into the development of a common focus in design, treatment approach or outcome measurement. Design quality overall also remains relatively low and reflects the dominance of a pragmatic approach. Until the research effort becomes more homogeneous and well designed, any results from pooling studies will be limited in the robustness of results.

Recommendations for future research

1. Improvements are needed in the design quality of future research studies. Of particular note is the relative dearth of RCTs, especially in the evaluation of non-pharmacological interventions. Furthermore, RCTs themselves should be improved by extending the study

follow-up period wherever possible. The quality and rigour of research in the field could be improved by more consistent attention to the protocols that have been published with respect to the reporting of both randomised and quasi-experimental designs. Researchers should identify a single primary outcome variable against which effectiveness is judged.

2. Any approach that could increase the homogeneity of research in this field will be welcomed. Greater homogeneity in study design, the interventions applied and outcome measures used, would all be beneficial, especially if actual aggression or violence rather than some proxy for these were to be adopted as the primary outcome measure. If the best-validated measures were to be more widely used it would strengthen internal validity and also facilitate comparability across studies for review purposes.
3. A programme of research funded and co-ordinated at a national or international level should be developed, as this would improve the capacity to conduct robust MAs and increase confidence in their results. The review has revealed the extensive literature that has been produced in just the past few years but this is coupled with relatively low design quality. Much of the research is conducted opportunistically by practitioners on the basis of what is possible within their clinical setting. Although this is laudable as a contribution to the principle of evidence-based practice, without adequate resources to improve study design the cumulative evidence base will never produce knowledge that is generalisable beyond specific local settings.
4. Some treatment approaches are particularly lacking in evidence-based interventions, such as psychosocial interventions other than CBT. A greater focus on improving the quantity and quality of research here is likely to prove very beneficial.
5. Psychosocial and other non-pharmacological interventions should be defined more clearly so that the theoretical elements they are testing is made explicit. In this way, the key components that make up a broad intervention, such as CBT, will be identified and examined for effectiveness.

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Publication

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NIHR Health Technology Assessment programme

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The research reported in this issue of the journal was commissioned by the HTA programme as project number 08/101/01. The contractual start date was in May 2009. The draft report began editorial review in April 2011 and was accepted for publication in June 2011. As the funder, by devising a commissioning brief, the HTA programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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