

Interventions integrating health and academic education in schools to prevent substance misuse and violence: a systematic review

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Scientific summary

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Scientific summary

Background and rationale

The review focused on substance use (i.e. alcohol consumption, smoking and drug use) and violence. The prevalence, harms and costs of these outcomes among young people mean that addressing them is a public health priority. Existing systematic reviews suggest that school curriculum-based health interventions can reduce alcohol consumption, smoking, drug use and violence, but in the UK these are increasingly difficult to deliver within constrained school timetables. In this context, schools may deliver health education in other subjects, integrating it with academic learning. Such interventions may either teach health education within other mainstream school subjects or provide specific health education lessons, ones that also provide teaching that covers academic, as well as health, knowledge and skills. This approach may allow for increased curriculum teaching time, be less prone to student resistance and prevention fatigue, and enable synergy and reinforcement between sessions provided in different subjects. However, existing interventions of this sort in the UK have not been informed by existing theory or evidence. Effects on substance use and violence are likely to be synergistic because each predisposes the other and has common risk factors.

No systematic review has examined evidence concerning interventions integrating health and academic education. Those exploring related interventions are dated and do not have comprehensive inclusion of integrated curricula. The marginalisation of student health and well-being education, especially in England, and the potential advantages of interventions integrating health and academic education to jointly achieve health and academic outcomes warrant an exploration of the available evidence.

Aim and review questions

The aim was to systematically search for, appraise the quality of and synthesise evidence to address the following review questions:

1. What types of curriculum interventions that integrate health and academic education in schools and address substance use and violence have been evaluated?
2. What theories of change inform these interventions and what do these suggest about potential mechanisms and effects?
3. What characteristics of interventions, deliverers, participants and school contexts facilitate or limit successful implementation and receipt of such interventions, and what are the implications of these for delivery in the UK?
4. How effective are such interventions in reducing alcohol consumption, smoking, drug use and violence, and increasing academic attainment, when compared with usual treatment, no treatment or other interventions, and does this vary according to students' sociodemographic characteristics?
5. What characteristics of interventions, deliverers, school contexts and students appear to moderate or are necessary and sufficient for the effectiveness of such interventions?

Methods

We carried out a multimethod systematic review of theories of change, process and outcomes of school-based curriculum interventions integrating health and academic education among students aged 4–18 years addressing substance use or violence. Academic education was defined as education in specific academic subjects, literacy, numeracy or study skills. The studies that were included addressed one or more of the

following primary review outcomes: smoking, alcohol use, legal or illicit drug use and violence (perpetration and victimisation). Academic attainment was also assessed as a secondary outcome. The review followed existing criteria for the good conduct and reporting of systematic reviews [Moher D, Liberati A, Tetzlaff J, Altman DG, Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLOS Med* 2009;6:e1000097].

Searching electronic databases

The search strategy involved terms concerning three core concepts: health education curricula (e.g. violence, smoking, drugs or alcohol education), integration with academic learning (e.g. integration within mathematics or literacy teaching), and population and setting (e.g. primary and secondary school-aged children). From 18 November to 22 December 2015, we searched the following databases: Applied Social Sciences Index and Abstracts (ASSIA), Australian Educational Index, BiblioMap (database of health promotion research), British Educational Index, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Database of Promoting Health Effectiveness Reviews, Dissertation Abstracts (UK theses, all dates; global theses 2010–15), Econlit, EResearch Index Citations, Health Technology Assessments, International Bibliography of the Social Sciences, MEDLINE, NHS Economic Evaluation Database, PsycINFO, Social Policy and Practice including Child Data & Social Care Online, Social Science Citation Index/Web of Knowledge and Trials Register of Promoting Health Interventions. We updated searches for outcome evaluations using PsycINFO and the Cochrane Central Register of Controlled Trials. Searches for outcome evaluations relating to violence were updated on 28 February 2018 and searches relating to substance use were updated on 14 May 2018.

Searching other resources

The following 32 websites were searched to identify relevant studies: Cambridge Journals [URL: www.cambridge.org/core/ (accessed 12 January 2016)], Centers for Disease Control and Prevention: Smoking & Tobacco Use [URL: www.cdc.gov/tobacco/index.htm (accessed 12 January 2016)], Child and Adolescent Research Unit [URL: www.cahru.org/ (accessed 12 January 2016)], Childhoods Today [URL: www.childhoodstoday.org/ (accessed 12 January 2016)], Children in Scotland [URL: <https://childreninscotland.org.uk> (accessed 12 January 2016)], Children in Wales [URL: www.childreninwales.org.uk/ (accessed 12 January 2016)], Community Research and Development Information Service [URL: https://cordis.europa.eu/home_en.html (accessed 14 January 2016)], Database of Educational Research [Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre)] [URL: <https://eppi.ioe.ac.uk/webdatabases/SearchIntro.aspx> (accessed 14 January 2016)], Drug and Alcohol Findings Effectiveness Bank [URL: <https://findings.org.uk/> (accessed 14 January 2016)], Google [URL: www.google.com (accessed 14 January 2016)], Google Scholar [URL: www.scholar.google.com (accessed 14 January 2016)], Government of Wales [URL: <http://gov.wales/?lang=en> (accessed 18 January 2016)], Government of Scotland [URL: www.gov.scot/ (accessed 18 January 2016)], Joseph Rowntree Foundation [URL: www.jrf.org.uk/ (accessed 18 January 2016)], National Criminal Justice Reference Service [URL: www.ncjrs.gov/ (accessed 18 January 2016)], National Society of the Prevention of Cruelty to Children [URL: www.nspcc.org.uk/ (accessed 18 January 2016)], National Youth Agency [URL: <https://nya.org.uk/> (accessed 18 January 2016)], National Institute for Health Research (NIHR) Clinical Research Network Study Portfolio [URL: www.nihr.ac.uk/research-and-impact/nihr-clinical-research-network-portfolio/ (accessed 19 January 2016)], Northern Ireland Executive [URL: www.northernireland.gov.uk/ (accessed 19 January 2016)], OpenGrey [URL: www.opengrey.eu/ (accessed 19 January 2016)], Personal Social Services Research Unit [URL: www.pssru.ac.uk/ (accessed 19 January 2016)], Project Cork [URL: www.dartmouth.edu/~cork/ (accessed 21 January 2016)], University College of London Institute of Education Digital Education Resource Archive [URL: <http://libguides.ioe.ac.uk/dera> (accessed 21 January 2016)], University of Illinois at Urbana Champaign [URL: <http://illinois.edu/> (accessed 21 January 2016)], US Centre for Substance Abuse Prevention [URL: www.samhsa.gov/ (accessed 21 January 2016)], Social Issues Research Centre [URL: www.sirc.org/ (accessed 21 January 2016)], The Campbell Library [URL: www.campbellcollaboration.org/library.html (accessed 21 January 2016)], The Children's Society [URL: www.childrenssociety.org.uk/ (accessed 21 January 2016)], The Open Library [URL: <https://openlibrary.org/> (accessed 22 January 2016)], The Schools and Students' Health Education Unit Archive [URL: <http://sheu.org.uk/> (accessed 22 January 2016)], World Health

Organization International Clinical Trials Registry Platform [URL: www.who.int/ictcp/en/ (accessed 23 January 2016)] and Young Minds: Child & Adolescent Mental Health [URL: <https://youngminds.org.uk> (accessed 21 January 2016)].

Study selection

Studies were screened by the title and abstract by four reviewers. Each reviewer initially screened sets of 50 of the same studies. A 90% agreement rate was required before proceeding to independent screening by the title and abstract. Full reports were obtained for studies not excluded by the title and abstract using the same process of piloting.

Data extraction and management

References were stored in EPPI-Reviewer version 4.0 (Evidence for Policy and Practice Information and Coordinating Centre, University of London, London, UK) and data were extracted using coding tools for theory, process or outcome reports. Data extraction tools were piloted on five studies (two theory reports, two process evaluations and one outcome evaluation) and refined. For studies describing a theory of change, we extracted data on description of the theory of change, the rationale for integrating health and academic education, links to other theories and how the theory differs from others included in the study. For process and outcome evaluations, we extracted data on study location, intervention/components, description of integration, intervention development, timing of intervention and evaluation, target population, provider and provider organisation, research questions or hypotheses, timing of evaluation, sampling methods and sample size at baseline and follow-up, sociodemographic characteristics of participants at baseline and any follow-ups, and data collection and analysis.

For outcome studies, when additional data were needed to calculate effect sizes, we contacted authors for the relevant information. When authors did not provide the relevant information, we used the best approximation available.

Quality appraisal

The quality of each study was independently assessed by two reviewers, with differences in opinion resolved by discussion without the need for recourse to a third reviewer. The quality of studies reporting on theory was assessed on clarity (of definition of constructs and pathways), plausibility (of pathways, the theory being informed by empirical evidence), testability (evidence of empirical testing), ownership (of theory by relevant stakeholders) and generalisability (of theory to different contexts with evidence of having done so).

The quality of process evaluations was assessed based on whether or not efforts had been made to increase rigour of data collection and data analysis, the extent to which the study findings were grounded in the data, the extent to which the study privileged the perspectives of youth participants, and the breadth and depth of the findings. Reviewers then judged both the reliability and the usefulness of the findings as low, medium or high.

Outcome evaluations were assessed for risk of bias in seven domains: sequence generation, allocation concealment, blinding, completeness of outcome data, whether or not clustering was accounted for, other sources of bias, and the suitability of the control group. Each study was then defined as having a low, high or unclear risk of bias.

Synthesis of theoretical data

First, we synthesised theories of change for each individual intervention included in the review. Second, we synthesised theories across all interventions to explore points of reciprocal resonance, refutation and/or complementarity potentially leading to the development of a line-of-argument synthesis. This led us to employing a mix of methods: line-by-line coding and thematic synthesis for the 'within-intervention' theories and meta-ethnography for the 'across-intervention' theories.

Synthesis of process data

Process evaluations reported qualitative, quantitative or mixed results and were synthesised qualitatively using thematic synthesis methods applied to any results.

Synthesis of outcome data

We undertook both narrative synthesis and meta-analytic synthesis of the results of outcome evaluations. Our narrative synthesis included both end-point measurements and trajectory estimates for each intervention separately. Effect sizes from included study reports were converted into standardised mean differences (Cohen's *d*) using all available information as presented for each study. Effect estimates adjusted for covariates were used when these were presented alongside unadjusted estimates. In interpreting the results of meta-analyses, the standard rule for the interpretation of Cohen's *d* was followed: 0.2 is a small effect, 0.5 is a medium effect and 0.8 is a large effect. Negative effect sizes indicate a positive effect (e.g. a reduction in substance use). Data transformation and imputation were carried out as necessary and a multilevel meta-analysis with random effects was used at both the outcome and study level. A standard three-level model was used, with level one being the 'hypothetical' participants who contributed to the effect sizes, level two being the within-study outcome-specific effect size estimates with sampling error and level three being the 'between-study' level. A 'matrix' of key stage (KS) against type of outcome was created. Findings were then meta-analysed within each cell of the matrix where appropriate. For each model, an overall effect size was estimated and expressed as a standardised mean difference with a 95% confidence interval. *I*² was estimated at the study level using the variance components implied by the multilevel model.

Stakeholder analysis

One-to-one consultations were conducted to reflect on the findings with policy and practice stakeholders. Young people were also consulted via the Advice Leading to Public Health Action young people's public health research advisory group based in the Centre for Development and Evaluation of Complex Public Health Interventions for Public Health Improvement. Views were sought regarding the potential feasibility and acceptance of integrated academic and health education within the UK. Emerging hypotheses were also explored, largely around implementation characteristics.

Ethics considerations

This project was approved by the Research Ethics Committee (REC) of University College of London Institute of Education (ethics approval reference REC 746). The project complied with the Social Research Association's ethics guidelines and guidance from the National Co-ordinating Centre for Public Engagement.

Results

Included studies

Original searches identified 78,451 unique references from which 62 reports were included. Update searches retrieved an additional 2355 and 1945 references (on 28 February 2019 and 14 May 2018, respectively), yielding an additional six reports of outcome evaluations. Thirty-nine reports described theories, 16 reports (15 studies) evaluated process and 41 reports (16 studies) evaluated outcomes.

What types of curriculum interventions that integrate health and academic education in schools and address substance use and violence have been evaluated?

Health curricula were either partially or fully integrated within an academic class. Fully integrated curricula use the same learning activities to achieve health and academic learning objectives (e.g. a programme that uses English literature lessons to teach themes about bullying, aiming to reduce both violence in children and improve literacy). Partially integrated programmes have separate learning activities that address health and academic learning objectives separately but within one overall package.

What theories of change inform these interventions and what do these suggest about their potential mechanisms and effects?

The interventions within this review aimed to integrate and, thus, erode boundaries between health and academic education. Role-modelling and reinforcement of risk avoidance by teachers and pro-social peers promoted through interventions was important, particularly alongside the development of positive teacher–student and pro-social peer relationships (interpreted as erosion of boundaries between students and teachers). Theories of change also emphasised multilevel interventions with classroom work, supported by other components delivered at multiple levels (e.g. the overall school environment and the family). This was interpreted as erosion of boundaries between classrooms and schools and between schools and families. Such work was theorised to ensure that learning and reinforcement of positive behaviours occurred beyond the classroom. In turn, it was theorised that these interventions would provide students with various assets necessary to reduce engagement in substance use and violence as well as to increase academic attainment.

What characteristics of interventions, deliverers, participants and school contexts facilitate or limit successful implementation and receipt of such interventions, and what are the implications of these for delivery in the UK?

Key facilitators of integrated health and academic curricula were supportive senior management, alignment of the intervention with the school's ethos, positive teaching environment and positive pre-existing student, teacher and parent attitudes towards interventions. Important barriers were overburdened teachers, with little time to both learn and implement integrated curricula. Reflections from stakeholders, as part of our consultation process, suggested a broad alignment with the above factors and the importance of government support for such programming, as well as having effective teacher training with ready-made resources that do not add to the teacher workload or prove burdensome in promoting good implementation in the UK. There were further comments about the differences in primary and secondary schools, with the general agreement that implementation would be more feasible and more logistically possible in primary schools. It was not possible to draw on the above factors to determine which interventions, reported on by studies included in this review, are most appropriate for the UK context.

How effective are such interventions in reducing alcohol consumption, smoking, drug use and violence, and increasing academic attainment when compared with usual treatment, no treatment or other interventions, and does this vary according to students' sociodemographic characteristics?

The strongest evidence for the effectiveness of interventions integrating health and academic education was for the reduction of substance use in schools at KS2 and 3. A meta-analysis for the effectiveness of these interventions in reducing violence and victimisation in KS2 did not find an effect. It was not possible to undertake an analysis based on sociodemographic characteristics. There was mixed evidence about the effects of these interventions on academic outcomes, the reporting of which was generally poor.

What characteristics of interventions, deliverers, school contexts and students appear to moderate or are necessary and sufficient for the effectiveness of such interventions?

Studies provided insufficient detail on such factors, precluding analysis.

Conclusions

This form of intervention is undertheorised but involves multiple forms of boundary erosion. There is clear evidence of characteristics affecting implementation. Interventions are likely to have the greatest impact on substance use. These programmes may be effective in reducing substance use but do not appear to reduce violence and findings on educational impacts are mixed. These differences may simply reflect the particular studies reviewed or the differences in how open these outcomes are to modification among school-aged children.

Study registration

This study is registered as PROSPERO CRD42015026464.

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