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

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Scientific summary

Background and rationale

The review focused on substance use (alcohol, 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 but which also provide teaching covering academic as well as health knowledge and skills. This approach may allow for larger doses, be less prone to student resistance and prevention fatigue, and may enable synergy and reinforcements 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 since 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 wellbeing 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 available evidence.

Aim and review questions

Aim: To search systematically for, appraise the quality of and synthesise evidence to address the following research questions:

1: What types of curriculum interventions integrating health and academic education in schools addressing 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 attainment, when compared to usual treatment, no treatment, or other interventions, and does this vary according to students' socio-demographic characteristics?

5: What characteristics of interventions, deliverers, school contexts and students appear to influence the effectiveness of such interventions?

Methods

We carried out a multi-method 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. We included studies addressing 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.

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: 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 2010-2015); 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

We searched the following websites for additional sources: Cambridge Journals; Centers for Disease Control and Prevention: Smoking & Tobacco Use; Child and Adolescent Research Unit; Childhoods Today; Children in Scotland; Children in Wales; Community Research and Development Information Service; Database of Educational Research (Evaluation for Policy and Practice (EPPI)-Centre); Drug and Alcohol Findings Effectiveness Bank; Google; Google Scholar; Government of Wales; Government of Scotland; Joseph Rowntree Foundation; National Criminal Justice Reference Service; National Society of the Prevention of Cruelty to Children; National Youth Agency; Northern Ireland Executive; OpenGrey; Personal Social Services Research Unit; Project Cork; UCL-IOE Digital Education Resource Archive; UK Clinical Research Net Study Portfolio; University of Illinois at Urbana Champaign; US Centre for Substance Abuse Prevention; Social Issues Research Centre; The Campbell Library; The Children's Society; The Open Library; The Schools and Students' Health Education Unit Archive; WHO International Clinical Trials Registry Platform; and Young Minds: Child & Adolescent Mental Health. We also consulted experts checked references of included studies.

Study selection

Studies were screened on 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 on title and abstract. Full reports were obtained for studies not excluded on title and abstract, using the same process of piloting.

Data extraction and management

References were stored in EPPI-Reviewer 4 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 theory of change; 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, 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 doing so).

The quality of process evaluations was assessed based on: whether 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 findings. Reviewers then judged both the reliability and usefulness of 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 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 employ 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 and meta-analytic synthesis of the results of outcome evaluations. Our narrative synthesis included both endpoint 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. We used effect estimates adjusted for covariates when these were presented alongside unadjusted estimates. In interpreting the results of meta-analyses, we followed the standard rule for interpretation of Cohen's d that 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. We used multilevel meta-analysis with random effects at both the outcome and study level. We used a standard three-level model, 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. We created a 'matrix' of key stage (KS) against type of outcome. We then meta-analysed findings within each cell of the matrix where appropriate. For each model, we estimated an overall effect size expressed as a standardised mean difference with a 95% confidence interval. We estimated I^2 at the study level using the variance components implied by the multilevel model.

Stakeholder analysis

We conducted one-to-one consultations to reflect on our findings with policy and practice stakeholders. We also consulted young people via the Advice Leading to Public Health Action (ALPHA) 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 (DECIPHer) Centre. Views were sought regarding the potential feasibility and acceptance of integrated academic and health education within the UK. We also explored emerging hypotheses, largely around implementation characteristics.

Ethical considerations

This project was approved by the research ethics committee of UCL Institute of Education (ethics approval reference REC 746). The project complied with the Social Research Association's ethical guidelines and guidance from the National Coordinating 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 2,355 and 1,945 references, 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.

1: What types of curriculum interventions integrating health and academic education in schools addressing 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 (for example, a programme that uses English literature lessons to teach themes about bullying, aiming to both reduce violence in children as well as improving literacy). Partially integrated programmes have separate learning activities which address health and academic learning objectives separately but within one overall package.

2: 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 teacher 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 multi-level 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.

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?

Key facilitators of integrated health and academic curricula were: supportive senior management; alignment of the intervention with school ethos; positive teaching environment;

and positive pre-existing student, teacher and parent attitudes towards interventions. Important barriers were over-burdened teachers, with little time to both learn and implement integrated curricula. Reflections from stakeholders as part of our consultation process suggest a broad alignment with the above factors and suggested the importance of government support for such programming and having effective teacher training with ready-made resources that do not add to 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.

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

The strongest evidence for the effectiveness of interventions integrating health and academic education was for the reduction of substance use in school key stage (KS) 2 and KS3. A meta-analysis for the effectiveness of these interventions in reducing violence 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.

5: 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 under-theorised but involves multiple forms of boundary erosion. There is clear evidence on 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 reflect differences in how open are these outcomes to modification among school-aged children.

Study registration

PROSPERO 2015:CRD42015026464.

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