

PHR 11/3009/04 Sexual health promotion for young people delivered via digital media: a scoping review

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JB, EM and CF have developed interactive digital interventions (IDI), and lead programmes of research to evaluate interventions. None of the authors have received fees or sponsorship from organisations which stand to make a profit from the development and implementation of digital interventions.

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Scientific summary

Background

Young people are at risk of poor sexual health and are in need of comprehensive, effective sexual health education. Young people are confident users of digital technology such as the Internet and mobile phones, and there are many innovative possibilities for sexual health education. In this report we present available evidence for effectiveness and cost-effectiveness of interactive digital interventions for sexual health promotion; what is known about how best to design, develop and implement digital interventions; and how best to evaluate them. We also comment on the future potential for digital interventions for sexual health.

Methods

This review considers sexual health promotion for young people aged 13 to 24 years in the UK, defining sexual health in holistic terms, to include physical, emotional, mental and social well-being in relation to sexuality. We focus particularly on *interactive* digital interventions (IDI), defined as digital media programmes that provide sexual health information and tailored decision support, behaviour-change support, and/or emotional support for sexual health issues. We conducted a review of literature to locate and synthesise available evidence on digital interventions for sexual health for young people spanning the last ten years, integrating the findings with the views of key informants (young people, parents, and experts in digital media/sexual health).

Results

Evidence on best practice for digital intervention design and development

We identified many examples of IDI for sexual health promotion, particularly from the United States.

Good practice for IDI design and development includes 1) developing an understanding of the target population and their behavioural needs, 2) targeting the modifiable mechanisms of the desired behaviour change through research with users, 3) selecting change techniques that match user needs, 4) implementing techniques in forms that are engaging and promote long-term interest/use among users, 5) ensuring that interventions are feasible and sustainable within an implementation context. Young people should be involved at all stages, and the views of other stakeholders can highlight sexual health needs not identified by young people themselves, and help to optimise implementation.

Most IDIs focus on reducing sexual risk behaviour and increasing condom use, with few interventions addressing issues such as sexual pleasure and relationships, or co-factors such as alcohol and mental health. There are also gaps for risk groups such as young women after pregnancy, 'looked-after' young people (in institutional care), young people experiencing sexual and domestic violence, young people with learning difficulties, and lesbian, gay, bisexual and transgender youth. Promising interventions that have already been developed could be adapted for specific target groups and evaluated in UK settings.

There is rapid innovation in the development and design of digital interventions. More collaboration is needed to capitalise on the knowledge of users and stakeholders, the design and software skills of the commercial sector, and the theoretical expertise and evaluation skills of academia. There is a need for mechanisms to assess whether interventions meet defined quality criteria for intervention content and to assess potential risks.

Evidence on effectiveness of interactive digital interventions for sexual health promotion

We located 19 studies which were randomised controlled trials of IDI for sexual health promotion for young people. We extracted data and (where possible) synthesised the findings from these studies to assess the effectiveness of IDI. IDIs were delivered in a variety of settings (schools, colleges, health care settings and online) and targeted heterosexual young people as well as young men who have sex with men.

Are IDIs effective?

We found that IDI have statistically significant effects as follows: a moderate effect on sexual health knowledge (standard mean difference [SMD] 0.54, 95% CI 0.17 to 0.92); a small

effect on self-efficacy (SMD 0.11, 95% CI 0.02 to 0.20); a positive effect on sexual behaviour (Odds Ratio [OR] 1.28, 95% CI 1.02 to 1.61), but no significant effects on safer sex intentions (SMD 0.09, 95% CI -0.01 to 0.19) or biological outcomes (OR 0.95, 95% CI 0.69 to 1.31). There were no data on adverse effects.

Are IDIs as effective as face-to-face interventions for sexual health?

The results of one study suggest that IDIs may be as good as, or better than, face-to-face interventions for sexual health knowledge acquisition (SMD 0.51, 95% CI 0.11 to 0.90) and intention (SMD 0.46, 95% CI 0.06 to 0.85), but not self-efficacy (SMD 0.38, 95% CI -0.11 to 0.77). There were insufficient data to draw conclusions about effects of IDI on sexual behaviour, biological outcomes or adverse effects.

How do IDIs work?

The existing evidence on this topic is limited since little trial evidence is available.

These results show that IDI are effective tools for learning about sexual health, but there is not enough evidence to be sure of effects on biological outcomes such as STI or pregnancy.

Evidence on methods for economic measurement, analysis and modelling in sexual health

There is very limited health economic evidence which relates directly to digital interventions for sexual health promotion, so we draw on evidence and guidance regarding (non-digital) sexual health promotion and (non-sexual health) digital interventions.

Sexual health promotion interventions are likely to be cost-effective if the target groups have a high prevalence of sexually transmitted infections and/or if the intervention is relatively cheap. Once developed, the on-going costs of IDI can be relatively low, and targeting large numbers of people can in theory be relatively cheap and easy. However, the level of uptake and engagement with an intervention and the characteristics of target populations might be more instrumental in determining the cost-effectiveness than intervention efficacy alone.

Cost-utility analysis is the type of economic evaluation recommended in the UK (calculating the incremental cost per quality adjusted life year (QALY) gained), but this may not be the most suitable type of economic evaluation for sexual health intervention evaluation if it does

not capture all of the costs and consequences of interest. Cost-effectiveness analyses (e.g. reporting results as cost per sexually transmitted infection case detected or cost per pregnancy avoided) may provide more useful information to a decision maker in a sexual health context. Decision modelling can potentially capture a wider range of information, and long term impacts of an intervention beyond the duration and scope of an RCT. Since most of the costs and benefits of sexual health promotion come from potentially rare events (such as the prevention of cases of STI or prevention of unintended pregnancies), it is likely that large, observational datasets will play an increasing role in capturing this information.

Further research and consensus is needed on how best to cost intervention development, implementation and maintenance; how to measure health and well-being outcomes in the sexual health promotion field, particularly long term outcomes; and the best ways to conduct economic evaluations of digital media interventions for sexual health promotion.

Evidence on implementation of sexual health IDI for young people

The impact of a sexual health promotion IDI will be determined by its **Reach** (proportion of the target population reached), **Efficacy**, **Adoption** (within the target setting), **Implementation** (how well it is delivered) and **Maintenance** (sustainability) – RE-AIM.

Sexual health IDIs delivered in settings such as a clinic or the classroom have a captive audience which enables interventions to be delivered with high fidelity over a defined period of time. In contrast, online interventions can allow private and convenient access, and reach populations who may not be linked into mainstream services, but require the user not only to find the intervention but also to stay with it. Mixed delivery through complementary routes (in static settings and online) is most likely to maximise the proportion of the target population gaining access.

The reach of IDI could be enhanced by linking sexual health promotion interventions with existing digital systems such as STI testing, or with trusted branded websites or popular social networking sites. Face-to-face recruitment and facilitated engagement (e.g. with teachers or clinicians) also encourage young people to access interventions and are more likely to facilitate continued engagement. More research is needed on how social networking sites, mobile phones and gaming can be harnessed for sexual health promotion.

Using the knowledge of local staff is vital for both successful intervention development and successful implementation. An effective intervention usually requires some adaptation for local contexts, but care is needed in identifying and preserving the core components so that effectiveness is maintained. Technical support, moderation/monitoring and updating are further challenges for implementing sustainable digital interventions.

There are few national policy levers to drive implementation of sexual health promotion IDIs in practice, and responsibility for health and education is increasingly devolved to local healthcare and local authority commissioning groups. An increased emphasis on local cross-sectoral working means there may be more opportunity for shared initiatives and shared (financial) risk.

Evidence on optimum research design and outcome measurement to evaluate digital interventions

Digital platforms offer quick, convenient and relatively cheap methods for conducting sexual health research. Recruitment via the Internet offers opportunities for reaching hard-to-reach, stigmatised populations, although convenience sampling makes sample representativeness more difficult to assess. Online recruitment to trials allows self-registration, online consent, automated randomisation, automated follow-up and online data collection, which can potentially reduce the cost of conducting trials. Using digitally mediated research methods (e.g. computer-assisted self-interviews or mobile phones for data collection) can enhance confidentiality. Requesting several participant identifiers (such as address, telephone number, date of birth) can help to reduce the risk of enrolment in online studies multiple times. Robust measures are needed to ensure security and confidentiality of data collected using digital methods.

Retention in studies which use digitally-mediated research methods can be a challenge (e.g. online trials and longitudinal surveys). However, using multiple strategies such as offering incentives, sending reminders via text and email, and appealing to the altruism of participants can enhance retention.

Age-appropriate sexual health outcomes should be used in research with young people. If interventions address multi-dimensional aspects of sexual wellbeing and other health issues such as substance use and mental wellbeing (as users would like), outcome evaluation

should also reflect these broader concepts of health. There is a trade-off between producing a specific intervention with clear (narrow) aims, and producing an intervention which addresses the complexity of sexual health.

It is difficult to capture impacts on health (e.g. STI or pregnancy) since these events are relatively rare, especially in younger age groups. It is important to measure determinants of behaviour change (such as knowledge and self-efficacy) to capture shorter-term impacts, and to understand how interventions work. Adequately powered, longer term studies are needed to assess the impact of digital interventions among young people. Qualitative process evaluations are needed to evaluate how complex interventions work, and to assess engagement and implementation in practice.

In conclusion, digitally mediated research methods are acceptable and feasible for recruitment and administration of sexual health research, and there is increasing evidence about how best to ensure good quality online data, and how to maximise retention in studies.

Conclusions - current state of play and future potential of IDI for sexual health

There is clear need for better access to sexual health promotion, since many young people in the UK do not currently have access to accurate information about the positive aspects of sex, sexuality and relationships, nor sufficient information to assess and minimise risks. Sexual health is a challenging field in which to try to change behaviour, because of the complexity of behaviours and social taboos. Public health/medical perspectives on sexual health have tended to focus on negative outcomes rather than the positive dimensions of sex and sexuality and its potential to enhance health and happiness.

Internet access is almost universal for young people in the UK, and sexual health promotion via digital media is a highly appropriate way to reach young people. Accurate information is a vital first step towards sexual self-determination, and digital interventions can meet young people's need for this. We need stronger evidence on the best designs for interventions (e.g. choice of behaviour change mechanisms and interactive features), evidence on the best models of delivery (e.g. setting, modes of delivery, methods of facilitation, support for engagement), and evidence on cost-effectiveness. More evidence is needed on how to

impact upon sexual behaviour, on biological outcomes (STI and pregnancy), and on sexual wellbeing.

At the moment in the UK (in 2015), there are pockets of local innovation but no coordinated national programme to exploit the potential of IDI for sexual health promotion. Young people have a big appetite for IDI for sexual health, the commercial sector is keen to exploit opportunities to develop digital media interventions for health, and there is political will to deploy IDI for health. However, there are important obstacles to wide-spread implementation of IDI in clinical settings (e.g. technical issues, access problems, engrained patterns of working), in schools (e.g. lack of compulsory sex and relationships education (SRE), teacher and parent reservations, blocks to websites with sexual health content) and online (e.g. lack of financial incentives to develop or implement freely-available interventions). More research is needed on how to understand obstacles to implementation, and how best to address these.

We located many examples of IDI (mostly from other countries) which were developed with young people's input, which utilise imaginative interactive features, and which are underpinned by behaviour change theory. We did not identify any IDI which are ready for implementation in the UK, either because evidence of effectiveness is lacking, or because interventions shown to be effective in other countries would need to be adapted and evaluated in the UK before implementation.

Key to successful design and implementation is collaboration between stakeholders (including young people themselves, developers, academics, educators, parents, teachers, school boards, clinicians, NHS managers and policy-makers). We need better mechanisms for bringing together the creative energy of young people and of the commercial sector with academic expertise which can ensure that interventions are theoretically sound and rigorously evaluated before roll-out. We need to ensure that interventions can be developed and evaluated within reasonable timescales whilst also ensuring that the quality and effectiveness of intervention content is known, and that risks to users' privacy and safety are minimised.

IDI have potentially high reach, and if proven effective have significant potential to impact positively on the sexual health of young people in the UK. They could be cost-saving, as well as reaching young people who do not currently have access to high quality SRE (in or

outside school). IDI could usefully form a component of sexual health education in schools, in clinic settings and online.

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