

Dedication

To my family, especially to my brother who has an amazing sense of humour (which is very contagious) and has a cheerful and kind attitude towards everybody.

Acknowledgment

I would like to thank all those people from my department who were in my life at the University of Oxford as they made me a stronger person. I appreciate that I had the unique opportunity to learn research techniques from fascinating professors and meet remarkable guest speakers. Particularly I am thankful to my supervisor - Dr. McMillan for her positive attitude and support in the scarce time left before the final deadline of my thesis.

I dedicate this long but important paragraph to my friends. Kimmy, Peter, Carlotta, Klaudia and Jenny are amazing warm-hearted people who have been next to me even when we were geographically far away. Kimmy is one of the strongest people that I have ever known and an example of how to fight with difficulties yet remain kind and loving towards others. Peter and Jenny are my “wise men” who have been guiding me when I was finding myself on a crossroad not knowing which path to take. Carlotta and Klaudia are my hotline buddies - always ready to listen with great compassion and to offer warm tea with fun art colouring after hard working days. Mary is a lovely person who has shown to me the nuances of academic writing style and the way to express

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MPhil Thesis

Behavioural interventions designed to reduce the risk of
transmission of Sexually Transmitted Infections (STIs)
among university students: current evidence of
effectiveness and of potential application at the University
of Oxford



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List of Abbreviations

AGD – Australian Government Department of Health
AIDS - Acquired Immune Deficiency Syndrome
CDC – USA Centre for Disease Control and Prevention
CONSORT - Consolidated Standards of Reporting Trials
CRD - Centre for Reviews and Dissemination
CUREC - Central University Research Ethics Committee
EBPI - Evidence-based practice
FGD - Focus group discussion
HBM - Health Belief Model
HIV - Human Immunodeficiency Virus
HPV - Human Papilloma Virus
IMB - Information-Motivation-Behaviour Model
ISCED - International Standard Classification of Education
JCRs - Junior Common Rooms
MCRs - Middle Common Rooms
MOH – Malaysian Ministry of Health
NHS - National Health Service
OUSU - Oxford Student Union
PRS - Pakistan Society Representative
RCTs - Randomised controlled trials
RevMan - Review Manager 5.3
SCM - Stages of Change Model
SCT - Social Cognitive Theory
SLT - Social Learning Theory
SOLO - Search Oxford Library Online

STDs - Sexually transmitted diseases

STIs - Sexually Transmitted Infections

TPB - Theory of Planned Behaviour

TRA - Theory of Reasoned Action

UNAIDS - Joint United Nations Programme on HIV/AIDS

UNESCO - United Nations Educational, Scientific and Cultural Organisation

WHO - World Health Organization

Abstract

Objectives: The overall objective of this thesis was to gain an understanding of behavioural interventions designed to reduce the risk of transmitting Sexually Transmitted Infections (STIs) among university students. In particular, it aimed to: (i) evaluate the effect of those interventions; (ii) understand whether the results of the review are applicable at the University of Oxford; (iii) understand the possible implementation process/processes for sexual health interventions at the University of Oxford.

Method: The achievement of the above aims this thesis involved the conduction of a systematic review of randomised controlled trials (RCTs), and a focus group discussion (FGD).

Results and further development:

Systematic review results showed that the majority of the studies had a low overall risk of bias in the sequence generation aspect and low risk of reporting bias. There was an unclear risk of bias in: allocation concealment, performance bias, detection bias, attrition bias, and bias risk of imbalance between groups at baseline. For further development, this thesis suggest that guidelines such as Consolidated Standards of Reporting Trials (CONSORT) should be followed by researchers in order to improve the quality of reporting, as this would lead to easier and more accurate judgment of the rigours of their work. In terms of the effect of the included studies, only one study measured the intervention's effect on STI incidence rates (Pedlow 2004). It found no effect on decreasing STI incidence rates at 2-month follow-up. Mixed (and sometimes inconsistent) effects were found for other outcomes, including high-risk behaviours, preventative behaviours, and mediators of behaviour change, with some studies showing an effect and some none. For further development, this thesis recommends conducting a process evaluation in order to see whether the failure of an intervention is due to problems in the theory underpinning the intervention, or simply its delivery.

The results of the focus group discussions (FGDs) suggest that there are certain aspects of the interventions that were included in the systematic review that are not applicable at Oxford. These incompatible aspects include specifying population gender, and two outcomes: abstinence from sex, and reducing the number of sexual partners. There were aspects of the interventions which were found applicable to the Oxford setting by the participants, such as the inclusion of sexually active and inactive individuals in the sample. Finally, there were aspects of the interventions that were included in the systematic review which led to contradictory opinions among the participants such as the use of the researcher who designed the intervention as its deliverer. For further development this thesis would recommend recruiting more student representatives from other colleges and societies in order for the results to be more generally applicable. It also recommends more than one focus group session in order to better present the results of the systematic review, and ensure that they are clearly understood by the participants before leading the discussion.

Chapter 1 - Background

Scope and importance of the health condition

The term 'sexually transmitted diseases' (STDs) refers to a variety of medical syndromes that are generally acquired by vaginal, anal or oral sexual activity (CDCa, 2015). Nowadays this terminology has been updated to 'sexually transmitted infections' (STIs) (Sharma and Kumar, 2009). The term STIs includes conditions such as hepatitis B that do not necessarily lead to problems with the genitalia (Sharma and Kumar, 2009). STIs can in fact be caused by more than thirty different bacteria, viruses, and parasites known to be transmitted sexually (WHO, 2008; Rogstad, 2011). Of these thirty types of infection only four are currently curable: syphilis, gonorrhoea, chlamydia and trichomoniasis (WHO, 2016a). In this thesis the term STI will be used to describe the condition being investigated.

STIs have a significant impact on global health, imposing a psychological and physical burden (Rodgstad, 2011). Physical consequences of STIs include: acute illnesses, infertility, cancer, and death (WHO, 2008). Figure 1 shows the number of deaths due to HIV-related illnesses among people in the World Health Organization (WHO) region. For example, worldwide a total of 1.1 million children and adults died due to HIV-related illnesses in 2015.

Figure 1 – Number of deaths of HIV-related illnesses among people in the WHO region

[The Figure originally presented here cannot be made freely available via ORA because of copyright. The image could be found at: WHO (2016b), for more details about the exact reference, please, refer to the bibliography]

Each year 528 000 women are diagnosed with cervical cancer, with 266 000 of these dying due to human papilloma virus (HPV) infection (WHO, 2016a). As STIs can be transmitted from mother to child, they can also cause miscarriage, low birth weight, infant illness and death (Stanberry and Rosenthal, 2013). The most recent report shows that in 2008 there were 520 000 adverse birth outcomes due to syphilis among pregnant women (Newman et al, 2013). This is worrisome since syphilis is becoming more difficult to treat: the latest WHO published guidelines for treatment of syphilis, chlamydia and gonorrhoea show that these common STIs are being more resistant to treatment due to misuse or overuse of antibiotics (WHO, 2016c). Finally, STIs are also a burden on the global economy as their treatment is very costly. For instance, in the USA the estimated cost of direct medical spending on STI treatments is \$16 billion per annum (CDCa, 2016).

STIs amongst people aged under 29

Several reports show that globally people aged under 29 are a vulnerable group for contracting STIs.

HIV/AIDS

In Europe, a WHO (2015) surveillance report shows that the highest rate of HIV diagnoses occurs among the 25 to 29 year olds age group (14.8% prevalence per 100 000) in 2015. In the USA, a report published by the Centre for Control and Prevention

shows that the rate of diagnoses for HIV people aged 25-29 has increased between 2010 and 2014, reaching prevalence a rate of 33.4% in 2015 (CDCb, 2015). For example, in Malaysia, a report issued by the Ministry of Health shows that about 34% of reported HIV/AIDS new infections are amongst young people aged between 13-29 in 2014 (MOH, 2015). In Sub-Saharan Africa, people aged 15-24 years old account for 25% of newly diagnosed HIV cases amongst the adult population (UNAIDS, 2016).

Other STIs

A report by WHO (2005) shows that each year an estimated 333 million new cases of curable sexually transmitted infections (syphilis, gonorrhoea, chlamydia and trichomoniasis) occur worldwide, with the highest rates among 20-24 year olds, followed by 15-19 year olds. For example, in Australia the age group which is most vulnerable to chlamydia infection is 15-29 with 25-29 having the highest number of infections (in total 4852 newly diagnosed cases) in 2016 (AGD, 2017). In the USA a national health survey looked at HPV prevalence between 2009 and 2012 among women aged 14-34 years. This found that 12% of HPV cases occur between ages 20-24 followed by 11% of HPV cases which occur between ages 25-29 (CDCb, 2016). In a study conducted in Sweden, 26.3% of female university students aged 16-24 were found to have experienced an STI. The three most frequently reported STIs were chlamydia, HPV and genital herpes (Ehrsson et al, 2015).

Ways to transmit STIs and risk-reduction behaviours

It is easy to transmit and acquire STIs, and there are several factors associated with increased risk of infection. These factors include: the age of first sexual intercourse; drug or alcohol addiction; sexual activity with high-risk groups such as commercial sex workers; and high-risk sexual behaviours (Sharma and Kumar, 2009). In particular, high-risk sexual behaviours include: frequent sexual intercourse; unprotected sex; a high number of previous sexual partners; and certain sexual practices such as anal, oral or vaginal sex (Ayer et al, 2007; Sharma and Kumar, 2009). The reduction of these high-risk behaviours could lead to the prevention of STIs such as HIV (Sharma and Kumar, 2009). Additionally, an increase of preventative behaviours could lead to a decrease in STI rates. Such preventative behaviours include: vaccination against curable STIs (WHO, 2003), increased testing, screening and timely treatment for STIs

(WHO, 2003), and communication or the negotiation of safe sexual practices or abstinence from sexual activity (Ayer et al, 2007). Regarding vaccination, there are currently only two effective vaccines that exist, which intend to prevent the occurrence of hepatitis B and HPV (WHO, 2016a).

University as a risk setting

The university campus setting gives students the opportunity to engage in a new environment where different social roles and new social norms are learned (McAunty, 2012; Wilton et al 2015). This social context provides the possibility for many types of high-risk sexual behaviour which can lead to the acquisition or transmission of STIs. . As this section will show, primary research available supports this, showing that across the world university students occupy an environment which creates more frequent opportunities for high-risk sexual behaviour. Further, the primary research in different parts of the world shows that there is a lack of preventative behaviour amongst university students.

The following studies investigated the high-risk sexual behaviour amongst students below age of 29 in: USA (Opt and Loffredo, 2004; Malerich and Clark, 2004), Sweden (Larsson and Tyde, 2006), Ethiopia (Shiferaw, 2014), South Africa (Heeren, 2014). Opt and Loffredo (2004) found that 35% of the sexually active participants between age of 18 and 21 use latex condom. They also found that 25% had 2-4 partners during the previous six months before the survey. Larsson and Tyde (2006) investigate the high-risk sexual behaviours of female Swedish university students, comparing the findings of their study to an older survey from 1999. The female university students in 2004 were engaging in sex with more partners than in 1999 (with a mean of 5.4 of sexual partners per respondent in 1999 versus 7.4 in 2004). They also found that they were also having more first-date intercourse without a condom (37% in 1999 and 45% in 2004). Shiferaw et al (2014) found that of the total 384 students, 60 (55%) males and 93(89.2%) females were reported inconsistent condom use in the last 6 months with participants aged between 19 and 26. Heeren (2014) study had a sample of 92 people aged 18-24 and found that 61.5% of males had multiple partners within 3 months prior data collection.

The following studies investigated the preventative behaviours amongst students below age of 29 in the USA (Opt and Loffredo, 2004; Marchand et al, 2012) and Jamaica (Norman, 2005). Opt and Loffredo (2004) found that in the USA 54.3% students said they had not been tested for HIV. Furthermore, Malerich and Clark (2004) report that within the 18-25 age group, only 21% out of the 178 sample had been tested for HIV. Those authors further comment that only 25% out of the sample of 178 students have had the HPV vaccine. Norman (2005) found that in Jamaica less than half (41.8%) of the sampled 961 students had been previously tested for HIV.

It should be noted that in this thesis the words college and university will be used interchangeably as “college” is a synonym of university used in the USA and other countries (Oxford Dictionaries, 2016).

Interventions that aim to halt the spread of STIs

“Sexual health intervention” is defined as any activity designed to improve people’s sexual health by preventing or treating STIs (Stephenson et al, 2003). These interventions fall into two categories: (i) medical interventions that aim to terminate transmission and/or acquisition of STIs through medical treatment and/or STI screening or tests; and (ii) health promotion” interventions that aim to modify high-risk sexual behaviour by increasing knowledge, developing skills, and changing attitudes (Stephenson et al, 2003). This thesis will concentrate on the latter type of intervention which is also referred to in the literature as ‘behavioural strategies’ (Coatres et al, 2008), ‘behaviour change interventions’ (Miller and Green, 2002; Michie and Abraham, 2007), ‘behavioural interventions’ (Oakley, 1995; Aral et al, 2007; Noar, 2008; Shepherd et al, 2011), or ‘behaviour interventions’ (Fishbein and Yzer, 2003). For the purposes of this thesis the term “behavioural interventions” will be used.

Behavioural interventions designed to prevent STIs aim to change people’s behaviour in order to *reduce* high-risk sexual behaviour and *increase* preventative behaviours (Aral et al, 2007). The content and duration of these interventions varies, and they can also be conducted in various locations (Coatres et al, 2008; Shepherd et al, 2011). Behavioural interventions can also target those changes on a variety of levels. They might focus on individuals, couples, families, peer groups, networks, institutions, or communities

(Coatres et al, 2008). Interventions can involve a variety of techniques and/or community normative approaches, including education, motivation, peer group, and skill building (Coatres et al, 2008). Interventions can also take different formats, such as group discussions, educational sessions, computer programmes, mass media (video, television, and newspapers/magazines), campaigns, and so on (Aral et al, 2007). Behavioural interventions can also change on a variety of levels. They might focus on individuals, couples, families, peer groups, networks, institutions, or communities (Aral et al, 2007; Coatres et al, 2008).

The goals of those interventions could include: decreasing the number of sexual partners; increasing condom use; increasing involvement in safer sexual practice; STI test-seeking behaviour and increasing the uptake of biomedical strategies that prevent transmission such as HPV vaccination (Coatres et al, 2008). In general those implementing behavioural interventions will usually attempt to modify the mediators of behavioural change such as knowledge, attitudes, social norms and beliefs, and self-efficacy (Aral et al 2007; Shepherd et al, 2011). Further details on how they might achieve the goals can be found in the next section.

How behavioural interventions might work

Usually behavioural interventions achieve their goals by fostering a behaviour change (Miller and Green, 2002). The way this behaviour change could happen has been captured by different behaviour theories. Michie et al (2014) identify 83 different behaviour theories that could be used in designing behavioural interventions. Specifically to the STI prevention field, according to Aral et al (2007) some of the well-known behaviour change theories used to prevent and control STIs include: the Health Belief Model, the Theory of Planned Behaviour, Stages of Change, Social Cognitive Theory, Social Learning Theory, Theory of Reasoned Action and Information – Motivation - Behaviour Model. The following sections contain a short explanation of each theory and present a model that combines more than one theory.

Health Belief Model (HBM)

The HBM assumes that the people's engagement in health promoting behaviour depends on their fear of a disease, their perception of the benefits of avoiding the

disease and factors influencing their decision to act (US National Institutes of Health, 2003). This theory has evolved through time and currently there are six constructs belonging to this theory that relate to the way people's decisions are influenced: perceived *susceptibility* (people's belief of people that they are at risk of contracting the disease), perceived *severity* (people's belief that the health disease could have a serious damage on their health if contracted), perceived *benefits* (people's belief that taking appropriate actions will lead to prevention for contracting the disease), perceived *barriers* (people's belief that cost of taking the action would be outweighed by the benefits), *cues to action* (exposure of people to strategies that promote the health-behaviour) and *self-efficacy* (people's belief that they are able to perform the health behaviour) (Anderson, 2004; Glanz and Viswanath, 2015). Figure 2 shows the way the model works.

Figure 2 – Health Belief Model

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Information-Motivation-Behaviour Model (IMB)

The IBM proposes that there are three determinants which lead to the performance of a certain behaviour: information, motivation and behavioural skills (Aral et al, 2007). In the field of the HIV prevention, the information component could include facts about transmission of the sexual health disease while the motivation determinant includes personal and social aspects such as personal attitude towards condom use and social support for the use of the condoms (Suls and Wallson, 2003). Finally, behavioural

skills could encompass learning how to use condoms comfortably (Suls and Wallson, 2003).

Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA)

The TPB and TRA are very similar theories with only one difference between them – the TRA includes an additional component, perceived behavioural control (US National Institute of Health, 2003). This additional component claims that people perform certain behaviour if they feel that they have a control over this particular behaviour (Anderson, 2004). The underlying concept of both theories is that people's intention of people is what primarily influences their behaviour (Madden et al, 1992). Figure 3 shows the way both the TRA and TPB work.

Figure 3 – Theory of Reasoned Action and Theory of Planned behaviour

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Stages of Change Model (SCM)

The SCM views behavioural change as a process consisting of the following stages: pre-contemplation, contemplation, preparation, action and maintenance (shown on Figure 4). Precontemplation is the stage at which the person has no intention to take an action in the next six months (Funnell and Rogers, 2011). Contemplation is a stage in which the person starts to intend to undertake an action in the next six months (US National Institutes of Health, 2003). Preparation is a stage in which the person intends to take an action within the next 30 days. Action is a stage in which the person has changed behaviour and this behaviour is consistent for less than six months while maintenance involves sustaining the behaviour for more than six months (Funnell and Rogers, 2011).

Figure 4 – Stages of Change Model*

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The model is circular, which means that people can enter the change process at any stage, return to an earlier stage, or begin the stages again (US National Institutes of Health, 2003).

Social Learning Theory (SLT) and Social Cognitive Theory (SCT)

SLT and SCT are very similar and in fact SCT is an updated version of SLT with self-efficacy as an added component (US National Institutes of Health, 2003). SCT views behaviour differently from HBM and TBP. In summary, the theory proposes that behaviour change is a process which results from mutual interplay of personal factors such as cognition, person's behaviour and social/environmental factors (Bandura, 1986).

Integrated Model of behaviour change

In the literature also contains models that try to combine theories and make a new theoretical framework. The framework of Fishbain and Yzer (2003) is shown in Figure 5 and briefly explained underneath.

Figure 5 –Integrated Model of Behaviour Change*

[The Figure originally presented here cannot be made freely available via ORA because of copyright. The figure was extracted from: Fishbain and Yzer (2003, page 167), for more details about the exact references, please, refer to bibliography]

Fishbain and Yzer (2003) argue that most behavioural change theories such as Health Belief Model, Social Cognitive Theory and Theory of Reasoned Action incorporate three crucial determinants of behavioural change: a person's *attitude* towards performing the behaviour, *perceived norms*, and *self-efficacy*. Their integrated theoretical model was developed by combining these three variables (Figure 5). According to this model there is a high probability that the person engages in certain

behaviour if she/he has: *the essential skills* to perform the behaviour, *a strong intention* to engage in the behaviour and *no environmental constraints*.

Adoption of reliable evidence to show that behavioural interventions work

Evidence-based practice (EBPI) is judged to be significant in the field of social policy and social intervention. Adoption of reliable research evidence by professionals in their practice is seen as an ethical obligation towards their patients (Gambrill, 2003). This is because seeking evidentiary support that an intervention or policy works could prevent the adoption of programmes and/or policies that do not work or which might even cause harm to individuals (Sackett, 1996; Chalmers, 2003; Stephenson et al, 2003; Newman, 2005; Chalmers, 2005; Gambrill 2012). Furthermore, having an effective intervention is important in terms of saving resources. Behavioural interventions are costly, as they may require considerable time to undertake, numerous sessions, and/or highly skilled staff (Stephenson and Imrie, 1998). Evaluating efficacy is important, as financial and temporal resources could be better spent elsewhere if these interventions are ineffective (Stephenson and Imrie, 1998). Having taken into consideration the importance of evidence-based social practice, this thesis will aim to evaluate the impact of behavioural interventions on student behaviours relating to STI prevention.

However, when evaluating the evidence it should be noted that not all evidence that shows an intervention to work gives equally trustworthy results (Newman et al, 2005). Using a high-quality research design can help to ensure that the evidence generated by the study is of also of high quality. Figure 6 shows the hierarchy of evidence, in which different research designs are ordered according to their reliability. Systematic reviews of multiple randomised controlled trials and meta-analyses were found to be the research designs that are least biased for investigating the efficacy of interventions. As such, this thesis will use systematic review of multiple randomised controlled trials as its method of evaluation and aims to evaluate the impact of behavioural interventions on changing student behaviours relating to STI prevention.

Figure 6 – Hierarchy of evidence

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Existing systematic reviews evaluating behavioural interventions

As indicated in the previous section, this thesis includes systematic reviews of randomised controlled trials (RCTs). In order to understand what is already done, previous systematic reviews of behavioural interventions were searched in the Cochrane Library, Google Scholar, Campbell Collaboration, Search Oxford Library Online (SOLO), and Centre for Reviews and Dissemination (CRD). A search was undertaken for systematic reviews of RCTs alone or combining RCTs and studies of other quasi-experimental designs. In total 13 reviews were identified that met the inclusion criteria: Van-Velthoven et al (2013); Vidanapathirana et al (2005); Bertrand et al (2006); McCoy et al (2009); Michielsen et al (2010); Negin et al (2014); Underhill et al (2007); Waish et al (2014); Wariki et al (2012); Carvalho et al (2011); Johnson et al (2008); Fua et al (2014); Shepherd et al (2011).

Type of STI

Most of the systematic reviews (9 out of 13) looked at behavioural interventions focused on HIV/AIDS: Van-Velthoven et al (2013); Vidanapathirana et al (2005); Bertrand et al (2006); McCoy et al (2009); Michielsen et al (2010); Negin et al (2014); Underhill et al (2007); Waish et al (2014); Wariki et al (2012). Two systematic reviews included behavioural interventions that targeted at all types of STIs

(Carvalho et al,2011; Johnson et al, 2008) and two systematic reviews included HPV behavioural interventions (Fua et al, 2014; Shepherd et al, 2011).

Type of behavioural intervention

The majority of the reviews (8 in total) looked at all types of behavioural interventions, at any level, using any delivery method: Carvalho et al (2011), Johnson et al (2008), McCoy et al (2009), Michielsen et al (2010), Negin et al (2014), Shepherd et al (2011), Walsh et al (2014), Wariki et al (2012). Two of those 13 looked at mass-media delivered behavioural interventions (Vidanapathirana et al (2005); Bertrand et al (2006)). The remaining three of the 13 systematic reviews looked at: educational interventions (Fua et al, 2014), specific programmes that aim to change only through promotion of abstinence (Underhill et al, 2007) and telephone-delivered behavioural interventions (Van-Velthoven et al, 2013).

Targeted population

The targeted population in the systematic reviews varied. Three of the 13 systematic reviews had no restrictions on the population and might have included students: Vidanapathirana et al (2005), Bertrand et al (2006), Fua et al (2014). The rest looked at the following populations: HIV negative people (Van-Velthoven et al, 2013); women living with HIV (Carvalho et al, 2011); men who have sex with men (Johnson et al, 2008); women and girls living in low and middle income countries (McCoy et al, 2009); young people aged 10-25 from sub-Saharan Africa (Michielsen et al, 2010); people aged 50 years and older (Negin et al, 2014); young women aged 25 or less (Shepherd et al, 2011); HIV negative people in high-income countries (Underhill et al, 2007); people diagnosed with severe mental illness (Walsh et al, 2014); sex workers and their clients in low-and middle-income countries (Wariki et al, 2012).

Study design

Three out of 13 systematic reviews included only RCTs: Carvalho et al (2011); Shepherd et al (2011); Walsh et al (2014). The remaining 10 studies included RCTs amongst other quantitative designs such as: interrupted times series (Van-Velthoven et al (2013), Vidanapathirana et al (2005); quasi-experimental design (Fua et al, 2014; McCoy et al, 2009; Underhill et al, 2007; Wariki, 2012). .

Targeted outcomes

Eight out of 13 reviews had occurrence of STIs as their targeted outcome: numbers of HIV infections (Van-Velthoven et al, 2013); acquisition of STIs (Carvalho et al, 2011); HIV incidence (McCoy et al, 2009, Michielsen et al, 2010, Walsh et al, 2014, Wariki et al 2012, Underhill et al 2007); incidence of HPV (Shepherd et al, 2011); STI incidence (Underhill et al, 2007). 11 out of 13 reviews included change in high-risk sexual behaviours as their targeted outcome: Van-Velthoven et al (2013); Bertrand et al (2006); Carvalho et al (2011); Johnson et al (2008); Negin et al (2014); McCoy (2009); Michielsen et al (2010); Shepherd et al (2011); Underhill et al (2007); Walsh et al (2014); Wariki et al (2012). Additionally, four out of 13 reviews included preventative behaviours as their targeted outcome: test-seeking behaviour (Vidanapathirana et al, 2005); HPV vaccination uptake (Fua et al, 2014); abstinence from sex (Michielsen et al, 2010); HIV testing uptake (Negin et al, 2014). Finally, 5 out of those 13 systematic reviews included mediators of behavioural change as one of their target outcomes: knowledge (Velthoven et al, 2013; Bertrand et al, 2006; Negin et al, 2014); self-efficacy (Bertrand et al, 2006); HPV vaccination attitudes and intentions (Fua et al, 2014); intention to use condoms (Michielsen et al, 2010).

Purpose and uniqueness of the systematic review in this thesis

Compared to the systematic reviews in the previous section, this thesis aims to evaluate the impact of behavioural interventions on risk-reduction behaviours aimed at targeting all STIs. It focuses specifically on university or college students below the age of 29. To the author's best knowledge no such review has been undertaken before.

Qualitative research - purpose of the focus group discussion

The systematic review in this thesis prioritises RCTs. However, one of the limitations of this approach is that it does not easily enable a nuanced understanding of people's opinions, preferences and experiences. This thesis aimed to gain understanding of university students' practical perspective in order to understand: whether the interventions identified in the systematic reviews are found to be useful by the university students in their practice setting; practical aspects of implementing behavioural interventions on STI-risk reduction within the University of Oxford. Student representatives or student supporters of organisations that are interested or involved in improving the sexual health of other university students at the University of Oxford were approached with an invitation to participate in FGDs.

The study involved three focus group discussions. FGDs have the advantage of providing data quickly and at lower cost than other qualitative methods such as interviews (Stewart et al, 2007; Morgan, 1993). A further advantage that contributed to the choice of this method is that FGDs give an in-depth view of a range of experiences and opinions of the focus group participants (Morgan, 1993; Stewart et al, 2007).

Summary of the objectives of this thesis and the methods used to achieve them

Objective 1: To evaluate the effect of behavioural interventions that aim to change university student behaviours relating to STIs. This has involved a systematic review of RCTs.

Objective 2: To understand whether the results of the systematic review are found to be applicable to the University of Oxford setting as suggested by the focus group participants.

Objective 3: To understand the process of possible implementation of sexual health interventions at Oxford as suggested by the focus group participants.

Chapter 2 – Methods

Systematic review

Inclusion and exclusion criteria

Type of participants

This systematic review focused on university settings where individuals' encounter a new social world in which the possibility of risky sexual behaviours can increase (see Background chapter). The term “university” refers to an established institution in which tertiary education is provided (Eurostat, 2015). A 2011 UNESCO report describes tertiary education as a more complex and advanced level of education in specialised fields that begins after the completion of secondary education. It could consist of an academic education; an advanced vocational or professional education such as ISCED levels 5, 6, 7 and 8; a Bachelors or Masters degree; a doctoral degree; or any equivalent advanced vocational or professional education. The duration of tertiary education usually requires 8 to 11 years of education from the beginning of ISCED level 1, which means that when the students begin tertiary education they are usually at least 17 years old (UNESCO, 2011). Thus, to be able to be included in the systematic review the studies needed to target students with minimum age of 17. Further, an upper age limit is set to be 29 years old as worldwide the prevalence of STIs is highest before the age of 29 (see Background chapter). No exclusions were made by gender, sexual orientation, racial or ethnic group or sexual history.

Type of intervention

Any type of behavioural interventions designed to prevent STIs by reducing high-risk sexual behaviours or increasing preventative behaviours of university students.

Type of study design

This systematic review seeks to evaluate the impact of behaviour interventions, and in particular their efficacy/effectiveness. When considering the efficacy/effectiveness of interventions, randomised controlled trials (RCTs) have been identified as the best possible study designs (Solomon, 2009). RCTs are judged to be the “gold standard” by

respected organisations such as the Campbell Collaboration, the Cochrane Collaboration and the RAND Corporation (Fraser et al, 2009). One of the main advantages of RCTs is that their outcomes are likely to be due to the intervention in question rather than other factors (Field and Hole, 2003). This is because randomisation protects against systematic differences between the experiment and control groups (Oakley et al, 2003). While the Cochrane Handbook recommends that quantitative systematic reviews aiming to evaluate interventions should only use RCTs, it recognises circumstances in which this is not possible: within reviews that aim to inform the design of subsequent RCTs; in cases where the intervention is extremely unlikely to be studied if an RCT design is used; or in cases where long-term and rare outcomes cannot be studied by RCTs (Higgins and Green, 2008). This thesis seeks to find out the effect of behavioural interventions that aim to change student behaviours relating to STI prevention. The immediate outcomes of these interventions can be studied by using RCTs, and this thesis does not seek to study long-term and rare outcomes, or to inform the design of subsequent RCTs. Thus, the recommendation to use only RCTs is suitable for the purpose of the systematic review in this thesis.

Types of outcomes

In order to be included in this systematic review, behavioural intervention studies must have one of two primary outcomes: either change of at least one STI risk-reduction behaviour or change in STI incidence rate. Behavioural change is measured in one of two ways: (i) by a decrease in high-risk sexual behaviours - such as but not limited to fewer unprotected sex acts, less frequent sexual intercourse, or a decrease in the number of sexual partners - or (ii) by an increase in preventative behaviours, such as an increased STI testing, increased negotiation of safe sexual practices, or increased vaccination against curable STIs such as HPV. As a secondary outcome the review includes studies that concentrate on altering one of the following mediators of behaviour change: STI knowledge, STI attitudes, STI social norms, STI beliefs and/or self-efficacy.

Exclusion criteria for screening of studies

Studies that do not fulfil the above criteria are not considered. Furthermore, studies are excluded if they:

- Concentrate on any other outcomes such as unplanned pregnancy as a result of high-risk sexual behaviour.
- Concentrate on reducing stigma or alcohol or drugs intake that leads to acquisition or transmission of STIs.
- Are not in the English language.

Time frame of the studies

No time frame restrictions have been imposed, and studies of various durations will be included. According to Higgins and Green (2008), date restrictions should be only used if there is an evidence-based argument to do so – if the specific date of the first application of a particular intervention is known, for example, or if the intervention is applied for an identifiable period of time. Since this is the first systematic review on the subject, there is no limitation in terms of time range.

Search methods for identification of studies

Electronic searches

Four different databases were searched: Embase, PsychINFO, PubMed and Medline. Embase, PubMed and Medline are suitable for inclusion, as they cover biomedical research as well as clinical medicine (Petticrew and Roberts, 2006) while PsychINFO is appropriate because it encompasses psychology and related disciplines including sociology and education (Ovid, 2016).

When designing the search strings to be used, advice about the accuracy of the search terms was sought from an experienced librarian. The ‘help’ sections of each database were also carefully read, and variety of search term combinations were tested, such as free text and controlled vocabulary (refer to the Search strings in Section A in the Appendix). This approach was taken because spending time in learning from the help menus of each data base shows how different databases work and thus, produces a more effective search (Higgins and Green, 2008; Bronson and Davis, 2011). The online databases searched produced four different search strings which were tailored to the each database technical specification. The final four search strings are presented in the Section A in the Appendix.

Searching other resources

Additional searches were conducted by: manually searching in relevant journals, contacting academics, and checking the reference lists of previously done systematic reviews, ProQuest Dissertation Abstracts and Open Gray.

When searching the reference lists in relevant literature, the method advised by Gough et al (2012) was used and reference lists were screened for relevance by title. Relevant academics that work on STI prevention were searched via Google. Five professionals were contacted via email. These practitioners were given two weeks to reply. If any professional supplied responses after the two weeks, their responses were not included in the systematic review analysis because of the time limit for this study. Moreover, in regard to the hand-search the Oxford Direct website was used to check the availability of journals (Oxford Direct, 2016). A librarian was also consulted about possible journals relevant to the topic that could be found as a hard copy in the Oxford libraries. As a result, the following journals were searched: AIDS: Education and Prevention (with issues published between 1989 and 2015 available in the library); AIDS Care (with the library housing copied from to) Journal of HIV/AIDS & Social Services (with the library housing copies from 2007 to 2009); Sexual and Reproductive Health (with issues published between 2010 January and 2014 January); and HIV & Sexual Health (with issues published from 2007 to 2012). This systematic review set out to hand search in other journals more relevant to the topic such as Journal of American College Health, alas there were no hard copies in the libraries. Reference lists of the following 13 reviews were checked: Van-Velthoven et al (2013), Vidanapathirana et al (2005), Charania et al (2011), Nababan et al (2014), Bertrand et al (2006), Carvalho et al (2011), Fua et al (2014), Johnson et al (2008), McCoy et al (2009), Michielsen et al (2010), Negin et al (2014), Shepherd et al (2011), Underhill et al (2007), Walsh et al (2014). Finally, the search string of ProQuest Dissertation Abstract can be seen in Section B in the Appendix.

Method of analysing studies

Analysis included assessing the risk of bias in the studies following the Cochrane Handbook guidance. Meta-analysis was not performed in this systematic review as in

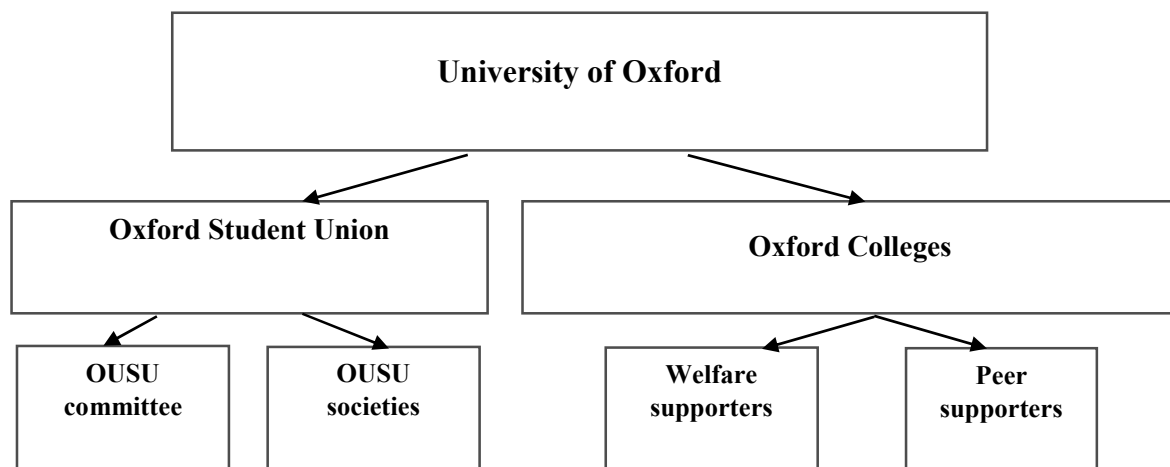
this case the treatments of the interventions were heterogeneous. They included a variety of approaches, including educational sessions, computer-based programmes, peer-led lectures, and many other formats. As Higgins and Green observe (2008), if the studies included in a review are very diverse, a meta-analysis becomes meaningless, since it is pointless to combine studies that involve different forms of treatment. Instead of meta-analysis, the systematic review summarised the effects of the studies.

Focus groups

Identification of relevant focus group participants

In order to understand the opinion of participants and for a good discussion to be fostered there has to be a good match between the researcher's and the participant's areas of interest (Morgan, 1993). Thus, potential participants were identified by searching University of Oxford websites for relevant communities/societies which have representatives and that have developed or conducted programmes aiming to prevent STIs amongst the student population, or are interested in developing or conducting programmes of this kind. Potential participants were also identified in face-to-face settings; for example, one of the websites advertised a HIV/AIDS awareness campaign at Oxford University. A variety of events were organised as part of the campaign, including educational sessions about HIV/AIDS led by NHS staff. The author attended all the events, listened carefully to speakers, and observed the student roles. This aided understanding concerning the individuals who are most suitable for inclusion in a FGDs. As a result of this participation in the campaign and the information obtained through searching the website, the following potential participants (those who could have an interest in participating in a FGDs) were identified (Figure 7).

Figure 7 – Identified potential participants in the FGDs at University of Oxford



As Figure 7 shows, at the University of Oxford organisations that care about student’s well-being or welfare fall into two categories: Oxford Student Union (OUSU) and the Oxford colleges. As part of OUSU there are student representatives at OUSU committee and at OUSU societies. OUSU societies range from cultural, social and sports clubs with some groups such as LGBT community that include a focus on sexual health. In the Oxford colleges, the welfare supporters and the peer supporters are responsible for ensuring student’s well-being. The rationale for including those students from those organisations is given in Table 1, below.

Table 1 – Type of organisation and their interests*

Name of organisation or society	Their interests
Oxford University Student Union	Supplies welfare officers at the colleges with free condoms; motivates students to seek advice on sexual health topics, organises STI testing (OUSU, 2016).
OUSU societies such as LGBTQ Society	The society is committed to providing the appropriate information and resources about STIs and ways to improve students’ sexual health (OU LGBTQ, 2016).

Welfare officers at Oxford colleges	They are responsible for talking to students about their sexual health when needed, and providing them with free condoms, when required.
Peer supporters	Their role is to listen and to support other students on any topic. They have interest in the well-being of students including their sexual health.

Recruitment of focus group participants

The recruitment process took place after the Ethics form was approved. Recruitment took place via informal messages and face-to-face informal meetings with student representatives. A formal invitation letter was emailed to each person who showed interest in participating and a written confirmation of the participation was sought. An invitation letter is presented in Section E in the Appendix. The aim was to conduct up to four FGDs, with a maximum of 10 people per session.

Conduction of the focus group discussion

The importance of using this guide when conducting a focus group lies in its functions which are: reminding the moderator about the questions that need to be asked in order to complete the research goals; ordering in a consistent way the data collection; ensuring the appropriateness of the questions being asked (Hennink, 2014). The brief guide used during the FGDs can be seen in Figure 8 below.

Figure 8 - Brief Guide of the focus group discussion

Part 1: Introduction (10 min)

- Explanation about the ethical form and allowing time for questions. Giving participants the ethics brief information sheet. Asking them to sign the form.
- Asking participants to introduce themselves.
- Introducing briefly the aim of the systematic review in this MPhil thesis and explaining why it is important.
- Explaining how important the participation of those people is and thanking them for it.
- Explaining briefly how the focus group discussion will proceed: the purpose of the cards, purpose of the additional paper (that is used for them to make brief thoughts before answering if they wish and that they will take the paper with them home).

Part 2: Presenting the seven cards with questions (60 min)

The cards included questions about the use of the result of the systematic review and their applicability at Oxford setting.

Part 3: Thank you, refreshments and goodbye (10 to 20 min)

Giving participants an information sheet of welfare organisations that could support them in case some of the information reminded them of personal issues. Remaining after the focus group for refreshments and chat was optional. The length of that refreshment/chat was subject to people's will.

As Figure 8 shows, the FGDs consisted of three parts. The first part involved a short introduction to ensure that participants understood the ethical issues. In part two of the FGDs the results of the systematic review were presented. The literature shows a variety of different techniques that could be used to conduct the focus groups (Krueger, 2000; Liamputton 2011). Since the amount of information needed to be converted within an hour, interactive cards were designed with illustrations to present the systematic review results and prompt discussion on each theme (See Section E in the Appendix). Finally, at the end of the FGDs a small non-monetary reward in the form of ice cream and chocolate was given to participants as a form of thanks for their time and participation. Including such a reward is judged to be acceptable in the academic literature (Krueger, 2000; Liamputton, 2011; Bloor 2011).

Ethical considerations

Ethical approval

Ethical approval was obtained from the Central University Research Ethics Committee (CUREC) at the University of Oxford.

Confidentiality

A major concern in FGDs is the protection of confidential information from other members within the group (Morgan, 1993). To minimise the possibility of leaks of confidential information shared in the group the researcher must ask the participants to respect the confidentiality of all group members and not to repeat what is said outside the group (Liamputton, 2011). This request was made at the beginning of the FGDs (See Figure 8 above).

Informed consent

Informed consent forms were attached to the recruitment e-mails in order to provide participants with time to decide whether they would like to participate. The participants had at least three days before the FGDs to read the form and decide whether they wished to participate or not. On the day of the workshop consent forms were reviewed and where necessary content was clarified with participants. The Informed consent form given to the participants is in the Section E in the Appendix.

Anonymity

In this FGDs there were two ethical concerns relating to anonymity – anonymity of participants and anonymity of people that participants have helped. At the beginning of the FGDs the participants in the FGDs introduced themselves (refer to Figure 8) which meant that data collected during the FGDs was not anonymised at the time. To conceal the source of this data, participants were pseudo-anonymised. For instance, the role of the student representative from the LGTB community was not disclosed neither the name nor the college of that representative. The participant was referred as LGTB1 in the text. Further, effort was made to ensure that in the course of the FGDs, no confidential information about third parties was revealed in a way that could be identifiable. At the beginning of the FGDs, participants were asked not to reveal any

identifiable information about others, a request which was also included in the Consent Form (see Section E in the Appendix). An example of how the participants could refer third parties was provided on the Ethic Consideration sheet given at the beginning of the FGDs (see Section E in the Appendix).

Dealing with possible inadvertent distress to participants

During FGDs there is a risk that friction between the participants can occur due to conflicting views (since participants come from different backgrounds) or because they may over-disclose of information which can lead to immediate distress or distress at a later stage (Liamputtong, 2011; Krueger, 2000). To reduce the risk of any possible inadvertent distress, a person who has training to listen to upset students was hired and present during the FGDs in case the students get upset/distressed and need debriefing during or after the FGDs. A further step was the provision of an information sheet for the participants that included relevant agencies and referral sources in case the focus group participant wished to discuss the issues further. In the information sheet and details about the following agencies was included: the University of Oxford counselling service; Oxfordshire Sexual Health Services; Student Advice Service.

Analysis of focus group data

Thematic analysis and coding

In general, the way the focus group data is analysed depends on the aims of the research and the structure of the FGDs (Flick, 2014). In this thesis a thematic analysis was used. Thematic analysis is a tool which generates codes and themes from qualitative data where codes are the smallest units that build up the themes (Clarke and Braun, 2016). In the case of this focus group data, thematic analysis was used to identify the patterns under each of the broader themes. There are seven broader themes, based on the topic guide: aims of the interventions, components of the interventions, duration of the intervention, delivery of the intervention, gender of the population in the interventions, sexual activity of the population in the interventions, implementation of the intervention (see Section E in the Appendix). Since those overall themes already exist for the first six cards, concept-driven coding was used to analyse them. Concept-driven coding is a method which uses pre-set codes, chosen from the topic guide (Gibbs, 2007).

For instance, in card one of the topic guide, various intervention aims presented - such as for example increase of condom use or increase of STI testing. Each of those aims was used as a code. For instance, 'increase of condom use' aim was written as a code 'CU'. In the transcript where the participants were discussing this targeted outcome the code 'CU' was written next to the relevant paragraph. Then all of the coded 'CU' paragraphs were combined to analyse and to understand: by whom that outcome was selected, whether there is a conflicting views about that intervention aim and whether there is similar pattern in the reasoning of their choice of this targeted aim. The same was done for the rest of the aims and for the remaining cards. It should be noted although the key card were presented in sequence to focus discussion on each theme, some participants raised points later in workshop that were relevant to subjects that had already been discussed so coding enabled organisation of new data. It should be further noted that the seventh card, which focused on implementation if the interventions within the University of Oxford itself differed from the rest and as such required the use of open coding. Open coding is a technique in which the text is being examined, compared and from which theoretical codes are derived (Gibbs, 2007).

Validity of the analysis

Validity refers to the accuracy of the way the phenomena under investigation is being presented (Hennink, 2014). In order to ensure the validity of the analysis, respondent validation was used. Respondent validation is a method that verifies that the investigator's interpretation of the accounts is accurate by asking the study participants to read and share their opinion about their analysed accounts (Mays and Pope, 2000). Each participant of the FGDs was sent an email with a short document with the analysis and with the participant's corresponding pseudonym. The focus group participants were given one week to voice any concerns or to make any adjustments to the document. Responses received were positive with participants finding the analysis of good quality and not making any adjustments to it.

Reliability of the analysis

Reliability refers to the ability of the research to be reproduced (Jerome and Miller, 1986). Two important aspects ensuring reliability are reflexivity of the researcher and use of quotations from the transcript (Hennik, 2014). Reflexivity is judged to be an

important aspect as it provides information of any certain characteristics that the researcher might possess which could affect the research, while quotations provide direct information from the way the participants answered the questions without the reliance of researcher's analysis (Hennik, 2014).

Reflexivity of the researcher

The author of this thesis acknowledges that his/her background, decisions and actions can have an impact on data collection, analysis and interpretation. This acknowledgment is called reflexivity (Horsburgh, 2003; Kuper et al, 2008). One way to demonstrate reflexivity is to describe the aspect of the research in which the researcher had personal involvement (Horsburgh, 2003). The research acknowledges the fact that she/he is not from the UK and has a different perspective than people in the UK which could lead to the researcher's opinion being more alike international students in the sample than UK nationals. To avoid bias in analysis or in moderating, the author has aimed to include the thoughts of all participants equally in the analysis and sought to ensure the participation of all present in the FGDs.

Quotations from the transcript

The author ensured quotations from each of the 12 participants were used at least once in the text and that the same participant was not quoted too many times.

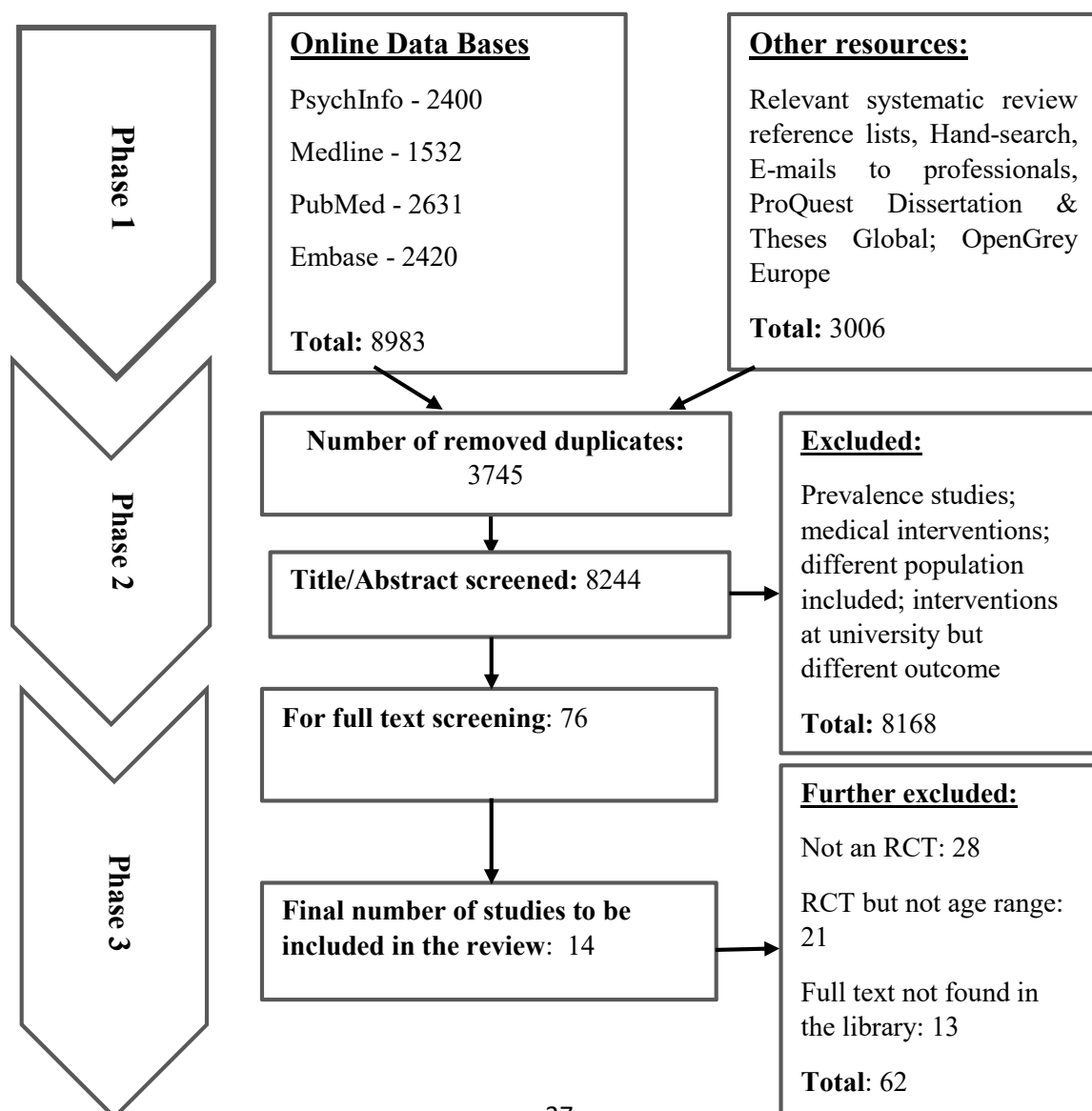
Chapter 3 - Results

Systematic Review

Results of the search for relevant studies

This section includes information about the study screening process. Figure 9 shows a diagram of the results of the search. The paragraphs underneath explain the process in detail.

Figure 9 – Flow diagram of the study search process



Phase 1: Generating total numbers of studies for screening

The initial search of online databases produced 8983 results in total (Figure 9). When broken down by individual database, these included: PsychINFO – 2400 study records; PubMed – 2631; Embase – 2420; and Medline - 1532 (Figure 9). The online database search was conducted between 1 December 2016 and 30 January 2017. In addition to searching online databases, additional searches included: systematic review of reference list searches; manual searches of hard copies of journals; email communication with professionals; searches via ProQuest Dissertation & Theses Global; and searches using OpenGrey Europe. This generated a total of 3006 studies to be screened for relevance (see Figure 9 again). Of these 3006 results, ProQuest Dissertation & Theses Global generated the highest proportion of results – 2999 studies. Reference list searching generated five results, and manual journal searches resulted in three studies. Open Grey Europe and email contact with professionals generated no results. The studies generated via these searches were downloaded and combined in EndNote.

Phase 2: Removing duplicates and screening metadata (titles and abstracts)

After combining the results of all searched studies in EndNote, 3745 duplicates were removed. The titles and abstracts of 8244 studies were screened and 8168 studies were removed. The following studies were excluded:

- Studies which focused on the prevalence or incidence of STIs
- Studies which included a medical intervention
- Studies which focused on behavioural interventions aiming to reduce STIs, but which were not targeted at university/college student populations
- Studies which included a university-based behavioural intervention, but had a different intended outcome, such as pregnancy

Phase 3: Full-text screening of studies

After removing the 8168 studies after screening titles and abstracts, the full text of 76 studies were screened. Of these 76, 13 studies were not available in Search Oxford Libraries Online (SOLO). With the help of a librarian further searching was carried out in COPAC, WorldCat, Google Scholar, and Research Gate. A few of these missing studies were located but due to limited time and financial resources it was not possible

to obtain the full text of articles and they were excluded. A further 28 studies were excluded as they were not RCTs. Moreover, 21 studies with an RCT design were excluded as the age range of the studies' participants was either unclear or unsuitable. An effort was made to trace and contact authors of studies where the age ranges was not explicit, and details were found for five authors, who were contacted. Two weeks were allowed for a response. Only two of the five authors replied, and following their responses it was clear that one of the two studies could be included based on age range suitability. In total, 14 studies were included. Characteristics of included and excluded studies can be found in the Section C of the Appendix.

Characteristics of included studies

Year of publication and publication source

The included studies were published between 1995 and 2016. Three studies were published in 2012 (Saad; Hopfer; Bulduk) and three in 2016 (Perez; Mantell; Lustria). Two studies were published in 2015 (Mortimer and Shearer) and two in 2013 (Sweeney and Mehta). The following years had one study each: 2009 (Jahanfar), 2004 (Pedlow), 2003 (Singh), and 1995 (Sikkema).

The majority of the studies (10) were published in a journal (Sikkema, 1995; Singh 2003; Jahanfar 2009; Buduk 2012; Hopfer 2012; Saad, 2012; Mortimer 2015; Perez 2016; Mantell 2016; Lutria 2016). Only 4 studies were published in ProQuest Dissertation and Abstracts, a grey literature source (Pedlow 2004; Sweeney 2013; Mehta 2013; Shearer 2015).

Country

The majority of studies (8) were conducted in the USA (Sikkema 1995; Pedlow 2004; Mehta 2009; Hopfer 2012; Sweeney 2013; Shearer 2015; Perez 2016; Lustria 2016). The rest of the studies (8) were conducted in: South Africa (Mantell 2016); Australia (Mortimer 2015); Nigeria (Saad 2012); Turkey (Bulduk 2012); Malaysia (Jahanfar 2009); and India (Singh 2003).

Participants

This subsection summarises the sample size and demographic of the participants in the studies, including gender, age, ethnicity, and SES, plus any specific exclusion criteria.

Sample size and gender

Altogether, the studies enrolled 3651 participants at baseline, of whom 2277 were females and 1374 were males. Sample sizes of the studies ranged from 55 to 1065 participants. Seven studies had samples consisting of only females (Sikkema 1995; Singh 2003; Pedlow 2004; Hopfer 2012; Sweeney 2013; Mantell 2015; Perez 2016). Six studies included both female and male participants in their sample (Jahanfar 2009; Saad 2012; Bulduk 2012; Shearer 2014; Mortimer 2015; Lustria 2016). Four of those six had a higher proportion of male participants in their samples (Jahanfar 2009; Saad 2012; Bulduk 2012; Lustria 2016) and two had more females than males (Shearer 2014; Mortimer 2015). One study included only males in their sample (Metha 2013).

Age

As indicated in the method and background sections, this systematic review looks at studies with participants in the 17-29 age range. Almost all studies (11) set a minimum age of 18 for participants (Singh 2003; Pedlow 2004; Hopfer 2012; Bulduk 2012; Sweeney 2013; Metha 2013; Shearer 2014; Mortimer 2015; Mantell 2015; Lustria 2016; Perez 2016). Two studies had a minimum age of 17 (Jahanfar 2009; Saad 2012) and one study had a minimum age of 19 (Sikkema 1995). Maximum participant age differed: it was 26 in three studies (Hopfer 2012; Perez 2016; Lustria 2016), 29 in three studies (Bulduk 2012; Sweeney 2013; Mortimer 2015), 22 in two studies (Sikkema 1995; Singh 2003), 24 in two studies (Pedlow 2004; Saad 2012), 25 in two studies (Metha 2013; Shearer 2014), 27 in one study (Jahanfar 2009), and 28 in one study (Mantell 2015).

Sexual activity and STI history

The sexual activity of the participants was reported in 9 out of 14 studies (Pedlow 2004; Hopfer 2012; Bulduk 2012; Sweeney 2013; Metha 2013; Shearer 2014; Mantell 2015;

Mortimer 2015; Lustria 2016). The majority of the participants in those studies were sexually active. In total, these studies engaged 2228 sexually active participants and 293 sexually inactive participants. Most of the studies (6 out of 9) had specified in their text that sexually inactive participants were ineligible to participate in the study, focusing their interventions solely on sexually active participants (Pedlow 2004; Bulduk 2012; Sweeney 2013; Shearer 2014; Mantell 2015; Lustria 2016). Some of these studies focused specifically on sexually active university students who are engaging in high-risk sexual behaviour (Pedlow 2004 and Mantell 2015). Three studies included both sexually active and inactive individuals (Hopfer 2012; Metha 2013; Mortimer 2015). In those studies there were fewer sexually inactive participants than sexually active participants: 20 inactive to 70 active in Metha 2013; 109 to 266 in Mortimer 2015; and 184 to 220 people in Hopfer 2012. The sexual activity of the participants was not reported in five trials (Sikkema 1996; Singh 2003; Jahanfar 2009; Saad 2012; Perez 2016).

Participants' STI history was reported in 5 out of 14 studies (Pedlow 2004; Bulduk 2012; Mantell 2015; Mortimer 2015; Perez 2016). In those studies, the majority of the participants (856 individuals) had not previously been diagnosed with an STI. Four studies note whether or not participants had had an STI without specifying the type of STI (Bulduk 2012; Mantell 2015; Mortimer 2015; Perez 2016). One study (Pedlow 2004) distinguished between participants' history of herpes, chlamydia, gonorrhoea, and HPV. Pedlow (2004) listed an "other" STI category but it was not clear to which STIs this referred.

Intervention

This subsection summarises the design, duration, delivery and specific content of the interventions in the 14 studies.

Design

The intervention designs in these studies were developed using include different strategies, such as the use of theory or theories, participant involvement, reviews of previous research, or a combination of these approaches. The use of theory was included in all of the studies, except two (Sikkema 1995; Shearer 2014). Eight studies based the design

of their intervention on a single theory (Singh 2003, Jahanfar 2009; Bulduk 2012; Saad 2012; Sweeney 2013; Mortimer 2015; Mantell 2015; Perez 2016). Four studies used an Information-Motivation-Behavioural model (IMB) (Singh 2003; Jahanfar 2009; Saad 2012; Perez 2016) while other studies used Social Learning Theory (Mantell; 2015), a Health-Belief Model (HBM) (Mortimer 2015), Social Cognitive Theory (SG) (Bulduk 2012), and theory of Planned Behaviour (Sweeney 2013). In comparison, two studies (Pedlow 2004; Hopfer 2012) used a combination of theories. Pedlow (2004) used five theories: IMB, SG, the Stages of Change model, theory of Reasoned Action, and principles of Harm Reduction. Hopfer (2012) used three theories: Culture-Centric Narrative theory, Social Cognitive Theory, and Exemplification Theory. Two studies used a combination of strategies for their design (Metha 2013; Lustria 2016). Lustria used a HBM in combination with a pre-intervention survey of students' needs and a review of previously published research. Metha used HBM in combination with a pre-intervention focus group of a university population's needs and a review of previously published research. Two studies used only participant involvement (Sikkema 1995; Shearer 2014).

From looking at the 14 studies to be included, it is evident that the theory most commonly used is IMB (featured in five studies) followed by HBM (used in three studies) and Social Cognitive Theory (also used in three studies).

Delivery

Delivery methods, where specified, varied across studies. Three trials used a computer for intervention delivery (Shearer 2014; Mortimer 2015; Lustria 2016), one study did not specify the delivery method (Singh 2003), and the rest (10 trials) featured person-delivered interventions (Sikkema 1995; Pedlow 2004; Saad 2012; Bulduk 2012; Hopfer 2012; Jahanfar 2009; Sweeney 2013; Metha 2013; Mantell 2015; Perez 2016). Of these ten trials, three were delivered by the researcher (Pedlow 2004; Sweeney 2013; Metha 2013), two were peer-led (Saad 2012; Bulduk 2012), two used a combination of different people (Jahanfar 2009; Hopfer 2012), one described the use of a female doctoral student (Sikkema 1995) and two mentioned the use of group facilitators but did not provide any details about them (Mantell 2015; Perez 2016). Of these 10 studies, six lacked reporting about the delivery process, the reasons behind the selection of

individuals for delivering the trials, and/or the recruitment and training of those individuals (Sikkema 1995; Hopfer 2012; Sweeney 2013; Metha 2013; Mantell 2015; Perez 2016). Four studies did provide some detail (Pedlow 2004; Janhanfar 2009; Saad 2012; Bulduk 2012). Saad (2012) mentioned the use of a manual, the recruitment process, and the provision of training to the peer leaders. However, the recruitment strategy was unclear. It was stated that the peer leaders were selected by asking their peers to identify the most respected individuals within the participant cohort. This poses questions about whether there was a lack of fidelity in the delivery. Bulduk (2012) described the provision of 30 hours of training to peer leaders, the use of manual by peer-leaders and supervision from authors during the delivery process which shows some consideration of fidelity when implementing the intervention. Janhanfar (2009) and Pedlow (2004) also referred to the use of an intervention manual. However, as in Saad (2012) there were no details about the selection process of the deliverers.

Intervention Components

Information about the components of the interventions was included in all but one (Saad 2012) of the papers. The main components of the remaining 13 studies fell into three categories: educational, motivational, and skill-building. These categories can also be divided into subcategories. It should be noted that interventions do not have to be singular in their approach, and many of the studies take a hybrid approach, combining two or more of the following categories.

Educational component (eleven of thirteen)

Eleven out of 13 studies included an educational component in their intervention (Sikkema 1995; Singh 2003; Pedlow 2004; Bulduk 2012; Sweeney 2013; Metha 2013; Shearer 2014; Mortimer 2015; Mantell 2015; Perez 2016; Lustria 2016).

These 11 educational interventions can be divided further into five different types of education component:

- Education about STI characteristics: 7 studies' interventions involved educating participants about the characteristics of STI(s) (Singh 2003; Bulduk 2012; Metha 2013; Shearer 2014; Mortimer 2015; Mantell 2015). Mantell 2015 and Singh 2003 shared information about HIV transmission, though Singh did not specify

which aspects of HIV transmission were used as educational material. Mortimer and Shearer both delivered information about STI prevalence. Bulduk included factual information about STI transmission. Metha's intervention involved educating participants about the negative consequences of HPV, as well as sharing statistics about HPV prevalence. Sweeney concentrated on educating participants about the importance of the asymptomatic nature of HPV.

- Education about STI testing: two studies deliver an educational component that involves educating participants about STI testing (Mortimer 2015; Sweeney 2013). Sweeney concentrated on educating participants about the importance of annual Pap tests, whilst Mortimer did not clarify which type of STI testing they were advocating (Pap tests or blood tests).
- Education about the cost HPV vaccinations and insurance options: two studies educated participants about the cost and insurance coverage of HPV vaccinations (Metha 2013; Perez 2016). Both studies shared information with participants on the various solutions for managing the cost of HPV vaccination, such as insurance coverage.
- Education relating to condoms: The only study which educated participants about where to find condoms and how to maintain condom supplies was Mantell (2015).
- Personalised educational information: Two studies offered variation in the education provided to each participant (Pedlow 2004; Lustria 2016). Both studies involved interventions tailored to participants' needs using information gathered from participants in a pre-intervention survey. Pedlow used a personalised normative feedback form to summarise the pre-intervention survey for each participant. Feedback forms showed that each participant was given positive reinforcement when their knowledge was correct, and when it was not further information was provided. For example, information given to participants could include data on the prevalence and symptoms of HPV, chlamydia, gonorrhoea, herpes, or HIV. Lustria's intervention stemmed from pre-intervention survey responses, which were analysed using computer algorithms to create a personalised educational plan for each participant. These plans comprised of messages, feedback, and images which covered a

combination of the following areas: what is an STI; common types of STIs; signs and symptoms of STIs; options for STI testing; and how to reduce sexual risk behaviours.

Of the 13 studies with educational interventions, only one could not be classified in these subcategories, as it described the implementation of 'risk behaviour education' with no clear explanation of which this might entail (Sikkema 1995).

Skill building component

Six out of thirteen studies involved an intervention that included a skill building component (Sikkema 1995; Singh 2003; Bulduk 2012; Shearer 2014; Mantell 2015; Perez 2016). This fell into four subcategories:

- Communication skills: Two trials addressed participants' communication skills (Singh 2003; Perez 2013). Perez' intervention addressed participants' ability to approach other people, such as family members, about receiving the HPV vaccine. Singh's participants were taught how to discuss safer sexual practices with their partners.
- Condom use skills: Skill building surrounding condom use was prevalent in two trials (Bulduk 2012; Shearer 2014). Bulduk used a model in which participants learned how to correctly put on condoms, whilst Shearer showed participants an instructive video concerning condom application. After the video, the participants completed exercises which required them to identify errors in condom use.
- Negotiation skills about safer sex practice: One trial aimed to develop negotiation skills for safer sex practices (Mantell 2015). Mantell aims to build participants' capacity to negotiate with their partners.
- Combination skill building: One trial took a combinational approach to their skill building interventions (Sikkema 1995). Sikkema developed participants' problem solving skills, as well as offering assertiveness training, enabling participants to refuse high-risk sexual behaviour, explain the reasons behind refusal, and suggest lower-risk alternatives. The problem-solving educational component involved participants working together to develop strategies to cope with their personal triggers that might lead to risky sexual behaviour.

Participants were then asked to put these problem solving strategies into practice as homework. Sikkema did not make it clear how long this practice component was continued, nor whether there was a follow-up discussion following participants' home practice. Assertiveness skills were developed by encouraging participants to model previously experienced sexual situations, working through role play scenarios of risky sexual behaviour. Such scenarios included sexual proposition without access to condoms.

- Personalised education - Pedlow (2004) offered training tailored to the needs of individual participants as identified in the pre-intervention survey. Participants could receive a combination of the following training: condom application; risky behaviour self-management skills; negotiation skills; sexual communication; and avoiding risky situations. Skills were developed through the use of role play scenarios, and by providing participants with feedback and support.

Motivational component

Five out of thirteen studies had a motivational component (Singh 2003; Pedlow 2004; Metha 2013; Mortimer 2015; Perez 2016). Unlike educational and skill building components, motivational intervention components cannot be divided into subcategories, as motivational components are too varied across studies. Perez 2016 intervention included motivational interviewing techniques to encourage behaviour change, and reminder tools to ensure the completion of all three doses. Mortimer's interventions included a "Book now" testing button to motivate participants to test during or after the intervention, as well as messages on the study's website that recommended screening. Singh 2003 intervention included two videos that aimed to challenge the unfavourable personal attitudes and social norms that hinder preventative practices. Metha 2013 intervention involved a discussion about the fear of vaccination and the preventative benefits it offers in order to motivate people to vaccinate. To motivate participants to complete the three vaccine doses the intervention included nine steps in which the vaccine can be taken. Pedlow 2004 intervention included a discussion about attitudes to condom use. In order to motivate participants take the precaution of using condoms, each participant was asked to list three strongly believed advantages to using condoms, and was encouraged to discuss situations from the past where she had felt most confident about practicing safer sex.

Duration

The duration of exposure to intervention was clearly reported in the majority of the studies, 10 of 14 (Sikkema 1995; Pedlow 2004; Jahanfar 2009; Saad 2012; Hopfer 2012; Bulduk 2012; Sweeney 2013; Metha 2013; Shearer 2014; Mantell 2015). Participants were exposed to just one session in three studies (Sweeney 2013; Metha 2013; Shearer 2014). The duration of this session varied; Shearer and Metha's sessions lasted two hours, whilst Sweeney's lasted one hour, and Pellow's lasted approximately an hour and a half. Six trials delivered their intervention through two or more sessions (Sikkema 1995; Saad 2012; Hopfer 2012; Bulduk 2012; Mantell 2015). Two trials delivered four sessions of various duration (Sikkema 1995; Saad 2012). Sikkema's sessions ranged from 75 to 90 minutes in length, and were conducted over four weeks (one session per week). Saad's interventions were delivered in 2-hour sessions, with 30 minutes' break between each session. Saad also reported an additional 4-hour booster session which was delivered 3 months after the intervention to remind the participants about the intervention content.

There was more variation in the rest of the trials in terms of intervention quantity and duration: Mantel's two intervention sessions lasted 4-5 hours; Baldur's three sessions were approximately 3.5 hours in duration. Hopfer offered different quantities and duration of sessions according to the tailored intervention responses: peer-only intervention consisted of one session, which comprised two videos of 3 min 46 and 3 min 39 duration; expert-only intervention session lasted 1 min 25 sec, and combined peer and expert intervention session comprised two videos of 1 min 11sec and 4 min 15 sec duration. Four trials did not give clear details about duration or quantity of intervention session offered to participants (Singh 2003; Mortimer 2015; Perez 2016; Lustria 2016). Perez mentions a single session, but the length of this session is unknown. Lustria states that the participants were encouraged to look at the website for at least 10 minutes, although the actual length of time that each student dedicated to this activity is unknown. Singh mentions three sessions, but the duration of these is unknown. Mortimer's intervention description was the most unclear of all: it simply said that the length of time varied according to the date of recruitment.

Control intervention

The effectiveness of the intervention was evaluated by comparing it to a control intervention in 9 out of 14 studies (Sikkema 1995 ; Pedlow 2004; Jahanfar 2009; Saad 2012 ; Metha 2013; Sweeney 2013; Mantell 2015; Perez 2016; Lustria 2016). One study did not have a control intervention (Bulduk 2012). The intervention it proposed was evaluated by comparing intervention participants with no-treatment control. In one trial the proposed intervention was evaluated by comparing it to two control interventions, and to a no-treatment control (Hopfer 2012). In Hopfer's study the participants received one of three options: an informational video; a website including information about HPV; and no intervention. Two studies gave no details about control interventions (Singh 2003; Mortimer 2015), and in one study a waitlist control group was used (Shearer 2014).

In all nine studies that featured a control intervention, one randomised arm was included. In six of those nine trials the control condition took the form of an alternative intervention (Sikkema 1995; Pedlow 2004; Metha 2013; Mantell 2015; Lustria 2016; Perez 2016). In the remaining three studies the control condition took the form of placebo intervention (Jahanfar 2009; Saad 2012; Sweeney 2013). In Perez (2016) the alternative intervention consisted of a brief overview of HPV and women's health in general. In Mantell (2015) the alternative intervention included the following aspects: information about HIV transmission; the importance of using barrier methods; information about condom use; and a brief overview of the female reproductive system. Lustria included a non-tailored educational website with information extracted from the Center for Disease Control and Prevention as a control intervention. In Metha (2013) the control included traditional knowledge-based intervention. Sikkema's control intervention was purely education-based, with no behavioural procedures for actual training and practice of skills as compared to the intervention being evaluated. In Pedlow (2004) the control intervention consisted solely of an informative video. Of the trials which included a placebo as the control, Saad and Jahanfar's placebos consisted of information about career development, whilst in Sweeney (2013) a YouTube video about study skills was used as a placebo.

Targeted outcomes

The Characteristics of Included Studies Table shows all targeted outcomes of all studies (see Section C in the Appendix). It should be noted that some outcomes such as HIV stigma were not the focus of this review and as such have not been reported upon. In some studies reporting about the meaning of outcomes was unclear: in the interventions of Jahanfar (2009) behavioural change was a targeted outcome, and a behaviour score was calculated; however, it is unclear how exactly this score was calculated.

STI incidence

In one study STI incidence as a targeted outcome was measured according to participants who self-reported as having been diagnosed with an STI in the previous 2 months (Pedlow 2004)

STI risk-reduction behaviour

Seven of the 14 studies aimed to reduce high-risk sexual behaviours, measuring their outcomes through participant self-reporting (Sikkema 1995; Pedlow 2004; Jahanfar 2009; Saad 2012; Bulduk 2012; Shearer 2015; Mantell 2015). Further, out of the 14 trials, six studies aimed at increasing preventative behaviours among their participants (Sikkema 1995; Pedlow 2004; Hopfer 2012; Bulduk 2012; Mortimer 2015; Lustria 2016).

Mediators of behaviour change

An increase of knowledge was a target outcome in 11 out of 14 trials (Sikkema 1995; Singh 2003; Pedlow 2004; Saad 2012; Bulduk 2012; Hopfer 2012; Jahanfar 2009; Sweeney 2013; Metha 2013; Shearer 2015; Perez 2016). Further, improving attitudes towards condom use was a target outcome in 3 of the 14 studies (Pedlow 2004; Shearer 2015; Mantell 2015). Studies also aimed to improve attitudes to the following issues: vaccination (Perez 2016); STI testing (Mortimer 2015); STI prevention (Saad 2012); safe sex (Jahanfar 2009); and HPV prevention (Sweeney 2013). Further, some studies targeted participant intention relating to specific areas: condom use (Shearer 2014; Mantell 2015); undergoing STI testing (Mortimer 2015; Lustria 2016); safe sex behaviours in general (Singh 2003; Pedlow 2004; Sweeney 2013); and undergoing vaccination (Hopfer 2012; Metha 2013; Perez 2016). Moreover, five of the 14 studies

aimed to alter norms. Only two of those five studies specify what types of norms were targeted (Mantell 2015; Perez 2016). Perez sought to increase the social norms for undergoing vaccination, whilst Mantel targeted peer norms for condom use. Further, self-efficacy of condom use was looked at in three studies (Metha 2013; Shearer 2015; Mantel 2015). Self-efficacy relating to specific STI vaccinations was a target outcome in four studies: HPV vaccination (Hopfer 2012; Perez 2016); and HIV vaccination (Sikkema 1995; Singh 2003). Finally, four out of 14 studies sought to improve participants' perceived risk of acquiring STIs. One of these four studies aimed at increasing participants' perceived risk of acquiring all STIs (Lustria 2016). Two of these four studies targeted the perceived risk of acquiring specific STIs (Mantell 2015 and Metha 2013). Mantell 2015 targeted HIV while Metha 2013 targeted HPV. One study of these four aimed to increase perceived risk of cervical cancer (Perez 2016).

Data collection and assessment times

Thirteen out of 14 trials used a survey to collect their data. Mantell's 2015 study is the only trial that used interviews for data collection. The assessment times during which data was collected varied across all the studies, but can be classified as either immediate post-intervention assessment, first follow-up assessment, or second follow-up assessment.

Immediate post-test assessment featured in 8 out of 14 studies (Sikkema 1995; Pedlow 2004; Saad 2012; Bulduk 2012; Jahanfar 2009; Sweeney 2013; Lustria 2016; Perez 2016). Two trials used only an immediate post-test assessment with no follow-up (Jahanfar 2009; Lustria 2016).

First follow-up assessment was present in 12 out of 14 studies (Sikkema 1995; Singh 2003; Pedlow 2004; Saad 2012; Bulduk 2012; Hopfer 2012; Sweeney 2013; Metha 2013; Shearer 2015; Mantell 2015; Mortimer 2015; Perez 2016). Five of those 12 trials held their follow-up assessments after one month (Sikkema 1995; Singh 2003; Sweeney 2013; Shearer 2015; Perez 2016). Two trials assessed participant outcomes after two months (Pedlow 2004; Hopfer 2012); two after 3 months (Bulduk 2012; Saad 2012) and one trial after two and a half months (Mantell 2015). In two studies it was unclear when the follow-up assessment took place (Metha 2013; Mortimer 2015). Mortimer states that the follow-up assessment was conducted in October without mentioning in which

month the intervention had been completed, while Metha stated that the follow-up assessments occurred between one and three months after the initial intervention.

Three studies included second follow-up assessments (Saad 2012; Bulduk 2012; Mantell 2015). Bulduk and Saad's studies assessed patient outcomes 6 months after the initial intervention, whilst Mantell made a secondary follow-up assessment 5 months after the initial intervention.

Risk of bias of included studies

The risk of bias is an important aspect since it shows the extent to which the results of the effect of the interventions are believable (Higgins and Green, 2008). This review followed the guidance outlined in chapter 8 of the Cochrane Handbook, and by using Review Manager 5.3 (RevMan). The types of bias that were investigated in this evaluation are: selection bias; performance bias; detection bias; attrition bias; reporting bias; and bias of imbalances between groups at baseline. The RevMan tables which give details about the reasons behind the judgement of each risk of bias are presented in the Section F in the Appendix.

The overall bias risk across all 14 studies is shown in Figure 10, whilst Figure 11 breaks down the different bias risks in each study. Figure 10 shows that the studies that used allocation concealment, a measure for preventing selection bias, showed an unclear risk of bias in the vast majority of cases (95%), largely on account of limitations in their reporting style. Figure 11 illustrates that Singh 2003 is the only study for which it was impossible to evaluate any kinds of risk bias due to a lack of reporting; due to the time constraints of this review, Singh could not be contacted for further details about their study.

The following subsections discuss in more detail the different types of bias present across the 14 studies.

Selection bias

Figure 10 shows that the studies which used sequence generation presented a low overall risk of bias (64% of the studies). Nine of the studies which used sequence generation presented a lower risk of bias: Pedlow 2004; Jahanfar 2009; Saad 2012;

Bulduk 2012; Hopfer 2012; Metha 2013; Mortimer 2015; and Lustria 2016 (Figure 11). Sequence generation in the studies was conducted in a number of different ways, including lottery sampling (Bulduk 2012), random number generation (Hopfer 2012; Mortimer 2015), computer algorithms (Shearer 2015; Lustria 2016), software generation (Metha 2013), computerised random generation (Jahanfar 2009; Saad 2012; Mortimer 2015), and using a random number table (Pedlow 2004).

The overall risk of bias in studies using allocation concealment was unclear due to limitations in reporting; 92% of the studies did not specify how their allocation concealment procedure would be conducted (Figure 10). The only study that gave details on allocation concealment was Mortimer 2015, which used web-based central allocation (Figure 11).

Figure 10 – Overall risk of bias of included studies

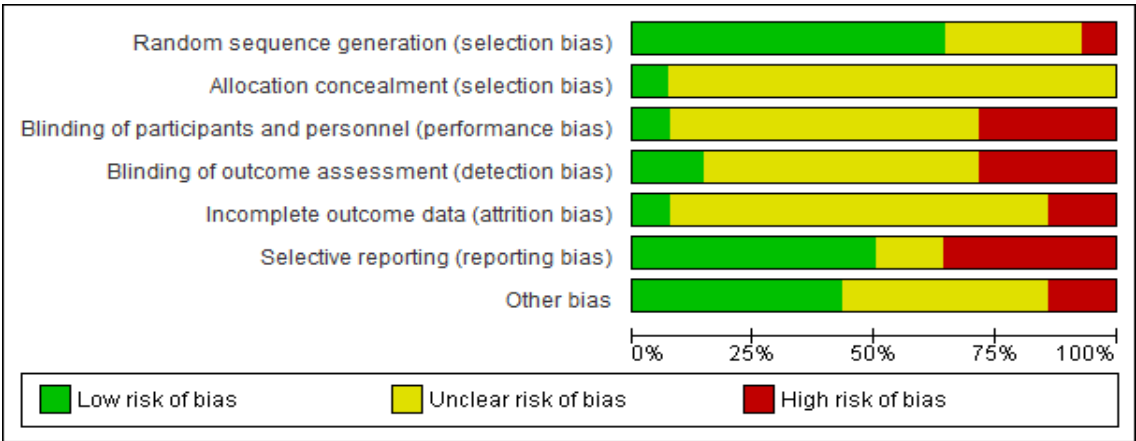


Figure 11 – Risk of bias in each of the include studies

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Bulduk 2012	+	?	?	-	?	+	?
Hopfer 2012	+	?	?	?	?	-	+
Jahanfar 2009	+	?	?	?	?	+	?
Lustria 2016	+	?	+	?	?	+	?
Mantell 2015	?	?	-	+	?	+	+
Metha 2013	+	?	?	-	-	?	-
Mortimer 2015	+	+	-	+	?	-	?
Pedlow 2004	+	?	-	-	+	-	+
Perez 2016	-	?	?	?	?	+	+
Saad 2012	+	?	?	?	?	+	+
Shearer E 2015	+	?	?	?	-	-	+
Sikkema et al 1995	?	?	-	?	?	-	-
Singh 2003	?	?	?	?	?	?	?
Sweeny 2014	?	?	?	-	?	+	?

Performance bias

In total, 64% of the studies presented an unclear risk of performance bias (Figure 10). This unclear risk of performance bias occurs in nine studies: Singh 2003; Jahanfar 2009; Saad 2012; Bulduk 2012; Hopfer 2012; Sweeney 2013; Metha 2013; Shearer 2015; and Perez 2016 (Figure 11). A low risk of performance bias was present in Lustria (2016), in which the participants were blinded to their allocation and the intervention was delivered via a computer rather than through personnel. A high risk of performance bias was present in four studies (Sikkema 1995; Pedlow 2004; Mortimer 2015; Mantell 2015). In Mantell (2015) and Sikkema (1995) the intervention facilitators were not

blinded to participants' conditions, and were aware of which interventions (control or experimental) they were delivering to whom. This was particularly evident in Sikkema (1995), in which the same facilitator was responsible for delivering both the control and the experimental interventions. In Mortimer (2015) and Pedlow 2004 the participants were not blinded to their condition. Pedlow (2004) specifically told the participants about their condition upon their arrival at the intervention appointment.

Detection bias

78% of the studies covered in this review presented an unclear risk of detection bias: Sikkema 1995; Singh 2003; Jahanfar 2009; Saad 2012; Bulduk 2012; Hopfer 2012; Sweeney 2013; Shearer 2015; Mantell 2015; Lustria 2016; and Perez 2016 (Figure 11). Three studies showed a high risk of detection bias: Pedlow 2004, Bulduk 2012, and Metha 2013. In Bulduk's (2012) study the authors were aware of the participant conditions as they supervised the delivery process, whilst in Metha (2013) and Pedlow (2004) the same researcher was responsible for delivering both the experimental and control interventions. Only Mortimer (2015) presented a low risk of detection bias, wherein the researchers were blinded to the participant's allocation.

Attrition bias

Overall, 78% of the trials presented an unclear risk of attrition bias due to a lack of reporting (Figure 10) and these are: Sikkema 1995; Singh 2003; Jahanfar 2009; Saad 2012; Bulduk 2012; Hopfer 2012; Sweeney 2013; Mantell 2015; Mortimer 2015; Lustria 2016; and Perez 2016 (Figure 11). A high risk of attrition bias was found in one study: Metha (2013) saw a large difference in the proportion of missing data between the experimental and control groups. In experimental group 22.2% of data was missing, while in control group it was 13.3%. The author did not conduct any attrition analysis, and concluded that the attrition had had a significant effect on the results. Low risk of attrition bias was present in Pedlow (2004) and Shearer (2015). In Pedlow (2004) the attrition rate was low at only 5%, while in Shearer (2015) an attrition analysis was conducted showing that there was no statistically significant difference between those who completed the follow-up assessment and those who did not.

Reporting bias

Overall, 50% of the studies presented a low risk of reporting bias (Jahanfar 2009; Saad 2012; Bulduk 2012; Sweeney 2013; Mantell 2015; Lustria 2016; Perez 2016) (Figure 10; Figure 11). 42% of the studies had a high risk of reporting bias (Sikkema 1995; Pedlow 2004; Hopfer 2012; Shearer 2015; Mortimer 2015) (Figure 10; Figure 11). 8% of the studies presented an unclear risk of reporting bias (Singh 2003 and Metha 2013), as they did not specify their target outcomes in their methods sections.

Bias of imbalances between groups at baseline

Imbalances of trial groups at baseline are also included as a potential bias risk in this review, and is presented in Figures 10 and 11 as “other risk of bias”. It is a type of bias risk that is crucial for evaluation, as it increases the risk of selection bias (Green and Higgins, 2008). Overall, the bias risk of imbalance between groups at baseline was unclear in 50% of the studies (Sikkema 1995; Singh 2003; Jahanfar 2009; Bulduk 2012; Sweeney 2013; Mortimer 2015; Lustria 2016) (Figure 10; Figure 11). There was a low risk of bias of imbalance of trial groups at baseline in 42% of the studies (Pedlow 2004; Saad 2012; Hopfer 2012; Shearer 2015; Mantell 2015; Perez 2016) (Figure 10; Figure 11). Only one study presented a high risk of this type of bias; in Metha 2013 there was a difference at baseline between scores for perceived benefits and perceived barriers respectively, and it was not discussed how these were dealt with statistically.

Effect of interventions

As noted in the Methods chapter, a meta-analysis was not possible due to the heterogeneity of the interventions. The following subsections present the interventions' effects on outcomes where these were clearly reported. As the previous section makes clear, 42% of the studies had a high risk of reporting bias (Sikkema 1995; Pedlow 2004; Hopfer 2012; Shearer 2015; Mortimer 2015). This makes it impossible to ascertain whether there was an effect on all targeted outcomes in those 5 studies. Thus, the following subsections summarise the main results from the available information for those five studies and the remaining nine studies. The Summary of Findings table in

Section D in the Appendix provides a comprehensive summary of all effects of the interventions on all outcomes at post-test and where reported, at follow-up.

STI incidence

I think this could be expressed as ‘There was no evidence of the effectiveness of the IMB intervention reported in Peldow (2004) on STI incidence rates at two month follow up. No significant between-group differences were found between the intervention and control groups ($p=0.73$).

STI risk reduction behaviour

STI risk reduction behaviour has been split into the two following subcategories: effect on high-risk sexual behaviours; and effect on preventative behaviours.

Effect on high-risk sexual behaviours

The effect on high-risk sexual behaviours was measured in the studies either by having one single summative indicator for high-risk sexual behaviour or by measuring the effect of the intervention on individual high-risk sexual behaviours.

Effect on summative indicator of high-risk sexual behaviours was evident in one study, Saad (2012). The peer-led intervention of this study achieved a decrease in high-risk sexual behaviour. When compared to the control group, the intervention group showed lower engagement in high-risk sex than the control group, both at first follow up (3 months after) and second follow up (6 months after). At first follow-up the intervention group had a mean (M) of 0.2 compared to the control group $M=1.49$. At second follow up the intervention group had $M=0.2$ compared to the control group $M=1.47$. It should be noted that at second follow up the intervention group maintained the same level of engagement in high-risk sexual behaviour ($M=0.2$). In comparison, changes in high-risk sexual behaviour did not occur in the peer-led intervention of Jahanfar (2009). There was no statistically significant difference in safe sex behaviours between the intervention group and control group at post-test ($p=0.530$).

The following subsections show the effect of the interventions on two specific high-risk sexual behaviours: condom use and number of sexual partners.

Condom use

The studies measured either the number of protected acts with condoms or the number of unprotected acts or both. The following subcategories emerged from the results of the studies: condom protected acts or condom unprotected acts.

Condom-protected acts

Bulduk 2012 examined the effect of their peer-led intervention on condom protected acts.

An effect on condom use during vaginal, oral, and anal sex was achieved at first follow-up. Condom use during vaginal intercourse increased in the intervention group from M=1.31 to M=2.44, while in the control group it decreased from M=1.37 to M=1.20. Condom use during oral intercourse increased in the intervention group from M=1.75 to M=2.66 while it decreased in the control group from M=1.92 to M=1.78. Condom use during anal intercourse increased in intervention group from M=1.27 to M=1.42 and decreased in control group from M=1.39 to M=1.27.

From first follow-up to second follow-up the M scores of the intervention group in condom-protected oral and anal intercourse continued to increase and the M scores in the control group continued to decrease. However, in both the intervention group and the control group there was an increase in M for condom-protected vaginal intercourse.

Mantell (2015) examined the effect of the intervention on female condom (FC)-protected vaginal intercourse. Contrary to what might be expected, the use of FCs in the control group increased steeply (136 times) between baseline and 2.5-month follow-up but only 16.8 times in the intervention group. There was no statistical difference or greater effect found in the number of female condoms used (p-value for interaction between time and intervention =0.06).

Condom unprotected acts

In Sikkema (1995) the outcome of decreased oral sex without condom protection was found from baseline to post-test. In the intervention group this changed from M=0.60 to

M=0.05 from baseline to post-test compared to the control group's decrease from M=0.95 to M=0. However, data shows that this decrease was not maintained at follow-up for the intervention and that there was in fact an increase in oral sex not protected by a condom in the intervention group (refer to Summary of Findings Table in the Appendix).

Pedlow (2004) found no effect for the intervention on unprotected vaginal sex. Observing the results from baseline to follow-up, a greater decrease is observed in the control group than the intervention group: the intervention group saw a decrease from M=9.2 to M=8, whilst the control group exhibited a decrease from M=14.7 to M=10.6. By way of comparison, Mantell (2015) reported an effect favouring the intervention for this outcome. There was a statistically significant reduction of unprotected vaginal sex from baseline to first follow-up and from baseline to second follow-up. In particular, rates of unprotected vaginal sex in the intervention group were 0.53 times lower from baseline to first follow up ($p=0.02$), and 0.42 times lower in the control group ($p<0.0001$). At the second follow up rates were 0.39 times lower in the intervention group ($p<0.0001$) and 0.40 times lower in the control group with $p<0.001$.

Number of sexual partners

In Bulduk (2012) the number of participants' sexual partners decreased in both control and intervention groups both from baseline to first follow-up and from first follow-up to second follow-up. The decrease from baseline to first follow up was M=2.56 to M=2.47 in the control group, and in the intervention group the decrease was M=3.61 to M=3.34. The decrease from baseline to second follow-up was M=2.47 to M=2.29 in the control group, and M=3.34 to M=3.19 in the intervention group. The control group showed a higher decrease in absolute terms, suggesting that the intervention had a limited effect on the number of participant's sexual partners. As a point of comparison, the reduction in the number of sexual partners in Pedlow (2004) showed a decrease in both the intervention and control groups from baseline to post-test, with the intervention group showing a decrease from M=1.6 to M=1.1 and the control group showing a decrease from M=1.4 to M=1.2.

Effect on preventative behaviours

The effect of the interventions on the following preventative behaviours was examined in the studies: communication with partner about STIs, communication with partner about condom use, abstinence from sex, testing for STIs and HPV vaccine uptake.

Communication with partner about STIs

In Bulduk 2012, a slight increase in participants' ability to ask potential sexual partners STI-related questions was found in the intervention group compared to the control group from first follow-up to second follow-up. From first follow up to second follow up a decrease is apparent in the control group - $M=14.59$ to $M=14.71$ while the intervention group saw a slight increase from $M=14.61$ to $M=14.64$. However, from baseline to first follow-up both groups saw a decrease ($M=15.47$ to $M=14.61$ in the intervention group, and $M=15.80$ to $M=14.59$ in the control group). Further, a negative change in communication about STIs was evident in Pedlow 2004. From baseline to first follow-up there was a decrease of communication in the intervention group (from 41% to 33%) and in the control group (from 29% to 25%).

Communication with partner about condom use

Communication with partner about condom use was positively impacted in Bulduk (2012). From baseline to first follow-up there was a greater increase in this outcome in intervention group ($M=2.27$ to $M=3.66$) compared to control group ($M=2.22$ to $M=2.32$). From first follow-up to second follow-up there was an increase only in intervention group (from $M=3.66$ to $M=3.97$) while the control group showed a decrease ($M=2.32$ to $M=2.29$).

Abstinence from sex

An increase in abstinence from sex was achieved in Bulduk (2012). There was a decrease in abstinence found in the control group from $M=34.05$ to $M=31.68$, whereas the intervention group saw an increase in abstention from $M=34.29$ to $M=45.90$. However, at second follow-up there was decreased abstinence in the intervention group ($M=45.90$ to $M=45.88$) and increased abstinence in the control group ($M=31.68$ to $M=33.12$).

Testing for STIs

Lustria (2016) measures the testing for STIs by looking at the percentage of STI test ordered. An increase in STI test ordering was higher at the post-test stage – 27% of the intervention group ordered a test kit compared with 20% of the control group. In comparison Pedlow (2004) measured the testing for STIs by looking at the number of people who reported being tested in the previous two months. This intervention showed no effect and in fact showed decline in testing for STIs from baseline to follow up, from 17 people to 13 people in the intervention group, while testing increased from 13 to 16 people in the control group.

HPV vaccine uptake

Perez (2016), measured the vaccine uptake by looking at the number of people who sought to vaccinate for HPV. The results showed that HPV vaccine-seeking behaviour had no significant differences at 1-month follow up ($p=0.89$). Hopfer (2012) measured the number of people who were vaccinated. This study found a statistically significant effect showing that at first follow up in the peer-expert intervention group (22%) there was higher percentage of participants vaccinated than in the control group (12%). This difference was statistically significant: $\chi^2(3, 404)=8.6, p<.035$.

Mediators of behaviour change

The mediators of behaviour change that were examined in the studies are: knowledge, attitude, intention, norms, self-efficacy, perceived risk. The effect of the interventions on those outcomes is summarised in the below subsection.

Knowledge

STI knowledge

Saad's (2012) reported a positive effect favouring the intervention in terms of STI knowledge. STI knowledge increased post-test for the intervention group ($M=19.25$) compared to the control group ($M=8.65$). At first follow up M was higher in intervention group ($M=18.09$) compared to the control group ($M=9.29$). M was also higher in intervention group at second follow up ($M=21.95$) compared to the control group ($M=10.37$). In Pedlow (2004) there was also an effect favouring the intervention on STI knowledge, with greater increase in the intervention group than the control

group at post-test (intervention M=13.2 to M=22.0; control group M=13.2 to M=16.6). However, this effect was not sustained at follow up. A decrease in STI knowledge was found in both the intervention and control group between post-test and first follow up (M=22.0 to M=19.6) as well as in the control group (M=16.6 to M=15.5).

HIV/AIDS knowledge

Saad (2012) showed that the intervention was effective. It was found higher HIV/AIDS knowledge in the intervention group than the control group: at post-test intervention group was M=30.20 compared to control group, M=22.69; at first follow up intervention group was M=28.68 compared to control group, M=23.10; at second follow up intervention group was M=32.27 compared to control group, M=24.02. In Pedlow (2004), a greater absolute increase was observed from baseline to post-test in the intervention group (M=37.5 to M=42.6) than the control group (M=38.1 to M=39). However, from post-test to first follow up M decreased in the intervention group (M=42.6 to M=41.8) and increased in the control group (M=39 to M=39.1). Moreover, the results of Bulduk (2012) show the following trends in HIV/AIDS knowledge: from baseline to first follow up increases were seen in the control group (M=9.27 to M=9.53) and the intervention group (M=9.53 to M=14.18); from first follow up to second follow up a decrease was found in the intervention group (M=14.18 to M=13.7) and an increase in control group (M=36.63 to M=37.59). Jahanfar (2009) also featured HIV/AIDS knowledge as a target outcome, finding a significant difference post-test between the intervention group and the control group ($p=0.001$), with an increase of M in both the intervention group (M=24.74 to M=30.7) and the control group (from M=24.39 to M=25.40). Another study with HIV/AIDS knowledge as an outcome is Singh (2003), which showed an increase in the intervention group (M=33.87 to 44.57) and a decrease in control group (M=33.68 to M=33.40) from baseline to first follow up. Finally, the HIV/AIDS knowledge outcome in Sikkema (1995) saw significantly higher post-test scores in the intervention group than the control group ($F=5.36$; $p<0.03$). The M values from pre- to post-test for the intervention group were M=13.95 and M=18.95, and M=11.90 and M=16.90 for the control group. No significant difference in values is seen at first follow up. From post-test to first follow up the intervention group shows a decrease (M=18.95 to 18.89) while the control group

increased slightly from M=16.69 to 17.26. However, M remained higher for the intervention group.

HPV knowledge

Metha (2013) reported a slight increase on HPV knowledge for the control group from baseline to post-test: M=4.73 to 4.78 (6%), compared to the intervention group's increase from M=4.67 to M=5.2 (11.35%). From post-test to first follow up there was a larger decrease in the control group than the intervention group (M=4.78 to M=4.33 [9.41%] compared to M=5.20 to M=4.90 [5.76%]). Sweeney (2013) also measured changes in HPV knowledge as an outcome: from baseline to post-test there was an increase in the intervention group (M=1.54 to 1.87) no change in the control group (M=1.55 on both occasions). From post-test to first follow up the intervention group showed a decrease from M=1.87 to 1.77, while the control group showed an increase from M=1.55 to 1.57. The data for HPV vaccine knowledge in Perez 2016 shows an increase for both the intervention group and the control group with insignificance (p=0.99). The results from post-test to first follow up show an increase for the intervention group only (p=0.04) and a decrease for the control group.

Attitude

Studies measured either: partner's perceived attitude towards male or female condom use; personal attitude towards condom use; attitude towards vaccination; attitude towards being tested; attitude towards STI prevention; attitudes towards safe sex; attitudes towards HPV prevention.

Partner's perceived attitude towards male or female condom use

In Mantell (2015) the partner's perceived attitude toward male condom use increased from baseline to first follow up in both the control group (0.4 times; $p < 0.01$) and the intervention group (0.34 times; $p = 0.01$), and also from baseline to second follow up in the control group (0.41 times; $p < 0.001$) and the intervention group (0.23 times; $p = 0.1$). In the same study the partner's perceived attitude towards female condom use increased from baseline to first follow up in both the control group (0.25 times, $p = 0.05$) and the

intervention group (0.27 times, $p=0.03$), as well as from baseline to second follow up in both groups (control group, 0.21 times, $p=0.10$; intervention group 0.31 times, $p=0.02$).

Personal attitude towards condom use

In Pedlow (2004) an increase in personal attitudes towards condom use was found at baseline to post-test in both groups (intervention group: $M=128.6$ to 131 ; control group: $M=126.5$ to 132.4). From post-test to first follow up a decrease was seen in both groups (intervention group: $M=131.0$ to 130.9 ; control group: $M=132.4$ to 128.5).

Attitude towards vaccination

Regarding attitude towards vaccination, Perez (2016) reported an increase from baseline to post-test in the intervention group with $p < 0.01$, compared to the control group where no significant change was observed. From post-test to first follow up the data showed a decrease in the intervention group with $p=0.02$ compared to the control group which showed no significant change from baseline to post-test.

Attitude towards being tested

Mortimer (2015) stated that attitude towards being tested was significantly more positive in the intervention group with $p=0.25$.

Attitude towards STI prevention

Regarding participant attitudes towards STI prevention, in Saad (2012), M was reported to be higher at all three stages for the intervention group as compared to the control group: at post-test for intervention group $M=54.13$ versus control group $M=45.31$; at first follow up for intervention group $M=54.04$ versus control group $M=45.50$; at second follow up intervention group $M=58.89$ versus for control group $M=46.23$.

Attitudes towards safe sex

Attitudes towards safe sex are discussed as an outcome in Jahanfar (2009). The results show a significant difference between both groups at post-test ($p=0.01$), with M increasing for the intervention group from $M=9.42$ to $M=9.47$.

Attitudes towards HPV prevention

Sweeney (2013) reported increases in attitudes towards HPV prevention from baseline to post-test in both groups (intervention group M=1.78 to 1.9, 6.74%; control group M=1.83 to 1.86, 1.63%). The trends in the intervention group and control group are different from post-test to first follow up: a decrease from M=1.90 to M=1.86 is present in the intervention group compared with a slight increase from M=1.86 to M=1.87 in the control group.

Intention

Studies measured either: female condom use intention, STI testing intention, future risk-reduction behaviour intention or HPV vaccination intention.

Female condom use intention

Mantell (2015) found that from baseline to first follow up there was an increase in both control groups in terms of intended female condom use (control group 0.49 times, $p < 0.0001$; intervention group 0.54 times, $p < 0.0001$). There was also an increase from baseline to second follow up in both groups (control group 0.18 times, $p = 0.10$; intervention group 0.48 times, $p < 0.0001$).

STI testing intention

Mortimer (2015) found significantly greater intentions to undergo STI testing at follow up in the intervention group ($p = 0.009$) compared to the control group.

Future risk-reduction behaviour intentions

Regarding future risk-reduction behaviour intentions, Singh (2003) found a decrease in both the intervention group (M=23.45 to 13.52) and the control group (M=22.80 to 22.62) from baseline to first follow up. Future risk-reduction behaviour intention was also an outcome in Pedlow's (2004) study. From baseline to post-test, an increase was reported in both the intervention group (M=37.9 to M=39.3, 3.69%) and the control group (M=37.6 to 38.2, 1.60%).

According to Sweeney (2013) the future risk-reduction intentions from baseline to post-test saw an increase in both groups (intervention group M=1.33 to 1.67; control group

M=1.32 to 1.33), while post-test to first follow up saw a decrease in both groups (intervention group M=1.67 to 1.44; control group M=1.33 to 1.24).

HPV vaccination intention

Metha (2013)'s data relating to HPV vaccination intention showed an increase from baseline to post-test in both the control and intervention groups (control group M=2.28 to 2.27; intervention group M=2.16 to M=2.78). From post-test to first follow up, a decrease was seen in both groups as well (control group M=2.27 to 1.67; intervention group M=2.78 to M=2.70). Further, Hopfer (2012) provides data for HPV vaccination intention outcome. At first follow up the peer-expert intervention group was twice as likely to vaccinate compared to members of the control group (OR=2.07; 95% CI=1.05, 4.10; p=.036). The peer-only intervention group did not significantly increase the odds off participant vaccination compared to the control group (OR=1.61, 95% CI=.80, 3.28, p=.185), whereas the expert-only intervention group saw a decreased in the likelihood of vaccination compared to control groups (OR=.48, 95% CI=.13, 1.69; p=.25).

Norms

The outcome norms was measured in Perez (2016) and Mantel (2015). Perez (2016) aimed to increase perceived social norms for getting vaccinated, but the outcome showed no statistically significant results while Mantel (2015) saw an increase in peer norms for condom use from baseline to first follow up in both groups (control group, 0.18, p <0.0001; intervention group 0.31, p<0.0001), and from baseline to second follow up in both groups (control group: 0.17, p <0.001; intervention group: 0.28, p<0.0001).

Self-efficacy

Results concerning HIV/AIDS-related self-efficacy in Singh (2003) show a greater increase from baseline to first follow up in the intervention group than the control group (intervention group M=62.68 to 36.31, 42.07%; control group M=59.56 to 58.2, 2.28%). Self-efficacy relating to HPV as an outcome in Perez 2016 showed no significant change for either group (P=0.35).

Perceived risk

Perceived risk of HIV acquisition in Mantell (2015) declined from baseline to first follow up in both the control group (-0.28 times, $p=0.01$) and intervention group (-0.36 times, $p<0.0001$), and from baseline to second follow up in both groups (control group: -0.21 times, $p=0.01$; intervention group: -0.25, $p<0.01$). In Metha (2013), the perceived risk of acquiring HPV increased from baseline to post-test from $M=9.06$ to 9.11 in the control group, and from $M=9.22$ to 10.44 in the intervention group. From post-test to first follow up M decreased from 9.11 to 8.83 for the control group and from 10.44 to 11.1. Finally, the perceived risk of acquiring cervical cancer reported by Perez (2016) from baseline to post-test saw no statistically significant change for either group ($p=0.09$), while from post-test to first follow up a decrease was identified in the intervention group ($p=0.01$).

Focus group

Recruited sample

In total 50 e-mails with invitation were sent to potential FGD participants. Out of those 50, 38 refused to participate. Most of them did not reply to the invitation e-mail. Those who replied said that the FGD was interesting but that it conflicted with busy schedules and upcoming exams. Due to a delay in the ethics approval it was not possible to organise it earlier as planned and thus the focus group had to be conducted at that exam period. In total 12 participants were recruited, of whom seven were peer supporters (P1, P2, P3, P4, P5, P6, P7), one welfare officer (W1), one Oxford University Student Union (OUSU) representative, one Pakistan Society Representative (PRS 1), two active members of Oxford's LGBT society (LGBT1 and LGBT2). Three of the 12 participants were from the UK and nine were from other non-UK countries. They belonged to three colleges: St Cross; Linacre; and All Souls. There were five men and eight women.

Applicability of systematic review interventions in the Oxford setting

As noted in the Methods section, the applicability of the following aspects of the intervention were examined: targeted outcomes; components; duration; delivery; participant gender; and participants' sexual activity. These aspects of the intervention and participants' top three selections for each aspect are presented in Table 2.

Table 2 – Applicability of aspects of the intervention according to the participants

Targeted outcomes	Condom use (P1, P2, W1, P5, OUSU1)	Ability to talk with partner about STIs (P5, PRS, LGBT1)
	STI-related knowledge (P1, P2, W1, P5, OUSU1)	Abstinence from sex (P1, P2, P5, LGBT2, P3, OUSU1, P6, P7)
	STI testing (PR1, OUSU1, LGBT1, P5)	Number of sexual partners (P1, P2, P5, LGBT2, P3, OUSU1, P6, P7)
	Ability to talk with partner about condom use (P5, PRS, LGBT1, P4, P7)	Additional aims (P1, P2, P5, LGBT1, OUSU1)

Components	Combination of skills (P2, W1, P1, P7)	Personalised education information (P2, W1, P6)
	STI occurrence (LGBT1, PRS, P1, P4, P3, P7)	Importance of STI testing (PRS, P5, P4, OUSU1)
	Pap test (LGBT2, OUSU1)	Communication of safer sex (PRS1, LGBT1, P5, P3)
	Attitude change (P1, P5, P4)	Ways to supply condoms (P2)
	STI testing booking tool (LGBT1, OUSU1)	Negotiation skills for safer sex (P6, LGBT2, P5, OUSU1)
	Additional components (OUSU1, P6)	
Duration	One session (P6, LGBT1, LGBT2, P1, OUSU1)	More than one session (P3, P5, P2, PRS, W1, P4, P7)
Delivery	Peer-led only (P2, PRS1, P5, P1)	Health professional and peer-led (W1, LGBT2, P3, OUSU1, P7, P6)
	Computer-based (P2, PRS1, P4, P5, OUSU1, P3, P7)	Researcher (P1, P2, P4, OUSU1, P6, P7)
	PhD student (P2, P1, P4, P6)	Additional delivery methods (PRS1, W1, P2, OUSU1, LGBT1)
Gender	Would not target the intervention to population of a specific gender (P1, PRS1, W1, P2, LGBT2, LGBT1, P5, P4, P3, W1, P6, P7, OUSU1)	
Sexual activity	Would not target the intervention to population with specific sexual activity (P1, PRS1, W1, P2, LGBT2, LGBT1, P5, P4, P3, W1, P6, P7, OUSU1)	

The following sub-sections include, where available, the discussions from the focus groups concerning all of the above presented aspects of the intervention and the discussion from the implementation Card 7 (refer to the Section E in the Appendix). It should be noted that not all of the participants are native English speakers, but the exact speech of the discussion has been preserved. Where minor edits have been made for clarity these are provided in square parentheses.

Targeted outcomes

Increased condom use

Increased condom use was an outcome mentioned during the focus group discussions by participants P1, P2, W1, P5, and OUSU1. P1, P2, W1, and P5 selected this as one of their top three outcomes because they believe that it is an effective method for STI prevention. They also added that, based on their experience, they think that in Oxford

the availability of condoms is still not well developed and should be improved in order to lead to increased condom use:

***P1:** “Because I think there is still room for improvement there, especially the condom issue, given that it is a student population and there might be financial issues, so more should be made available by colleges.”*

***P2:** “It is not available that much still. So I think it’s about giving out to people much easier, people will be more likely to use it”*

However, OUSU1 shared a contradictory opinion based on her/his experience and said that she/he thinks that since a lot of the representatives are involved in distributing the condoms and since there are placed in different rooms in the college, the availability is saturated and nothing more could be done:

***OUSU1:** “I think we reached quite capacity for reaching students...like, undergrad, grad have free condoms for all of them...by, like, everyone: welfare reps, peer supporters, in different rooms in college, all for free so well unless you knock on people’s door and give people condoms at night... I think we would be getting into a weird area of sexual health.”*

Increase of knowledge relating to STIs

W1, P2, P3, P7, P6, P4, and LGBT2 chose increasing the knowledge of STIs as one of their selected outcomes. The reasons for this choice varied. For W1 and P7 the reason for the choice was the belief that knowledge is the foundation of people’s STI behaviour change:

***W1:** “I think it is the foundation of the beginning of any change of behaviour.”*

***P7:** “If you know about an STI so if you actually know how bad it is, it might have an effect on your own behaviour.”*

Another mutual reason pointed by P7, P2, P4, and LGBT2 was that by increasing their knowledge people might find the strength to talk about it with their partners or anyone else:

P4: “And then people, I hope, are at the end understanding, and maybe feel more comfortable talking about it.”

Further, LGBT2 added another reason for seeking to increase STI knowledge; she/he feels that in the UK the overall aim of the policy system is to reduce pregnancy, and that it seeks to increase knowledge related to pregnancy whilst neglecting other important areas of sexual health knowledge:

LGBT2: “Particularly in UK, I find that everything is related to the risk of having pregnancy. So you are basically only focusing on penetrative sex, having penetrative sex, and you don’t really let you know how your body would react, what kind of STI might be just temporary or not, what to do, what is the response of your body to certain situations.”

Finally P6 spoke about the lack of knowledge among the international population in the UK, which makes her/him believe that increasing STI knowledge is as an important target:

P6: “Looking at the international population here and talking to different girls here or even guys, I feel like we have very limited knowledge about these things. I think it would be nicer to actually share those things with the students at Oxford because people are coming from very different backgrounds and some countries are very traditional about this and don’t really talk. So it would be nice if people know about that, what type of different STIs there are and how to actually identify them if you have them.”

Increased STI testing

PR1, OUSU1, LGBT1, and P5 chose increased STI testing as an aim that could be applicable to Oxford settings. LGBT1 and P5 commented that it is quite hard for people to decide whether to get tested and that testing is an important aspect in curable STIs being detected:

LGBT1: “STI testing, simply because some are quite easily curable but it is quite hard for people to decide to go and to do a test.”

OUSU1 gave the same reason, and added that in her/his experience people do not show up to events that OUSU1 had organised:

***OUSU 1:** “My “yes” is definitely STI testing because Oxford students are terrible at that. I tried to organise really easy accessible STI session days, we still get maybe 60 people with capacity of a 100 at least, which is just not enough.”*

OUSU 1 also commented that a broader range of STI diseases should be tested for at Oxford since the colleges are only trained in detecting specific STIs:

***OUSU1:** “A lot of colleges are trained to do chlamydia testing, and some welfare reps are trained to do chlamydia testing but not anything else, so you end up with population with a lot of gonorrhoea, which isn’t useful.”*

Furthermore, the justification of PR1 was that the outcome of increased STI testing is relatively easy and feasible to achieve at Oxford.

Increased communication with a partner

Two outcomes relating to partner communication – increased ability to talk with a partner about condom use, and increased ability to talk with a partner about STIs – were mentioned by P5, PRS and LGBT1. LGBT1 and P5 mentioned that they considered both outcomes to be crucial, and they liked the idea of frank and honest conversations about these issues, but did not specify the reasons behind their opinions, whilst PRS specified that in her/his Pakistan community at Oxford religion has an impact on the ability to communicate with partners:

***PRS:** “I come from a country that is predominantly Muslim where it is, like, a taboo and, like, forbidden to talk about sex, to know about your own body, about ‘oh, what’s happened to your body’, so I find discussing it very crucial and important.”*

P4 and P7 identified communication with a partner about condom use at a target outcome. P7 did not specify the reasons behind this choice other than the fact that he considers it important, whilst P4 believed this to be the easiest way of decreasing the

overall risk, and that it is a more feasible target outcome than increasing the ability to talk with partner about STIs:

P4: “Talking to your partner about condom use, that is probably the easiest step for them to do to decrease the overall risk, just, like, to talk about it. And I think it is easier than talking to your partner about STIs.”

Reducing the number of sexual partners and increased abstinent from sex

These two outcomes were discussed in each of the three FGDs by: P1, P2, P5, LGBT2, P3, OUSU1, P6 and P7. All of the participants agreed that these are inappropriate aims for an intervention design intended for Oxford students. In focus group 1, P1 and P2 concluded that people dislike being asked to change these types of behaviour, and that this would likely fail as a target outcome:

P1: “People tend to not like to change their behaviour so reducing the number of sexual partners or encouraging people to stay abstinent from sex, I think that this is something that they will be very unlikely to do and would, like, be a lot of waste of time and effort for very limited effect”

P2: “As P1 said, the number of sex partners and abstinence from sex, I think it will be extra hard to stop people from doing their behaviours.”

Furthermore, during the discussion held in focus group 2, P5 said that the number of sexual partners was not important, whereas safe sex practices were important. He/she also came to the conclusion that it is very unlikely that people would be abstinent at Oxford, and that asking them to stop having sex would be completely ineffective. LGBT2 added that even if the person were abstinent, this target outcome is very personal and limits the participant’s abilities to help other friends. This is how the conversation evolved:

P5: “That very much focuses on the individual and their choices, which really should not have any relevance. If people are practicing safe, regular sex with a different partner every week, that is a safer form of practice than a once-a-year unprotected sexual act.”

F: “And why abstinence?”

P5: *“I personally think it is kind of unrealistic. It is a little bit outdated. And if we are having an honest, frank conversation about sex, the majority [students] do have [sex]. Some chose not to and that’s perfectly OK, but if that is cited as a solution it kind of downgrades the others.”*

LGBT2: *“Also because, like, abstinence could be a choice. But if you offer it as an answer [to the problem] people will be uninformed. I mean, if they decide not to have sex because of whatever reasons it is more than respectable, but we would not be good supporters and good friends to people who find themselves in situations and circumstances in which they need advice.”*

P3: *“I even think that these two outcomes [abstinence and reducing the number of sexual partners] would actually increase sexual health problems, because it does the exact opposite in terms of increasing that kind of idea that sex is, that sex is something bad, sex is something dangerous. We shouldn’t do it as something shameful, and then again you can’t really talk about safe sex because if sex itself is shameful, how would you start the discussion? It might actually make things worse if you target it, if that would be your aim of an intervention.”*

Finally, in FGD 3, OUSU1 said that he/she finds these outcomes inappropriate as they ‘depower sexual health’, and that instead the aim should be for sex to be non-risky. P6 agreed with OUSU1 and added that even with one partner the participant could still be at risk. He/she added that people should not be scared of sex.

OUSU1: *“The definite, definite no ones are decrease of number of sexual partners and abstinence increase, because this is very anti-ethos and depowering sexual health. I am quite sex positive and I don’t think I should be aiming for people to reduce the amount of sex they have or the number of partners that they have sex with. I just think that sex should be as non-risky as possible.”*

P6: *“To add to that, even if you have one sexual partner that has an STI, you would get it. It doesn’t matter if you have one or 10...so...”*

OUSU1: *“Yeah, if one got it, you’ve got it too. So true.”*

P7: “I agree, I would not take abstinence from sex and [reduced] number of sexual partners.”

P6: “Yeah, it actually doesn’t do anything to the purpose. It’s like, I do not want to live in this building because an earthquake could happen at any time.”

Additional aims that were added and were found to be important

P1 added the creation of a responsible drinking culture as an important aim for an Oxford-based intervention, based on her/his experience with listening to people’s sexual issues, and having heard that those issues often arose from drinking. P2 felt that an intervention at Oxford should aim to increase the number of small clinics, as he/she felt that those clinics could offer a friendlier atmosphere than bigger clinics, and easier access to testing and condoms. Moreover, P5, LGBT1, and OUSU1 felt that the intervention should aim to increase awareness of other preventative methods such as dental dams, since people are often unaware of them. P5 noted that in his/her experience as a peer supporter he/she had received around 500 emails with people asking what dental dams were, whilst LGBT1 said that people, especially lesbians, often told him/her that they were not aware of methods other than condoms as a means of protection against STI transmission. OUSU1 also outlined that in her experience about 95% of students were not aware of what a dental dam was.

Components of the interventions

Combination of skills component

P2, W1, P1, P7 chose the combination of skills component, which includes skills that enable students to refuse engagement in high-risk sexual behaviours, and skills that enable students to cope with personal triggers that lead to high-risk sexual behaviour. P1 and P7 felt that this is a good way of potentially preventing STIs at Oxford. P2 stated that this is an important component since people at Oxford often do not know how to refuse sex, and W1 felt that these skills were difficult to acquire:

P2: “What I personally felt from my social circle is that sometimes STIs get contracted or transmitted when people start to have intercourse but then they realise they don’t have a condom, but still go ahead because they want to, and

sometimes some people don't want to but don't know how to refuse. So I think you have to educate them on how to provide suitable refusal. It will be appropriate to resolve this issue."

W1: "I feel these skills in particular are not easily acquired, so it would be really useful as a component of intervention."

Personalised educational information component

Two participants, P2 and W1, commented that they would include a personalised educational information component if they were to design an intervention at Oxford. P2 argued that individuals have to consult about things that matter to them, because an intervention which offers a generic educational component about STI transmission may simply be ignored. W1 and P6 looked at personal limitations in knowledge that others may or may not have:

P6: "I chose personalised education information, because what they [students] actually want to know, and then [be] more directed towards the people."

STI Occurrence Component

LGBT1, PRS, P1, P4, P3, and P7 considered educating participants about STI occurrence to be a highly appropriate component for interventions carried out in the Oxford setting. PRS, P1, P4, and P3 thought that general knowledge relating to STI occurrence was quite helpful, as it might help to spread awareness which in return would lead to a decrease in STI occurrence. LGBT1 likes the idea of educating participants about STI occurrence but points out that it should not lead to participants feeling too frightened to get tested:

LGBT1: "The way it was presented to me through my sexual education was sort of, er, those really bad things that could happen, which fed into making it scarier to go and get tested or something. As soon as you notice you react with some sort of fear: uh oh, what happened... argh, am I going to die?... where a lot of the STIs can be take more lightly, like having a cold, like 'oh, I have something, I have to go to a doctor'. Same thing."

Importance of STI testing component

PRS, P5, P4 and OUSU1 chose STI testing as an important intervention component. P4, OUSU1 and PRS did not specify why they think it is important, while P5 said that this might help to reduce the fear of getting tested if the advantages and ease of getting tested are explained to the students:

P5: “I would go with the importance of STI testing, because I think there is a great fear of the unknown, potentially disastrous consequences – that there is a big fear of going to get tested. So I think an education scheme stressing the importance of that would be great, you know... talking about the ease of actual STI testing, how brief it is.”

Importance of Pap test component

LGBT2 and OUSU1 thought that educating participants about the importance of the Pap test is a crucial component, and both felt that it is not something that was sufficiently discussed at Oxford.

Communication skills about safer sex practices component

PRS, LGBT1, P5, and P3 chose communication about safer sex practices with their partners as a key component. PRS and P5 did not give the reasons for this decision. LGBT1 said that cultural aspects might affect peoples’ ability to communicate easily with their partners about safer sex practices. LGBT1 felt that it would be beneficial for people to participate in a workshop providing them with the necessary skills for broaching these subjects with their partners. P3 agreed with LGBT1:

LGBT1: “I think having a workshop about that would be very helpful because in theory we all know, ‘yes, it is very important to talk about sex with my partner’, but in practice we all might be raised in cultures where that is actually quite hard. So having sort of a repertoire of sentences of how we could communicate would be very, very helpful.”

P3: “I think you already said everything.”

Unfavourable personal attitudes and social norms component

P1, P5, and P4 found the challenging of unfavourable personal attitudes and social norms to be a useful intervention component. P1 said that she/he didn't know how feasible it would be to actually achieve positive change through this method, but that she/he still likes the idea – no further explanation was provided. P5 thought that this could help to remove the uncomfortable feeling when having conversations about sexual health, which could lead to other benefits. P4 thought that this could motivate people to positively change their STI-related behaviours:

P4: “Because I would hope that if we have, especially, a group of people that actually change their social norms, I would hope that would actually help to motivate people to get tested, to use condoms.”

Ways to find condom supplies component

P2 is the only participant who identified the education of university students about sourcing condom supplies as a key component, arguing that this should be included in an Oxford-based intervention because he thought that his knowledge relating to condom use would increase:

P2: “You tell them that they can get them for free from particular places – that will increase the use of condoms for these people.”

A ‘Book Now’ STI tool component

LGBT1 and OUSU1 both considered a ‘Book Now’ STI tool to be a very pragmatic and suitable motivational technique for Oxford students:

OUSU1: “So I went a lot more, like, logistic and pragmatic. So I said the ‘Book Now’ STI testing tool [should be a key component], because once students at Oxford have an appointment they do it, but they never book themselves appointments.”

Negotiation skills component

P6 thought that negotiation skills are an important component bear in mind, in case a partner is unwilling to have safe sex:

P6: *“Skills to get to your partner, to get them to understand what is going on instead of having all your responsibility on yourself.”*

LGBT2, P5, and OUSU1 had a different view on this component contradicting P6’s comment. They felt that this component introduces an uncomfortable power dynamic, and that it should not be included if an intervention at Oxford is to be designed:

OUSU1: *“You wouldn’t want to be going for students who are a bad partner. You shouldn’t have to negotiate for safer sex. Part of consent is you either say “yes” to the safer sex that you want, or you don’t have sex. There are sort of no negotiation skills there.”*

Additional components

OUSU1 and P6 were the only participants to discuss adding an additional component, which was information about logistics of STI testing.

OUSU1: *“So you want to have an STI test: what happens? How much is the bus to the hospital? How long does it take to get there? How long do you wait for an appointment? Yeah, sure, HIV is scary – chlamydia is not. You take a 7-day course of antibiotics. I think because it is an STI people are like “ahh, it’s incurable and I am definitely going to die”, so they don’t go to get tested. So I think that if you get diagnosed with, if you come out positive with chlamydia, this is what happens, especially people who come from backgrounds where they do not talk about them. Like, I went to a school but catholic school. But if people actually know that the worst case scenario is [that they] need to go back to three appointments, that’s a lot more feasible to go to it than if you are just like, ‘I have no idea what is going to happen when I get there, there are going to kick me out in 3 months, and I am going to have to drop out of my DPhil.”*

P6 agrees with OUSU1 and adds:

P6: *“Some people go like, ‘Oh my god, my butt is itchy, I’ve got chlamydia because I have no idea what it is or what the symptoms are.’”*

The duration of the intervention

Overall there was agreement amongst all of the participants (P1, P2, P3, P4, P5, P6, P7, PRS, LGBT1, LGBT2, and OUSU1) that if an intervention is to be designed at Oxford, the duration of the intervention would depend on the format, and that the more passive the intervention the shorter it should be:

***P1:** “If you have a one-to-one thing then that’s more interactive. Or when you have a small group, that’s more interactive. Or actually, maybe doing roleplay to practice behaviours. So that’s sort of thing that you can do for a longer time, because you are more engaged, and it’s less passive. So the more passive, the shorter it has to be. The more active, the longer.”*

However, within each of the three FGDs the discussions showed different preferences from each person about the format of the intervention, the number of sessions, and their duration.

One session

P6, LGBT1, LGBT2, and P1 thought that a single general educational session during Fresher’s week was the most appropriate format for an intervention. LGBT2 and P6 opted for a session duration of 1h30, arguing that after an hour people begin to lose concentration or are required to leave due to other commitments:

***LGBT2:** “I think that in Fresher’s Week, when you organise those sorts of things, after an hour you lose people because there are so many things going on by your faculty for example, by your college... I would have a session that is no longer than an hour, maximum 1h30 for some time for Q&A.”*

Compared to LGBT2 and P6, P1 thought that the duration of the session should be 1 hour in order to cover the most important aspects of sexual health:

***P1:** “One session of 1 hour, because, yeah, so really you want to get people at the beginning of their degree because that’s the most problematic time, that is when they are going to be most vulnerable, that’s where they are going to be*

engaging in the most risky behaviour because they are still trying to impress everyone, getting used to being at Oxford, you want to catch them really early on, during Fresher's time."

LGBT1 thought that the educational session should take place regardless of the concentration of the students, as this session demonstrates that the college cares about the students' sexual health. She did not specify what duration these sessions should be:

LGBT1: *"I actually would argue that you do need to keep something in Fresher's Week because it's not... I know it's a lot going on, but it's not only about how much people are paying attention – but it's about the message the college might be sending... like, that we care about these things."*

Finally, OUSU1 identified one session of 4 min and 15 seconds as the optimal intervention, because she/he thought that if you could get it done in this time it would gather a lot of people. She/he was thinking about the STI testing session in particular.

More than one session

P3, P5, P2, PRS, W1, P4, and P7 would opt for more than one intervention session. PRS thought that there could be different themes for different sessions and gave examples for these themes, such as having different speakers, videos, and Q&A series. She/he thought that three hour-long sessions on a monthly basis would be the optimum intervention, to be offered alongside the creation of a consistent platform available in the university after the sessions ended if the students needed it. In comparison, P2 and W1 thought that there should be one general educational session followed by other personalised sessions available to students who wish to discuss certain sexual health topics and related issues further. They did not specify how many or how long those personalised sessions should be:

P2: *"There should be individual sessions for the individuals that want to come back and talk more, because I think that the first session would be more about the nurse or doctor talking to students, but I think the second or third sessions [should be] about the students coming back and communicating with them."*

W1: *"I really like that, the idea of like one general session that is followed by personalised individual sessions."*

P3 and P5 had the same opinion about the initial session, and argued that it should be more creative and integrated into college, although this could make it difficult to specify its duration. P5 made this decision based on his/her previous experience with organising similar integrated health sessions:

P3: “What I would think is something more creative, and integrating it into college life... And then you can’t really say that we need this amount of time to do that, right?”

P5: “A lot of what we did is to tag it to ordinary events... We just tried to integrate into normal events throughout the week. And then the Sunday at the end of the week, we had the STI testing coming to the welfare event, so there had been stuff going on throughout the week, people were kind of discussing them, so it was kind of hard to say how much time was spend on it, because it got woven into other events.”

Compared to P3 and P5, P4 thought that the intervention should consist of two sessions: one for explaining the different STIs; and one session on the general protection of the participants. He/she thought that both sessions should be no longer than an hour. Finally, P7 thought that the appropriate number and duration of sessions applicable to the Oxford setting is four half-hour sessions. He/she gave the following reason for this choice:

P7: “If people need to go for more than one that sort of pushes up their attention and conversation.”

The delivery method

Health professional and peer supporter

W1, LGBT2, P3, OUSU1, P7, and P6 chose the combination of health professional and peer supporter as a delivery method. P7 and P6 did not specify the reasons behind their choice, whilst W1, OUSU1, LGBT2, and P3 thought that this would be the perfect combination since the health professional ensures high quality knowledge about STIs whilst the peer supporter ensures a more “human” element which Oxford students usually appreciate and need. LGBT2 and P3 thought that the health professional would

only be useful if they could lead the speech in an approachable and professional manner. They concluded that if the health professional possesses those qualities it could lead to a larger number of students accessing their services:

P3: “I think it can be really helpful as you said (LGBT2) when they can reach people right, when they actually talk in a way that makes them more assessable. And I think for example if someone comes from a clinic people actually have an idea of what it would look like, and also can see the people who are working there, for example, aren’t scary, and they talk about these things... and that actually can be really helpful, because then when I want to go there people don’t look at me weirdly, people are really open about this. So yeah, if you have health professionals who actually are like this and can transfer this message, that could be really helpful to get people to these services.”

Computer-based

P2, PRS1, P4, P5, OUSU1, P3, and P7 discussed this delivery method. There were conflicting opinions. P5 thought that this could be a good method for delivering certain parts of an intervention, such as emails with further educational materials or a test after an intervention. P2, P3, and PRS1 thought that this delivery method would be effective for individuals who are still not ready to discuss sexual health or attend events, and who are hard to reach. OUSU1 thought that the computer could work well, as people at Oxford have busy schedules and could access this in their own time.

LGBT1 and LGBT2 thought that a computer-led intervention in the form of an interactive test could be helpful and could save people’s time. LGBT1 also added another option – setting up a forum as an intervention where people could seek sexual health advice:

LGBT2: “It would just take five minutes, and it would give you, like, a bar letting you know how much you know about that particular, specific thing. So that could be a little bit interactive but then have videos that address some particular matters... could be interesting.”

LGBT1: “I also think that the computer one would be quite helpful, especially framed as a “fun, procrastination” type of thing, because while people are

unlikely to turn up to talks to procrastinate, they are quite likely to do an online test. So things that are quite fun and interactive and maybe at the end actually link to various services that you could go to so if you want to get tested, click here, and this could be very, very helpful. In my college we have an anonymous MSN-type of thing where people can ask questions, whether personal or just general – what does this mean, or what do I do – and that is also quite helpful.”

P4 and P7 held a different opinion, and thought that if they were asked to read material on a given page and complete a certain activity people would ignore it and never open it:

P7: “I don’t know about the computer, you have to have the commitment, you have to show up, but the decision is taken for you. It’s just, if I was told to do something at some point, I just know I would never do it.”

Peer-led only

A peer-led delivery method was chosen as a possibility by P2, PSR1, P1, and P5, who thought that people at Oxford might feel more comfortable talking to their peers:

P5: “Peer-led is the strongest one to use, I think. The more the interventions are led by peers, the more they could be tailored towards the needs of that community. Peer-led should have representatives of all different communities and identities. It is incredibly important to have female and male representatives and LGBT+ etc. But yeah, having a diverse group, pinning in different issues.”

Researcher

P1, P2, P4, OUSU1, P6, and P7 discussed the choice of the researcher as a delivery method. P1 said that she/he would not choose the researcher as their academic training and perspective could make them biased, and might lead to a lack of flexibility regarding the actual needs of the intervention group at Oxford. P2 and P6 thought that a researcher-led intervention would bore students, and might discourage them because researchers are not good communicators:

P6: “I felt that many times the researchers who are actually designing it, they are not very good at communicating them. So the researchers themselves might put people off because if you are not a good communicator.”

Contrary to P6, P2 and P1, P4, OUSU1 and P7 showed support for researcher-delivered interventions. P4 thought that the researcher might provide some fresh knowledge from the field that other deliverers may not yet be aware of which could be very interesting to Oxford students. OUSU1 thought that the researcher could be useful since people at Oxford love taking part in academic life, and would view the intervention as a chance to participate in research and recruit others to do so. Finally, P7 said that since researchers are the people who would be most familiar with the intervention and the methods it entailed, they would deliver it in the best possible way:

P7: “Perhaps the upside of picking up the researcher is that they design the intervention and they know what they have in mind, and perhaps having a mediator, you might lose something there.”

PhD students

P2, P1, P4, P2, and P6 commented on PhD students as a delivery option. P2 had a strong opinion that this option would bore the students and would not be applicable in the Oxford setting. P1 also rejected this option but did not specify why. In contrast, P6 said that he/she likes the idea but would modify it to include PhD students of all genders, rather than simply female students. Finally, P4 thought that the intervention deliverer shouldn't need to be PhD student, although he/she liked the idea of having a female perspective.

Additional delivery methods

PRS1 and W1 thought that pamphlets were a useful way to deliver key intervention messages, arguing that this would draw students' attention. P2 and OUSU1 also added the use of health professionals alone as a delivery method, as they thought that this could reassure participants of the confidentiality of the intervention discussion:

P2: “I would actually put down health professionals alone. Just for someone who don't want to discuss this with someone they know. Just to make things confidential.”

***OUSU1:** “I put, like, just nurse, or just health professional. That could be nice. Does hopefully get rid of some biases that you might get from your peers.”*

OUSU1 added that she/he would actually use OUSU representatives as the delivery method, as this could provide a balance between a professional adult and a peer. She/he clarified that an OUSU representative is someone who is not meant to be your peer, but who still knows what they are talking about.

Finally, LGBT1 was the only participant who commented that delivery responsibilities could be shared between the peer leader, researcher, and health professional:

***LGBT1:** “I do think peer-led is very important and that it is essential to have a diversity. [With] both health professionals and with researchers, we would need to have them working together because there is a lot of expertise that comes from them that [it] would appear that students would not have, but they also might not have the capacity to communicate with students, so like, working together will be very, very helpful.”*

The gender of population

P1, PRS1, W1, P2, LGBT2, LGBT1, P5, P4, P3, W1, P6, P7, and OUSU1 had the same opinion regarding population gender, commenting that if an intervention at Oxford is to be designed the gender of the population should be not focused only on one or two genders. If they were to design an intervention the participants said that they would open it up to all genders and would not specify gender, as some people at Oxford wouldn't identify as male or female:

***P1:** “I would just make it even broader than that and say educate everyone because there might be some people who don't identify as male or female.”*

***PRS1:** “Hmm yeah...exactly my point. I think those people need educational preventative methods as well. Just like more males and females do...”*

***W1:** “I don't think gender is going to help anyway...I don't think there is any benefit to it.”*

LGBT1 and LGBT2 expressed concern that interventions are usually designed based on participants' biological sex, when some individuals might not identify their biological sex as their gender (i.e., might not be cisgender):

LGBT1: *“How are you going to know what genders people are? Especially if we are talking about sexual health stuff which often have to do basically with your biological sex, which might not correspond to the person's gender, so I think we would get into a very weird thing here... so I would just not divide it by gender.”*

OUSU1 added that she/he thinks that another reason for not including or excluding certain gender(s) in an intervention is that people who identify as women might not have vaginal sex, and that this stereotype might lead to women feeling uncomfortable during the intervention:

OUSU1: *“That has a potential to get very stereotype-y really quickly, and perhaps you end up talking to women – ‘so, when does the penis come near you?’ – and then you end up having women who say: ‘I don't have sex with people with dicks, this not me’, and vice versa.”*

However, OUSU1 added that the only reason she/he considered it acceptable to separate based on biological gender would be due to religious reasons, for example, in cases where women would not feel comfortable discussing certain issues with men in the room:

OUSU1: *“I suppose the only reason ever would be – OK, I would be playing devil's advocate myself – would be religious reasons, and women only. There might be cultural differences, especially for women who may them not want talk about sex in front of men.”*

Sexual activity of the population

As with the gender, all the participants – P1, PRS1, W1, P2, LGBT2, LGBT1, P5, P4, P3, W1, P6, P7, and OUSU1 – had the same opinion regarding the sexual activity of the population: that they would include people with any sexual activity, and that they would not concentrate their intervention on any options presented on the list. The reasons

behind this choice varied. P2, W1, P1, and OUSU1 thought that people would be very unlikely to stay sexually active or inactive forever, so concentrating an intervention on active or inactive people (or excluding either group) would not make sense:

P2: “Just because you are inactive in sexual activity it doesn’t mean that you would not have sex in your entire life.”

Furthermore, P3, P6, and P7 said that it would be very hard to identify people’s sexual activity:

P3: “I think it is necessary to divide people, and then what does it mean to be inactive? How long has it been that you’ve been inactive? I think it gets complicated, and also people don’t necessary want to share their sexual activities.”

P6: “You say inactive but people have different definitions of sex...So you in your head [you] can think that you are inactive but they might be active, you know. Everybody have different definition of sex.”

LGBT1 and P1 added that it would be very awkward for people to attend an intervention which is tailored to their sexual activity:

LGBT1: “Yeah, you are walking in this room, and by walking you are declaring how sexually active you are!”

P5 outlines another point for consideration; that even if individuals are sexually inactive, it could be good for them to receive an intervention as they might have ongoing STI symptoms from a previous time in which they were sexually active:

P5: “Also, the number of STIs that have invisible symptoms. So maybe they are inactive now, but perhaps not a year or two ago, and perhaps this talk might trigger something, or some of them have serious delay, some symptoms develop 6, 12 months after the incidence... you might not instantly jump to assume that this is the cause.”

Organisation and implementation of a program at Oxford

Using available resources to organise and conduct the intervention

All 12 participants said that they would use as many pre-existing resources as possible when organising and conducting the intervention:

P5: *“I think the broader involvement in the organisation of the program, the better.”*

The type of resources mentioned by the participants were: experts (P1); the NHS (W1, PRS1, OUSU1); OUSU (W1, OUSU1); colleges (W1, P1, P7, P6, P5); general practitioners (P2, P4, OUSU1, P6, P5); the welfare team (P2, OUSU1, P6); peer supporters (P1, P6); societies (PRS1, OUSU1); the MCR and JCR (P3, LGBT1, P4, P5); social secretaries (P6); and head residents (P6). Here are some examples of the participants’ contributions:

P1: *“Obviously Oxford is full of experts, so you’ve got all sorts of professionals that are affiliated with the colleges anyway, then you have the network of the colleges etc., that already have networks systems that can help organise these things... we’ve got colleges that are venues themselves, there is welfare budgets, that could help contribute to this.”*

OUSU1: *“OUSU money and skills, NHS and GPs, because NHS has a budget for this and they are quite willing to do it, because they do not want to treat it when it is 10 years on the line, so using their money resources. So pre-build communities... sort of like common rooms and departments, they are already there. Any other university would kill to have like 200 students who sort of know each other in a building, and in which you could go and be like: here is the thing... and also, slightly less, communities like LGBTQ”.*

P6: *“Welfare and equality officer, because that’s the person who sort of looks at those stuff, the doctors and hospital stuff, who take care of that. I would definitely include the student body as well. So, the welfare rep, the peer supporters, the senior students, and I think head residents, because my college has head residents in all the properties. If the students have any confusion and*

want to ask someone, the nearest point is actually the head residents, and they have the certain responsibility across the college. I would say social secs, I know this is weird but I am a social sec as well, and for some reason everybody thinks that for whatever the problem be, social secs know everything... for anything which has completely got no relation to my job, and they would come to me and ask me questions and I would be like: "guys, I have no idea what you are taking about!"

Only LGBT1 shared their reasons for advocating for the involvement of as many resources as possible. She/he said that this approach would increase the chances of finding enough people to collaborate and partner with when organising the intervention:

***LGBT1:** "Mostly because many people are not going to be collaborative. Maybe try to partner up with JCRs and MCRs, which very rarely happens for some reason, but even chat with external organisations like sexual health centres, clinics that could have people that are trained to do this kind of thing."*

Dealing with the challenge of motivating participants to attend

All 12 participants acknowledged that motivating participants to attend an intervention would be a challenge:

***P4:** "Motivation, that was always the thing."*

***P7:** "A big issue, really, trying to get a lot of people to come."*

***P5:** "Motivation is always going to be problematic... so I think that's really the biggest challenge that [there] is going to be - attendance."*

Six of the 12 participants proposed the same solution to the motivation problem; offering the implementation as part of a mandatory programme (P1, PRS1, P6, P7, OUSU1, and P2), while four other participants opposed this opinion and stated that this would not lead to positive outcomes for the intervention (W1, P3, P5, and LGBT1).

Here are some examples of what participants said about making the intervention compulsory:

P1: *“You see, I would go with the carrot and sticks approach. You can just make it a mandatory session at Fresher’s Week, and you can just have penalties for not attending. That’s it, that’s what I would do. If you can’t prove that you made any one of them, the Dean would come up with some punishment rather. That’s what they do with safety talks, because you are literally not allowed on the premises if you haven’t had a safety induction, and that’s what they have to do in order to get people coming. So I think this is just as important.”*

PRS1: *“Do it just like matriculation. So, you cannot study here without getting matriculation and without proper sex education which is important, which affects everyone. I mean you do have mandatory things so this should be one of them.”*

P2: *“The thing that I add it as mandatory in my notes is because I picture this as a voluntary thing, because if there is an email with ‘there is a sexual health session and we would like to invite people to come to’, I would not going to show up.”*

Examples from participants who disagreed with the above opinion and would not implement the programme as mandatory include:

W1: *“I definitely think that education is important, it’s just my thoughts are always the reaction that it creates, the culture it creates. In one hand you are giving it to people, in other hand you are providing this really negative sort of, like, association with it. And if you really want to effectively change behaviour it might be not good.”*

P3: *“So if you are forced to go to a sexual health and awareness, everyone is just going to hate it. I don’t think that something like this would work. I really don’t think that something like that would work.”*

Other challenges in implementing the program at Oxford

Two participants mentioned other challenges relating to differences between colleges (P1) and college turnover (P3). P1 said that different colleges have different objectives and that when implementing such a program at Oxford must secure the co-operation of all colleges:

P1: “You have to really make sure that all of the colleges really want this and really see the effect.”

P1 also added that a way to deal with this challenge could be the conduction of an inter-college competition, which could motivate colleges to want to implement this program in the best possible way. P3 said that MCR and JCR committees change every year and that would pose a difficulty when implementing the intervention as the new people would not have the power and developed contacts to implement such an intervention:

P3: “It kind of takes quite a long time, and it just depends, like, who are you meeting and, like, what your peers and peer committee is like, so even you know and especially the stuff, you don’t know who and what opinions they have, and who you can talk to about things.”

P3 stated that university staff would need to be involved in the implementation of this program in order to resolve this problem.

Chapter 4 - Discussion

Risk of bias in the studies

This systematic review conducted a risk of bias examination by using Review Manager 5.3 and guidance from the Cochrane Handbook (Higgins and Green, 2008). The results showed that the majority of the studies (64%) had a low overall risk of bias in the sequence generation aspect and low risk of reporting bias (50%). However, 42% of the studies exhibited a high risk of reporting bias (Sikkema 1995; Pedlow 2004; Hopfer 2012; Shearer 2015; Mortimer 2015). Due to limitations in the information provided in these studies the overall risk of bias was unclear regarding allocation concealment (92% of the studies), performance bias (64%), detection bias (78%), attrition bias (78%), and bias due to imbalance between groups at baseline (50%).

The effect of the interventions

The 14 behaviour interventions showed mixed effects regarding their targeted outcomes. The way that these effects were measured varied across studies. In many of the studies the interventions' effects on target outcomes were measured by comparing changes in the mean (M) difference from baseline to follow-up between the intervention group and the control group. Statistical significance of the outcomes was present in some of the studies (see the Summary Findings Table in Section C in the Appendix). As the previous chapter shows, 42% of the studies showed a high risk of reporting bias (Sikkema 1995; Pedlow 2004; Hopfer 2012; Shearer 2015; Mortimer 2015), which made it difficult to summarise all of the information for those studies.

STI incidence rates

Only one study measured the intervention's effect on STI incidence rates (Pedlow 2004). It concluded that the intervention was not effective in decreasing STI incidence rates at 2-month follow-up.

STI risk-reduction behaviour

The STI risk-reduction behaviour was split into the following two categories: high-risk sexual behaviours, and preventative behaviours.

High-risk sexual behaviours

The result of the systematic review showed that two studies used a summative indicator for high-risk sexual behaviours (Jahanfar 2009; Saad 2012), and the effects of the interventions in these two studies were contradictory. The peer-led intervention used in Saad (2012) achieved a decrease in high-risk sexual behaviours. In comparison, changes in high-risk sexual behaviour did not occur in the peer-led intervention of Jahanfar (2009). There was no statistically significant difference in safe sex behaviours between the intervention group and control group at post-test ($p=0.530$).

Regarding condom use indicator, the studies measured either the number of protected acts with condoms, the number of unprotected acts, or both. For instance, the intervention of Bulduk (2012) showed an effect on condom use during vaginal, oral, and anal sex was achieved at first follow-up. However, at second follow-up there was only an effect on condom-protected oral and anal intercourse. In comparison, Mantell's (2015) study showed no statistical difference or greater effect found in the number of female condoms used (p -value for interaction between time and intervention = 0.06).

Regarding the number of sexual partners, there were similar results across the studies. In Bulduk (2012) the number of participants' sexual partners decreased in the control and intervention groups, both from baseline to first follow-up and from first follow-up to second follow-up. In Pedlow (2004) the number of sexual partners shows a decrease in both the intervention and control groups from baseline to post-test.

Preventative behaviours

Regarding communication with a partner about STIs, in Bulduk (2012), a slight increase in participants' ability to ask potential sexual partners STI-related questions was seen in the intervention group compared to the control group from first follow-up to second follow-up. However, a negative change in communication about STIs was evident in Pedlow (2004). From baseline to first follow-up a decrease in communication was

witnessed in both the intervention and the control group. Finally, regarding the vaccine uptake measure, in Perez 2016 the results showed that HPV vaccine-seeking behaviour had no significant differences at 1-month follow-up ($p=0.89$), while in Hopfer 2012 a statistically significant effect was identified ($\chi^2 (3, 404) = 8.6, p<.035$).

Mediators of behaviour change

The mediators of behaviour change that were examined in the studies are: knowledge, attitude, intention, norms, self-efficacy, and perceived risk.

With regards to knowledge outcomes, the studies either measured general knowledge relating to STI(s), or specific STI knowledge, such as HIV/AIDS knowledge or HPV knowledge, or a combination of these outcomes. In summary, the studies that measured STI knowledge found that the intervention had an effect on that outcome (Pedlow 2004; Saad 2012). Further, six of the 14 studies (Sikkema 1995, Singh 2003, Pedlow 2004, Janhanfar 2009, Saad 2012, Bulduk 2012) showed that their interventions had an effect on HIV/AIDS knowledge. In four studies (Singh 2003, Pedlow 2004, Bulduk 2012, Saad 2012) this impact was measured by comparing the M-values of the intervention and control groups, whilst in Sikkema (1995) and Jahanfar (2009) the statistical significance of that outcome was presented. For Jahanfar (2009) this was $p=0.001$, and for Sikkema (1995) this was $F=5.36, p < 0.03$. Moreover, the effect of the intervention on HPV knowledge was measured in Metha (2013), Sweeney (2013), and Perez (2016). Metha (2013) and Perez (2016) showed no effect which was reported in Perez (2016) with $p=0.99$. Sweeney (2013) presented an effect.

In regard to attitude, in Mantell (2015) the partner's perceived attitude towards male condom use increased from baseline to first follow-up, in both the control and intervention groups, and also from baseline to second follow-up, meaning that the intervention had no effect on this outcome. Perez (2016) reported no significant change at post-test or follow-up regarding attitude towards vaccination. Mortimer (2015) stated that the intervention had an effect on attitudes towards being tested, which was significantly more positive in the intervention group ($p=0.25$). In Jahanfar (2009) the results showed a statistically significant difference for the attitudes towards safe sex outcome ($p=0.01$).

Regarding intention, Mantell's (2015) intervention did not show an effect on the intention to use female condoms. Mortimer (2015) found significantly greater intentions to undergo STI testing at follow-up in the intervention group ($p=0.009$) compared to the control group, suggesting that the intervention had an effect. HPV vaccination intention was examined in Hopfer (2012) and Metha (2013). Metha's (2013) intervention showed a limited effect on HPV vaccination, as an increase from baseline to post-test was evident in both the control and intervention groups. Hopfer (2012) showed that at first follow-up the peer-expert intervention group was twice as likely to vaccinate compared to members of the control group ($OR=2.07$; $95\% CI=1.05, 4.10$; $p=.036$). The peer-only intervention group did not significantly increase the odds of participant vaccination compared to the control group ($OR=1.61$, $95\% CI=.80, 3.28$, $p=.185$), whereas the expert-only intervention group saw a decrease in the likelihood of vaccination compared to control groups ($OR=.48$, $95\% CI=.13, 1.69$; $p=.25$).

Regarding norms, Perez (2016) showed no statistically significant results, while Mantel (2015) saw a limited impact as there was an increase in peer norms for condom use from baseline to first follow-up in both groups.

In terms of changes to HIV/AIDS-related self-efficacy, Singh's (2003) intervention showed an effect: a greater increase from baseline to first follow-up was witnessed in the intervention group than in the control group. Self-efficacy relating to HPV as an outcome in Perez (2016) showed no significant change for either group ($p=0.35$).

Perceived risk was examined in three studies (Metha 2013, Mantell 2015, Perez 2016). Mantell (2015) examined the impact of the intervention on the perceived risk of acquiring STIs and did not achieve an effect on this outcome. In comparison, Metha's (2013) study measured the perceived risk of acquiring HPV and found an increase from baseline to post-test. Finally, the perceived risk of acquiring cervical cancer reported by Perez (2016) from baseline to post-test saw no statistically significant change for either group ($p=0.09$), whilst from post-test to first follow-up a decrease was identified in the intervention group ($p=0.01$).

Applicability of the main characteristics of the interventions to the Oxford setting

Population characteristics

Gender

Of the 12 studies examined, the samples consisted of: only females (Sikkema 1995, Singh 2003, Pedlow 2004, Hopfer 2012, Sweeney 2013, Mantell 2015, Perez 2016); female and male participants (Jahanfar 2009, Saad 2012, Bulduk 2012, Shearer 2015, Mortimer 2015, Lustria 2016); and only males (Metha 2013). The 12 participants in the focus groups did not like any of these options, and were all in agreement that if they were to design an intervention at Oxford they would include participants of all genders, meaning that their sample would include more diverse participants than the studies reviewed here. The reason behind their choice was that some Oxford students might not identify with the gender they were assigned at birth, and that they would not like to exclude those people from the sample.

Sexual activity

The sexual activity of the participants was reported in 9 out of 14 studies (Pedlow 2004, Hopfer 2012, Bulduk 2012, Sweeney 2013, Metha 2013, Shearer 2015, Mantell 2015, Mortimer 2015, Lustria 2016). Most of the studies (6 out of 9) specified that sexually inactive participants were ineligible to participate in the study, focusing their interventions solely on sexually active participants (Pedlow 2004, Bulduk 2012, Sweeney 2013, Shearer 2015, Mantell 2015, Lustria 2016). Three studies included both sexually active and inactive individuals (Hopfer 2012, Metha 2013, Mortimer 2015). The 12 participants liked the combination of those three studies. Their reasons for choosing to include both sexually active and inactive participants varied. P2, W1, P1, and OUSU1 thought that people would be very unlikely to stay sexually inactive forever, and that concentrating an intervention solely on sexually inactive people does not make sense. P3, P6, and P7 thought that it would be very hard to identify people's sexual activity.

Targeted outcomes

The following targeted outcomes were discussed during the focus group: increase of STI-related knowledge (Pedlow 2004, Saad 2012), increase in STI testing (Pedlow 2004, Lustria 2016), increased communication about STIs (Pedlow 2004, Bulduk 2012), increased communication about condom use (Bulduk 2012), increase in condom use (Sikkema 1995, Pedlow 2004, Bulduk 2012, Mantell 2015), reducing the number of sexual partners (Pedlow 2004, Bulduk 2012) and increasing abstinent from sex (Bulduk 2012).

During the discussion, the following outcomes presented no contradictory opinions: increase of STI-related knowledge; increase in STI testing; increased communication about STIs; and increased communication about condom use. W1, P2, P3, P7, P6, P4, and LGBT2 selected increasing the knowledge of STIs as a key outcome. The reasons for this choice varied, but W1 and P7 argued that knowledge is the foundation for people's STI behaviour change. PR1, OUSU1, LGTB1, and P5 chose increased STI testing as an aim that could be applicable to the Oxford setting. For instance, LGTB1 and P5 commented that it can be quite difficult for people to decide to get tested, and that testing is key aspects to detecting curable STIs. Both outcomes relating to communication – increasing participants' ability to talk with partner about condom use and STIs respectively – were mentioned by P5, PRS and LGBT1. One reason behind this decision was provided by PRS; in his/her Pakistani community at Oxford, religion can impact upon individuals' ability to speak to their partners about sexual health-related matters.

Differing opinions were expressed with respect to increase of condom use as an outcome. P1, P2, W1, and P5 chose it amongst their top three because they believe that it is an effective method for STI prevention. Based on their experience, they also thought that the availability of condoms in Oxford is still not well developed, and should be improved further for increased condom use to be achieved. In contrast, OUSU1 said that she/he doesn't think there is anything more to be done to improve the availability of condoms in Oxford.

Additionally, P1, P2, P5, LGBT2, P3, OUSU1, P6, and P7 found the following two outcomes inappropriate for inclusion in an intervention at Oxford: reducing the number

of sexual partners, and increasing abstinence from sex. Participants such as P1 and P2 considered these two outcomes are unlikely to be achieved. Others such as P5 and P6 observed that a person who have had unprotected sex with one partner was still at risk and that the focus of message needed to be on safer sex practices rather than number of sexual partners.

Furthermore, P1, P2, P5, LGTBT1, and OUSU1 discussed the inclusion of additional outcomes that were not present on Card 1, which listed the targeted outcomes of the existing interventions: responsible drinking culture (P1), need to increase the number of small clinics (P2), and increase of knowledge of dental dams (P5, LGTBT1, OUSU1).

Components of the interventions

The results of the systematic review showed 13 studies out of 14 that elaborated on their components of the intervention. The following sections discuss the applicability of those components at Oxford as discussed by the FGD participants.

Educational component

Eleven of the 13 studies involved interventions that included an educational component (Sikkema 1995, Singh 2003, Pedlow 2004, Bulduk 2012, Sweeney 2013, Metha 2013, Shearer 2015, Mortimer 2015, Mantell 2015, Perez 2016, Lustria 2016). Of all the educational components entailed in these 11 studies, the participants of the focus groups opted for the following: personalised educational information (Pedlow 2004, Lustria 2016); education on STI prevalence (Mortimer 2015); importance of STI testing (Mortimer 2015); importance of Pap testing (Sweeney 2013); and ways to find condom supplies (Mantell 2015). There were no conflicting opinions relating to any of these outcomes. For instance, the importance of STI testing was chosen by PRS, P5, P4 and OUSU1, with P5 saying that this might help to reduce the fear of getting tested providing the advantages of this are explained to students at Oxford.

Skill-building component

Six of the 13 interventions included a skill-building component (Sikkema 1995, Singh 2003, Bulduk 2012, Shearer 2015, Mantell 2015, Perez 2016). Of these, components that the FGD participants commented on included: combined multiple skill-building (Sikkema 1995); communication skills about safer sex practices (Singh 2003); and

negotiation skills (Mantell 2015). PRS, LGBT1, P5, and P3 prioritised communication about safer sex practices with their partners as a key component; P2, W1, P1, and P7 chose the combined skill-building component. Finally, P6 thought that negotiation skills are an important skill to learn, in case a partner is unwilling to practice safe sex. LGTB2, P5, and OUSU1 disagreed with P6. They felt that this component introduced an uncomfortable power dynamic and that it should not be included if an intervention at Oxford is to be designed.

Motivational component

Five out of 13 studies had a motivational component (Singh 2003, Pedlow 2004, Metha 2013, Mortimer 2015, Perez 2016). Participants commented on some of these, including motivation relating to unfavourable personal attitudes and social norms (Singh 2003) and a ‘book now’ STI tool (Mortimer 2015). P1, P5, and P4 found a component which challenged unfavourable personal attitudes and social norms to be useful, with P4 saying that this could motivate people to make positive changes to their STI-related behaviour. Furthermore, LGTB1 and OUSU1 both thought that the ‘book now’ STI tool was a very pragmatic solution, and a highly suitable motivational technique for use in the Oxford setting.

Duration of the interventions and their applicability to practice

The duration of exposure to intervention was clearly reported in the majority (10 of 14) of the studies (Sikkema 1995, Pedlow 2004, Jahanfar 2009, Saad 2012, Hopfer 2012, Bulduk 2012, Sweeney 2013, Metha 2013, Shearer 2015, Mantell 2015). All 12 participants concurred that if an intervention is to be designed at Oxford, the duration of the intervention would depend on its format, and that the less interactive the intervention, the shorter it should be. However, within each of the three focus groups some participants showed a preference regarding the optimum number and duration of sessions for an intervention. Four participants, P6, LGBT1, LGBT2, and P1, argued for one general educational session during Fresher’s Week. LGBT2 and P6 suggested 1h30 as the optimum session length, arguing that people cannot hold their concentration for any longer than this. This option, which the participants thought would be appropriate to the Oxford setting, was present in Pedlow (2004). P3, P5, P2, PRS, W1, P4, and P7 would also choose to hold more than one session; however, none of the duration options

of the six studies in the systematic review (Sikkema 1995, Saad 2012, Hopfer 2012, Bulduk 2012, Mantell 2015) were found to be suitable for the Oxford setting according to FGD participants.

Delivery method of the interventions and their applicability to practice

The majority of the studies (10 of 13) featured person-delivered interventions (Sikkema 1995, Pedlow 2004, Jahanfar 2009, Saad 2012, Bulduk 2012, Hopfer 2012, Sweeney 2013, Metha 2013, Mantell 2015, Perez 2016). Three trials evaluated interventions that were delivered online (Shearer 2015, Mortimer 2015, Lustria 2016), while one study did not specify the method in which the intervention was delivered (Singh 2003).

Participants had no disagreements regarding peer-led delivery and combined delivery involving both a health professional and peer facilitator. The combination of health professional and peer facilitator was chosen by W1, LGTB2, P3, OUSU1, P7, and P6. W1, OUSU1, LGTB2, and P3 believed that this constituted the perfect combination of expert knowledge from the health professional, and approachability and a 'human element' from the peer facilitator. This combination was used in Jahanfar (2009) and Hopfer (2012).

Some methods of delivery caused disagreement amongst the focus group participants, including researcher-led, female doctoral student-led, and online methods. P1, P2, and P6 said that she/he would not choose a researcher to deliver interventions. P1 felt that researcher's academic training and perspective could lead to bias in their approach and to a lack of flexibility in terms of responding to the actual needs Oxford students. In contrast, P4, OUSU1 and P7 showed support for the researcher delivery method with P4 argued that the researcher might provide some fresh knowledge.

Implementation of an intervention at Oxford

Involving existing resources in organising the implementation of an intervention at Oxford

All 12 participants thought that they would use as many pre-existing resources as possible in organising the intervention. These already existing resources included: experts (P1); the NHS (W1, PRS1, OUSU1); Oxford University Student Union (W1, OUSU1); colleges (W1, P1, P7, P6, P5); general practitioners (P2, P4, OUSU1, P6, P5);

the welfare team (P2, OUSU1, P6); peer supporters (P1, P6); societies (PRS1, OUSU1); the MCR and JCR (P3, LGBT1, P4, P5); social secretaries (P6); and head residents (P6). Only LGBT1 shared their reasoning for involving as many resources as possible. She/he said this would increase the chances of sourcing enough people to collaborate in organising the intervention.

Dealing with the challenge of motivating participants to attend

All 12 participants acknowledged that motivating participants to attend an intervention would be a challenge. Six of those 12 proposed a solution to problem of motivation. The approach proposed by some participants was to implement it as a mandatory programme (P1, PRS1, P6, P7, OUSU1, P2). Four participants opposed this opinion and stated that this will be counterproductive (W1, P3, P5, LGBT1). P3 and W1 thought that imposing a mandatory programme on students would lead to resentment, ultimately resulting in a poor outcome for the intervention.

Other challenges in implementing the program at Oxford

Two participants added other challenges regarding the implementation of the program at Oxford; the differences between colleges in terms of attitudes and resources (P1), and differences in college turnover (P3). P1 pointed out that colleges have individual resources and opinions, which could lead to the intervention being implemented more effectively in some colleges than others, while P3 said that there is a large turnover of people in the college setting with MCRs/JCRs changing frequently, which creates problems in implementing interventions.

Chapter 5 - Conclusion

Evaluation of behavioural interventions

This thesis examined six types of bias that could occur when conducting an intervention: selection bias, reporting bias, performance bias, detection bias, attrition bias, and bias based on imbalances between groups at baseline. Overall, most of the studies examined presented an unclear bias risk due to limitations in their information reporting. This lack of reporting was also evident in previously conducted systematic reviews, such as Shepherd et al (2011). Shepherd et al (2011) point out that, although CONSORT and other guidelines exist, there are still gaps in many of the studies in terms of methodological details. This thesis strongly recommends that subsequent researchers adhere to these guidelines in order to improve the quality of reporting, as this would lead to easier and more accurate judgment of the rigours of their work.

As the methods chapter sets out (chapter 2), this thesis follows the advice of Higgins and Greens (2008). A meta-analysis was not conducted, and therefore the effects of the interventions were summarised. From the summaries, it was apparent that only one study (Pedlow 2004) measured the intervention's impact on STI incidence rates, concluding that the intervention was not effective in decreasing STI incidence rates at 2-month follow-up. Aside from this, other intervention outcomes yielded inconsistent results, with some (but not all) studies exhibiting an effect. These outcomes include high-risk behaviours, preventative behaviours, and mediators of behaviour change. Further research is needed in order to better understand the effects of those outcomes; an apparent failure in target outcomes may relate to issues with implementation fidelity. Indeed, in most of the studies examined, implementation fidelity had not been considered, and steps to ensure fidelity were not taken. Where they had been taken, there was a lack of detail about them. In order to shed light on the efficacy of the interventions, this thesis recommends that process evaluation be conducted. This is crucial, as it shows whether the failure of an intervention is due to problems in the

theory underpinning the intervention, or simply its delivery (Steckler et al, 2002; Rychetnik et al, 2002; Durlak and Dupre, 2008).

Applicability of the research findings

The results of the focus group discussions show that there are certain aspects of the interventions already conducted that are not applicable at the University of Oxford. Specifically, these factors include the gender of the population; and two target outcomes - the abstinence from sex and reduced number of sexual partners. Regarding gender, participants said that some Oxford students might not identify with the gender they were assigned at birth, and that they would not like those people to be excluded from the sample. In the systematic review most of the interventions contained a sample from females: in total, 2277 of 3651 participants across the studies were female. Regarding abstinence from sex and a reduction in the number of sexual partners, focus group participants argued that these outcomes are unlikely to be achieved, as people resent being told what to do. Indeed, they suggested that these outcomes are counterproductive, as the individual is still at risk even if unprotected sex only occurs once. In the systematic review two studies aimed to reduce the number of number of sexual partner (Pedlow 2004; Bulduk 2012), and one targeted abstinence (Bulduk 2012).

There were other aspects of the interventions which the participants of the focus groups found applicable to the Oxford setting, such as the inclusion of sexually active and inactive individuals in the sample. This was a factor present in Hopfer 2012, Metha 2013, and Mortimer 2015. All 12 participants approved of this combination, as some of them thought that people would be very unlikely to stay sexually inactive forever.

Finally, there were aspects of the interventions in the systematic review which led to contradictory opinions among the participants. It was therefore inconclusive whether these would be applicable at Oxford. Such points of controversy include whether or not the researcher who designs an intervention should be used as its deliverer.

It should be noted that although the results underpin important insights regarding the applicability of intervention aspects, only 12 participants were recruited in the focus groups. There is a need for further recruitment of student representatives from other

colleges and societies in order to further investigate these results and increase their general applicability.

Implementation

The focus group discussions show the aspects which need to be taken into consideration if an intervention is to be designed at Oxford. These considerations include the challenges of motivating students, the need for co-operation from all colleges, and the frequent turnover of JCR and MCR members. All focus group participants considered motivating students to be a major challenge on account of busy student schedules and a lack of motivation to engage with sexual health-related activities. As a solution to this some participants proposed implementing the intervention as a mandatory programme, while others disagreed, stating that this would cause resentment and would ultimately undermine the objectives of the intervention. A major problem with engaging MCR and JCR committees to co-operate in organising interventions is their rapid turnover, with elected representatives changing every year. This poses a difficulty when implementing the intervention, as new starters may not have developed sufficient contacts to implement such an intervention in their colleges. A suggested solution was to ensure that the program is implemented by permanent staff members instead. Finally, a problem is presented in the vast differences between Oxford's colleges. Different colleges have different objectives, and when implementing such a program at Oxford it is vital to ensure the co-operation of all colleges. A solution for this could be an intercollege competition which offers a prize to the college that best implements the program.

Strengths of this thesis

A strength of this thesis is that such systematic review has not been done before; it is also unique in showing which aspects of an STI-prevention intervention could be applicable to the Oxford University setting, and the ways in which this intervention could be implemented. Moreover, the review and the focus group presented a variety of methodological strengths. The review provided a robust search of around 11,989 studies from a variety of sources such as grey literature, e-journals, hand-searching, contacting professionals, and from reference lists of previous reviews. The methodological strength

of the focus groups lay in their reliability and validity thanks to measures taken in their conduction, including respondent validation, careful use of quotations, and the reflexivity of the researcher.

Limitations and further developments

The above sections summarised the overall results and outlined: strengths, some limitations and further developments. Some further limitations and developments are concluded underneath.

Due to time constraints it was not possible to contact the authors of the studies covered in the review for clarification. Furthermore, due to a lack of financial resources, 14 excluded studies in the systematic review were not ordered from COPAC and WordCat. Finally, it was difficult to fully clarify responses to focus group participants' questions about the intervention components due to the workshop time limit of 1h30. In subsequent focus group designs it is important that this extra time be taken into consideration in order to ensure that participants have a solid understanding of the interventions. For example, the focus group workshops could be split into two sessions: one for presenting the results and clarifying answers to participants' questions; and a second session for asking participants' opinions.

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Appendix

Section A: Online Database search strings

PubMed string

	SEARCH TERMS	NUMBER OF HITS
Targeted issues / outcome terms		
#1	(((STI incidence) OR STI incidence) OR STD incidence) OR STD incidence	10971
#2	(((sexual risk behaviour[Title/Abstract]) OR sexual risk behavior[Title/Abstract]) OR risky sexual behaviour[Title/Abstract]) OR risky sexual behavior[Title/Abstract]	2968
#3	Risk-Taking [Mesh]	26060
#4	condom[MeSH Terms]	8804
#5	(((unprotected sex[Title/Abstract]) OR unprotected intercourse[Title/Abstract]) OR safe sex[Title/Abstract]) OR condom[Title/Abstract]) OR condoms[Title/Abstract]	20586
#6	(((STI test*[Title/Abstract]) OR STD test*[Title/Abstract]) OR STD screening[Title/Abstract]) OR STI screening[Title/Abstract]) OR STI vaccination[Title/Abstract]) OR STD vaccination[Title/Abstract]	1387
#7	sexual partner[MeSH Terms]	12660
#8	(health knowledge[Title/Abstract]) OR health awareness[Title/Abstract]	2206
#9	safe sex intention[Title/Abstract]) OR self-efficacy[Title/Abstract]) OR sex attitude[Title/Abstract]	18705
#10	(((((((((((STI incidence) OR STI incidence) OR STD incidence) OR STD incidence)) OR (((((sexual risk behaviour[Title/Abstract]) OR sexual risk behavior[Title/Abstract]) OR risky sexual behaviour[Title/Abstract]) OR risky sexual behavior[Title/Abstract])) OR risk taking[MeSH Terms]) OR condom[MeSH Terms]) OR ((((((unprotected sex[Title/Abstract]) OR unprotected intercourse[Title/Abstract]) OR safe sex[Title/Abstract]) OR condom[Title/Abstract]) OR condoms[Title/Abstract])) OR ((((((STI test*[Title/Abstract]) OR STD test*[Title/Abstract]) OR STD screening[Title/Abstract]) OR STI screening[Title/Abstract]) OR STI vaccination[Title/Abstract]) OR STD	73387 [Combining all targeted issues/outcome terms]

	SEARCH TERMS	NUMBER OF HITS
	vaccination[Title/Abstract])) OR sexual partner[MeSH Terms] OR (((health knowledge[Title/Abstract]) OR health awareness[Title/Abstract])) OR ((safe sex intention[Title/Abstract]) OR self-efficacy[Title/Abstract]) OR sex attitude[Title/Abstract]))	
Intervention terms		
#11	(risk reduction[Title/Abstract]) OR risk reducing[Title/Abstract]	16131
#12	(change[Title/Abstract]) OR modification[Title/Abstract]	1058150
#13	((intervention[Title/Abstract]) OR interventions[Title/Abstract])	1187743
#14	((prevention[Title/Abstract]) OR preventing[Title/Abstract]) OR prevented[Title/Abstract]	731174
#15	Behaviour control [MeSH]	12288
#16	Primary Prevention [MeSH]	9558
#17	health promotion [Mesh]	63203
#18	health promotion [Title/Abstract]	25006
#19	health education [MeSH]	147162
#20	health education[Title/Abstract]	27128
#21	((((((((((risk reduction[Title/Abstract]) OR risk reducing[Title/Abstract])) OR ((intervention[Title/Abstract]) OR interventions[Title/Abstract])) OR behavior control[MeSH Terms]) OR health promotion[Title/Abstract]) OR health education[Title/Abstract]) OR health education[MeSH Terms]) OR health promotion[MeSH Terms]) OR primary prevention[MeSH Terms]) OR ((change[Title/Abstract]) OR modification[Title/Abstract])) OR (((prevention[Title/Abstract]) OR preventing[Title/Abstract]) OR prevented[Title/Abstract]))	73387 [Combining all intervention terms]
Population/setting terms		
#22	(college[Title/Abstract]) OR colleges[Title/Abstract]	91087
#23	(university[Title/Abstract]) OR universities[Title/Abstract]	284522
#24	(postgraduate[Title/Abstract]) OR postgraduates[Title/Abstract]	14066
#25	universities[MeSH Terms]	32037
#26	(freshman[Title/Abstract]) OR freshmen[Title/Abstract]	1902
#27	(undergraduate[Title/Abstract]) OR undergraduates[Title/Abstract]	30260
#28	(university student[Title/Abstract]) OR university students[Title/Abstract]	9558
#29	(college student[Title/Abstract]) OR college students[Title/Abstract]	15457
#30	((college[Title/Abstract]) OR colleges[Title/Abstract] OR (university[Title/Abstract]) OR universities[Title/Abstract] OR (postgraduate[Title/Abstract]) OR postgraduates[Title/Abstract] OR universities[MeSH	400982 [Combining all Population/Setting terms]

	SEARCH TERMS	NUMBER OF HITS
	Terms] OR (freshman[Title/Abstract]) OR freshmen[Title/Abstract] OR (undergraduate[Title/Abstract]) OR undergraduates[Title/Abstract] OR (university student[Title/Abstract]) OR university students[Title/Abstract] OR (college student[Title/Abstract]) OR college students[Title/Abstract])	
Final string		
#31	((((((((((((STI incidence) OR STI incidence) OR STD incidence) OR STD incidence)) OR (((sexual risk behaviour[Title/Abstract]) OR sexual risk behavior[Title/Abstract]) OR risky sexual behaviour[Title/Abstract]) OR risky sexual behavior[Title/Abstract])) OR risk taking[MeSH Terms]) OR condom[MeSH Terms]) OR (((unprotected sex[Title/Abstract]) OR unprotected intercourse[Title/Abstract]) OR safe sex[Title/Abstract]) OR condom[Title/Abstract]) OR condoms[Title/Abstract])) OR (((STI test*[Title/Abstract]) OR STD test*[Title/Abstract]) OR STD screening[Title/Abstract]) OR STI screening[Title/Abstract]) OR STI vaccination[Title/Abstract]) OR STD vaccination[Title/Abstract])) OR sexual partner[MeSH Terms]) OR (((health knowledge[Title/Abstract]) OR health awareness[Title/Abstract])) OR ((safe sex intention[Title/Abstract]) OR self-efficacy[Title/Abstract]) OR sex attitude[Title/Abstract])) AND (((((((((((risk reduction[Title/Abstract]) OR risk reducing[Title/Abstract])) OR ((intervention[Title/Abstract]) OR interventions[Title/Abstract])) OR behavior control[MeSH Terms]) OR health promotion[Title/Abstract]) OR health education[Title/Abstract]) OR health education[MeSH Terms]) OR health promotion[MeSH Terms]) OR primary prevention[MeSH Terms]) OR ((change[Title/Abstract]) OR modification[Title/Abstract])) OR ((prevention[Title/Abstract]) OR preventing[Title/Abstract]) OR prevented[Title/Abstract])) AND (((college[Title/Abstract]) OR colleges[Title/Abstract] OR (university[Title/Abstract]) OR universities[Title/Abstract] OR (postgraduate[Title/Abstract]) OR postgraduates[Title/Abstract] OR universities[MeSH Terms] OR (freshman[Title/Abstract]) OR freshmen[Title/Abstract] OR (undergraduate[Title/Abstract]) OR undergraduates[Title/Abstract] OR (university student[Title/Abstract]) OR university students[Title/Abstract] OR (college student[Title/Abstract]) OR college students[Title/Abstract]))	2631 [Targeted issues] AND [Intervention terms] AND [Population/setting terms]

PsychInfo string

	SEARCH TERMS	NUMBER OF HITS
Targeted issues / outcome terms		
#1	(STI incidence or STI incidence or STD incidence or STD incidence).af.	170
#2	sexual risk behaviour.ti. or sexual risk behaviour.ab. or sexual risk behavior.ti. or sexual risk behavior.ab.	1439
#3	risky sexual behaviour.ti. or risky sexual behaviour.ab. or risky sexual behavior.ti. or risky sexual behavior.ab.	1284
#4	exp sexual risk taking/	7299
#5	exp CONDOMS/	3506
#6	unprotected sex.ti. or unprotected sex.ab. or unprotected intercourse.ti. or unprotected intercourse.ab. or safe sex.ti. or safe sex.ab. or condom*.ab. or condom*.ti.	10248
#7	STI test*.ti. or STI test*.ab. or STD test*.ab. or STD test*.ti. or STI screening.ti. or STI screening.ab. or STD screening.ab. or STD screening.ti. or vaccination.ab. or vaccination.ti.	3345
#8	exp Sexual Partners/	4581
#9	health knowledge.ti. or health knowledge.ab. or health awarness.ti. or health awarness.ab.	925
#10	safe sex intention.ti. or safe sex intention.ab. or self-efficacy.ti. or self-efficacy.ab. or sex attitude.ti. or sex attitude.ab.	29825
#11	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	50645 [Combining all targeted issues/outcome terms]
Intervention terms		
#12	risk reduction.ti. or risk reduction.ab. or risk reducing.ti. or risk reducing.ab.	4285
#13	change.ti. or change.ab. or modification.ti. or modification.ab.	259512
#14	intervention*.ti. or intervention*.ab. or prevention.ti. or prevention.ab.	353810
#15	exp Health Promotion/	20199
#16	exp Health Education/	16312
#17	exp behaviour change/	10545
#18	health promotion.ti. or health promotion.ab.	11143
#19	health education.ti. or health education.ab.	6986
#20	12 or 13 or 14 or 15 or 16 or 17 or 18 or 19	598464 [Combining all intervention terms]
Population/setting terms		
#21	college*.ti. or college*.ab. or universit*.ab. or universit*.ti.	213998
#22	postgraduate.ti. or postgraduate.ab. or postgraduates.ab. or postgraduates.ti.	4508

	SEARCH TERMS	NUMBER OF HITS
#23	freshman.ti. or freshman.ab. or freshmen.ab. or freshmen.ti.	6712
#24	undergraduate.ti. or undergraduate.ab. or undergraduates.ab. or undergraduates.ti.	98029
#25	university student.ti. or university student.ab. or university students.ab. or university students.ti.	27922
#26	college student.ti. or college student.ab. or college students.ab. or college students.ti.	56261
#27	21 or 22 or 23 or 24 or 25 or 26	295181 [Combining all Population/setting terms]
Final string		
#28	11 and 20 and 27	2400 [Targeted issue] AND [Intervention] AND [Population/setting]

Embase string

	SEARCH TERMS	NUMBER OF HITS
Targeted issues / outcome terms		
#1	(STI incidence or STI incidence or STD incidence or STD incidence).af	247
#2	sexual risk behaviour.ti. or sexual risk behaviour.ab. or sexual risk behavior.ti. or sexual risk behavior.ab.	1984
#3	risky sexual behaviour.ti. or risky sexual behaviour.ab. or risky sexual behavior.ti. or risky sexual behavior.ab.	1471
#4	exp "condom use"/	3379
#5	unprotected sex.ti. or unprotected sex.ab. or unprotected intercourse.ti. or unprotected intercourse.ab. or safe sex.ti. or safe sex.ab. or condom*.ab. or condom*.ti.	22466
#6	STI test.ti. or STI test.ab. or STI tests.ti. or STI tests.ab. or STD test.ab. or STD test.ti. or STD tests.ab. or STD tests.ti. or STI screening.ab. or STD screening.ti. or STI vaccination.ab. or STD vaccination.ti.	773
#7	sexual partner*.ti. or sexual partner*.ab.	11812
#8	health knowledge.ti. or health knowledge.ab. or health awarness.ti. or health awarness.ab.	2303
#9	safe sex intention.ti. or safe sex intention.ab. or self-efficacy.ti. or self-efficacy.ab. or sex attitude.ti. or sex attitude.ab.	21842
#10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	342716 [Combining all Targeted issues term]
Intervention terms		
#12	risk reduction.ti. or risk reduction.ab. or risk reducing.ti. or risk reducing.ab.	21660
#13	change.ti. or change.ab. or modification.ti. or modification.ab.	1317610

	SEARCH TERMS	NUMBER OF HITS
#14	exp health promotion/	85271
#15	exp behavior control/	3786
#16	health promotion.ti. or health promotion.ab.	26588
#17	health education.ti. or health education.ab.	28297
#18	intervention.ti. or intervention.ab. or interventions.ti. or interventions.ab. or prevention.ti. or prevention.ab.	1394201
#19	12 or 13 or 14 or 15 or 16 or 17 or 18	2685034 [Combining all intervention terms]
Population/setting terms		
#20	postgraduate.ti. or postgraduate.ab. or postgraduates.ab. or postgraduates.ti.	18433
#21	freshman.ti. or freshman.ab. or freshmen.ab. or freshmen.ti.	2369
#22	undergraduate.ti. or undergraduate.ab. or undergraduates.ab. or undergraduates.ti.	34228
#24	college student.ti. or college student.ab. or college students.ab. or college students.ti. or university student.ti. or university student.ab. or university students.ab. or university students.ti.	664578
#25	university.ti. or university.ab. or universities.ab. or universities.ti.	512105
#26	college.ti. or college.ab. or colleges.ab. or colleges.ti.	189613
#27	20 or 21 or 22 or 23 or 24	700149 [Combining Population/setting terms]
Final string		
#28	10 and 19 and 27	2420 [Targeted issues/outcomes] AND [Intervention] AND [Population/setting terms]

Medline string

	SEARCH TERMS	NUMBER OF HITS
Targeted issues / outcome terms		
#1	(STI incidence or STI incidence or STD incidence or STD incidence).af.	199
#2	sexual risk behaviour.ti. or sexual risk behaviour.ab. or sexual risk behavior.ti. or sexual risk behavior.ab	1592
#3	risky sexual behaviour.ti. or risky sexual behaviour.ab. or risky sexual behavior.ti. or risky sexual behavior.ab.	1141
#4	exp Condoms/	9255
#5	unprotected sex.ti. or unprotected sex.ab. or unprotected intercourse.ti. or unprotected intercourse.ab. or safe sex.ti. or safe sex.ab. or condom*.ab. or condom*.ti.	19691
#6	STI test.ti. or STI test.ab. or STI tests.ti. or STI tests.ab. or STD test.ab. or STD test.ti. or STD tests.ab. or STD tests.ti. or STI screening.ab. or STD screening.ti. or STI vaccination.ab. or STD vaccination.ti.	370

	SEARCH TERMS	NUMBER OF HITS
#7	sexual partner*.ti. or sexual partner*.ab.	9357
#8	health knowledge.ti. or health knowledge.ab. or health awarness.ti. or health awarness.ab.	1812
#9	safe sex intention.ti. or safe sex intention.ab. or self-efficacy.ti. or self-efficacy.ab. or sex attitude.ti. or sex attitude.ab.	16643
#10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	45198 [Combining all Targeted issues term]
Intervention terms		
#11	risk reduction.ti. or risk reduction.ab. or risk reducing.ti. or risk reducing.ab.	14520
#12	change.ti. or change.ab. or modification.ti. or modification.ab.	964462
#13	exp health promotion/	67234
#14	exp behavior control/	12697
#15	health promotion.ti. or health promotion.ab.	21523
#16	health education.ti. or health education.ab.	23577
#17	intervention.ti. or intervention.ab. or interventions.ti. or interventions.ab. or prevention.ti. or prevention.ab.	973786
#18	11 or 12 or 13 or 14 or 15 or 16 or 17	1938513 [Combining all intervention terms]
Population/setting terms		
#19	postgraduate.ti. or postgraduate.ab. or postgraduates.ab. or postgraduates.ti.	12043
#20	freshman.ti. or freshman.ab. or freshmen.ab. or freshmen.ti.	1708
#21	undergraduate.ti. or undergraduate.ab. or undergraduates.ab. or undergraduates.ti.	26472
#22	college student.ti. or college student.ab. or college students.ab. or college students.ti. or university student.ti. or university student.ab. or university students.ab. or university students.ti.	22703
#23	university.ti. or university.ab. or universities.ab. or universities.ti.	257939
#24	college.ti. or college.ab. or colleges.ab. or colleges.ti.	79819
#25	19 or 20 or 21 or 22 or 23 or 24	351140
#26	10 and 18 and 25	1587
#27	1 or 2 or 3 or 5 or 6 or 7 or 8 or 9 or 27	46625 [Combining Population/setting terms]
Final string		
#28	10 and 18 and 27	1532 [Targeted issue] AND [Intervention] AND [Population/setting]

Section B: Grey literature search

ASSIA string

	SEARCH TERMS	NUMBER OF HITS
Targeted outcomes terms		
#1	TI,AB(STI incidence) or TI,AB(STD incidence)	3333
#2	TI,AB(sexual risk behaviour) or TI,AB(sexual risk behavior) .	122
#3	TI,AB(risky sexual behaviour) or TI,AB(risky sexual behaviour) .	868
#4	SU.EXACT("Condoms" OR "Female condoms")	1409
#5	TI,AB(unprotected sex) or TI,AB(unprotected intercourse) or TI,AB(safe sex) or TI,AB(condom*)	3932
#6	TI,AB(STI test*) or TI,AB(STD test*) or TI,AB(STI screening) or TI,AB(STD screening) or TI,AB(STI vaccination) or TI,AB(STD vaccination)	629
#7	SU.EXACT("Sexual partners")	360
#8	TI,AB(health knowledge) or TI,AB(health awareness)	13700
#9	TI,AB(safe sex intention) or TI,AB(self-efficacy) or TI,AB(sex attitude)	7155
#10	(TI,AB(STI incidence) or TI,AB(STD incidence)) OR (TI,AB(sexual risk behaviour) or TI,AB(sexual risk behavior) .) OR (TI,AB(risky sexual behaviour) or TI,AB(risky sexual behaviour) .) OR SU.EXACT("Condoms" OR "Female condoms") OR (TI,AB(unprotected sex) or TI,AB(unprotected intercourse) or TI,AB(safe sex) or TI,AB(condom*)) OR (TI,AB(STI test*) or TI,AB(STD test*) or TI,AB(STI screening) or TI,AB(STD screening) or TI,AB(STI vaccination) or TI,AB(STD vaccination)) OR SU.EXACT("Sexual partners") OR (TI,AB(health knowledge) or TI,AB(health awareness)) OR (TI,AB(safe sex intention) or TI,AB(self-efficacy) or TI,AB(sex attitude))	26221 [Combining all Targeted issues term]
Intervention terms		
#11	TI,AB(risk reduction) or TI,AB(risk reducing)	5932
#12	TI,AB(change) or TI,AB(modification)	73982
#13	TI,AB(health promotion) OR SU.EXACT("Sexual health promotion")	6422
#14	TI,AB(health education) OR SU.EXACT("Behavioural health education")	17050
#15	TI,AB(intervention) OR TI,AB(prevention)	79878
#16	(TI,AB(risk reduction) or TI,AB(risk reducing)) OR (TI,AB(change) or TI,AB(modification)) OR (TI,AB(health promotion) OR SU.EXACT("Sexual health promotion")) OR (TI,AB(health education) OR SU.EXACT("Behavioural health education")) OR (TI,AB(intervention) OR TI,AB(prevention))	156445 [Combining all intervention terms]
Population/setting terms		
#17	TI,AB(postgraduate*) OR TI,AB(undergraduate*)	9270
#18	TI,AB(freshman) OR TI,AB(freshmen)	478
#19	TI,AB(university student*) OR TI,AB(college student*)	16232
#20	(TI,AB(postgraduate*) OR TI,AB(undergraduate*)) OR (TI,AB(freshman) OR TI,AB(freshmen)) OR	23419 [Combining

	SEARCH TERMS	NUMBER OF HITS
	(TI,AB(university student*) OR TI,AB(college student*))	Population/setting terms
Final string		
#21	((TI,AB(STI incidence) or TI,AB(STD incidence)) OR (TI,AB(sexual risk behaviour) or TI,AB(sexual risk behavior)) OR (TI,AB(risky sexual behaviour) or TI,AB(risky sexual behaviour) .) OR SU.EXACT("Condoms" OR "Female condoms") OR (TI,AB(unprotected sex) or TI,AB(unprotected intercourse) or TI,AB(safe sex) or TI,AB(condom*)) OR (TI,AB(STI test*) or TI,AB(STD test*) or TI,AB(STI screening) or TI,AB(STD screening) or TI,AB(STI vaccination) or TI,AB(STD vaccination)) OR SU.EXACT("Sexual partners") OR (TI,AB(health knowledge) or TI,AB(health awareness)) OR (TI,AB(safe sex intention) or TI,AB(self-efficacy) or TI,AB(sex attitude))) AND ((TI,AB(risk reduction) or TI,AB(risk reducing)) OR (TI,AB(change) or TI,AB(modification)) OR (TI,AB(health promotion) OR SU.EXACT("Sexual health promotion")) OR (TI,AB(health education) OR SU.EXACT("Behavioural health education")) OR (TI,AB(intervention) OR TI,AB(prevention))) AND ((TI,AB(postgraduate*) OR TI,AB(undergraduate*)) OR (TI,AB(freshman) OR TI,AB(freshmen)) OR (TI,AB(university student*) OR TI,AB(college student*)))	2999 [Targeted issue] AND [Intervention] AND [Population/setting]

Section C: Characteristics of studies

Characteristics of excluded studies

AUTHOR	REASON FOR EXCLUSION
Angadi et al (2013)	Not an RCT
Barkley (1994)	Not an RCT
Basen-Engquist (1994)	Not found in SOLO
Bryan et al (1996)	RCT but not in the targeted age range of this systematic review
Calloway et al (2014)	Not an RCT
Cheramie (1998)	Not an RCT
Chernoff and Davison (2005)	RCT but not in the targeted age range of this systematic review
Chi et al (2015)	Not an RCT
D'Augelli and Kennedy (1989)	Not an RCT
Doherty and Low (2009)	Not found in SOLO
Dommenyer et al (1989)	Not found in SOLO
Egole-Oziri (2012)	Not an RCT
Ementu et al (2014)	Not an RCT
Farrell et al (2008)	Not found in SOLO

Fisher et al (1996)	RCT but not in the targeted age range of this systematic review
Franzini et al (1990)	RCT but not in the targeted age range of this systematic review
Fraser (1997)	Not found in SOLO
Greaves et al (2009)	Not an RCT
Gurdin et al (2008)	Not found in SOLO
Helion et al (2008)	RCT but not in the targeted age range of this systematic review
Ibrahim et al (2012)	RCT but not in the targeted age range of this systematic review
Jackson D (2014)	Not an RCT
Jackson et al (2016)	Not an RCT
Jackson P (2014)	Not an RCT
Jankovitz (1995)	RCT but not in the targeted age range of this systematic review
Jaworki and Carey (2001)	RCT but not in the targeted age range of this systematic review
Jenes et al (2008)	Not an RCT
John et al (2017)	Not an RCT
Kanekar (2010)	RCT but not in the targeted age range of this systematic review
Kiene and Barta (2006)	RCT but not in the targeted age range of this systematic review
Kim et al (2015)	Not an RCT
Knight (1994)	RCT but not in the targeted age range of this systematic review
LaBrie et al (2008)	Not an RCT
Lewis (2011)	Not an RCT
Lin et al (2016)	Not an RCT
Marsiglia et al (2013)	Not an RCT
Miller et al (2008)	Not an RCT
Moore et al (2012)	RCT but not in the targeted age range of this systematic review
Najarkolaei et al (2013)	Not an RCT
Negash et al (2013)	RCT but not in the targeted age range of this systematic review
Nokes (1996)	Not found in SOLO
O'Grady et al (2009)	RCT but not in the targeted age range of this systematic review
Okoror (2006)	RCT but not in the targeted age range of this systematic review
Ploem and Byres (1997)	RCT but not in the targeted age range of this systematic review
Richie and Getty (1994)	Not an RCT
Rye (1998)	Not found in SOLO
Sain (2006)	RCT but not in the targeted age range of this systematic review
Sanderson and Yopyk (2007)	RCT but not in the targeted age range of this systematic review
Schyler et al (2016)	RCT but not in the targeted age range of this systematic review
Shearer (2014)	Not an RCT
Shulkin et al (1991)	Not found in SOLO
Starosta et al (2016)	RCT but not in the targeted age range of this systematic review
Stegall-Harris (1994)	Not found in SOLO
Swayer (1990)	Not found in SOLO
Tesar (1996)	Not found in SOLO
Tung et al (2015)	Not an RCT
Turner et al (1994)	Not an RCT
Tyden (1994)	Not an RCT
Tyden et al (1998)	Not an RCT
Wilson et al (1992)	RCT but not in the targeted age range of this systematic review

Wusu and Okoukoni (2011)	Not an RCT
Yep (1993)	Not found in SOLO

Characteristic of included studies

AUTHORS	METHODS	PARTICIPANTS	INTERVENTIONS	TARGETED OUTCOMES
Perez 2016	RCT – intervention vs alternative intervention Assessment times: Post-intervention 1 month follow up Data collection: Questionnaire	US N: 62 Age: 18-26 Gender: female only	HPV <u>Intervention content</u> Designed: Information-motivation-behavioural skills model Duration: A single-session intervention Delivery: Group facilitator Brief content summary: <u>Vaccination Information Statement:</u> a brief overview of HPV and supplementary educational content related to HPV and HPV vaccine <u>Motivational module:</u> delivered by using motivational interviewing techniques <u>Skills building module:</u> ways to access HPV vaccine; methods for paying for the vaccine including information about insurance coverage; reminder tools to ensure completion of all three doses; approaches to communicate HPV vaccine interest to other people such as family. <u>Comparison intervention:</u> Vaccination Information Statement – a brief overview of HPV; Short video clips about women’s health in general.	HPV vaccine knowledge HPV and cervical cancer knowledge Perceived motivation Intentions for vaccination Attitude towards vaccination Perceived social norms for getting vaccination Perceived cervical cancer risk Perceived difficulty Perceived efficacy Vaccine seeking behaviour

Mantell 2015	RCT – intervention vs alternative intervention Assessment times: Follow-up at 2.5 months and at 5 months Data collection: Interviews	South Africa N: 296 Age: 18-28 Gender: only female	HIV/AIDS <u>Intervention content:</u> Designed: Social Learning Duration: Two sessions, 4-5 hours Delivery: Group facilitators Brief content summary: Information about HIV transmission; Importance of barrier method use; ways to use condoms; brief overview of female reproductive system; partner negotiation ; personal goal setting to achieve HIV prevention; ways to obtain and maintain condom supply. <u>Comparison intervention:</u> One session, 1-1.5 hours Information about HIV transmission; Importance of barrier method use; How to use condoms; Brief overview of female reproductive system	Number of vaginal intercourse occasions unprotected by either male condoms or female condoms. Number of female condoms used; Personal attitude towards condom use Unintended pregnancy Proportion of FC-protected vaginal intercourse occasions Proportion of vaginal intercourse occasions protected by either a female or male condom Male condom/FC use at last sex occasion Perceived susceptibility to HIV Intention to use FCs Peer norms for condom use Condom use self-efficacy Partner's perceived attitude toward male condom use Partner's perceived attitude towards female condom use
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Lustria 2016	RCT – intervention vs alternative intervention Assessment times: Post-test only, no follow-up measure Data collection: Survey	US N: 1065 participants Age: 18-26 Gender: male and female	All STIs <u>Intervention content:</u> Designed: Health belief model Duration: encouraged to explore the website for at least 10 min Delivery: computer delivered Brief summary of content: Tailored educational Website including: what is an STD, common types of STDs, signs and symptoms, risk factors, how to reduce risk, and options for STD testing received tailored persuasive content based on their responses to a theory-based STD risk assessment Participants in the tailored condition received unique combinations of messages, testimonials, feedback, and images based on their individual health information needs and matched with their pre-test responses. <u>Comparison intervention:</u> Non-tailored educational Website; General information from the CDC website	Intention to get tested STI test ordering behaviour Perceived risk of STI
Mortimer 2015	RCT – intervention vs alternative intervention Assessment times: Follow up conducted	Australia N: 747 Age: 18-29 Gender: female – 309,	All STIs <u>Intervention content:</u> Designed: Health Belief Model Duration: unknown – the length of time varied	Proportion of participants who self-reported for being tested for STI Intention towards being STI tested

	in October. Unknown how long it was done after the completion of the intervention Data collection: Survey	male – 438	Delivery: computer-based Brief summary of content: A website with evidence-based information about sexual health and indications and procedures for STIs testing. The educational content was adapted from NSW Health services. Aim to change people's perceived susceptibility to and severity of STIs. Done by offering educational component that aims to increase people's STI related knowledge and understanding of the prevalence of the infection and its associated risk factors and through recommendation for screening. Aim to increase people's perceived benefits of STIs testing. Done by presenting it as a positive social norm. Motivates people to test by including "Book now" button. Comparison intervention:- A static website – no information on what it included	Attitude towards being STI tested
Saad 2012	RCT – intervention vs placebo intervention Assessment times: 3 months and at 6 months post-intervention Data collection: Questionnaires	Nigeria N: 240 Age: 17–24 Gender: 175 male; 60 female	All STIs Intervention content Designed: Information-Motivation-Behavioral Skills Duration: 8h ; four 2-h group sessions; 30-min breaks between each session; a single booster session of 4-h duration was provided at 3 months Delivery: peer-led, use of manual; facilitator training: Two weeks prior to the intervention; 3-day workshop including evaluation; re-fresher training 3 days before the intervention; 10 people selected based on who is most	HIV-related stigma HIV knowledge STI knowledge Attitude towards STI prevention STI sexual risk behaviour

			respected by their peers – unknown how they judged that. Brief content summary: Lectures and interactive formats including role-play for problem-solving; small-group discussions, empathy exercises to reinforce learning and encourage participation, and reading material for self-study. <u>Comparison intervention</u> Placebo - 8 hour intervention on career development	
Hopfer 2012	RCT- 3 types of interventions compared to 2 types of control groups Assessment times: 2 month; Post-test Data collection: Survey	US Total number of participants: 404 Age: 18-26 Gender: women	HPV <u>Intervention content:</u> Designed: Culture-centric narrative theory and Social Cognitive theory and Exemplification theory Duration: Two peer-only interventions – 3.46 min and 3.39 min Expert only intervention – 1.25 min; Peer and expert intervention – 4.11 min and 4.15 min Delivery: computer Brief content summary: A narrative video intervention which included four themes: susceptibility narratives, vaccine self-efficacy narratives, vaccine safety narratives, and mother-daughter narratives. Those themes were created with the help of college women who were interviewed. The treatment condition viewed one of three videos: two videos delivered by peers, one video delivered by medical experts, or two videos delivered by a combination of peers and experts.	HPV knowledge HPV vaccination intent HPV Vaccine Self-Efficacy HPV Vaccine Uptake

			<u>Comparison intervention/s:</u> Three non-narrative options. People in the control group received one of three possibilities: an informational video without narratives; information about HPV via campus website; no message. <u>Duration:</u> website control condition was 546 words in length while the informational video was 1 min in length	
Bulduk 2012	RCT – intervention vs no intervention Assessment times: Only posttest Data collection: Questionnaire	Turkey N: 118 Age: 18-29 Gender: female - 36 and male -82	All STIs Designed: Social cognitive theory Duration: 3 sessions, 3.5 hours Delivery: Peer-led, 5 peer leaders, aged 18-21, 30 hours of training, structured educational plan/ protocol with supervision from authors Brief summary of content: Session 1: factual information about STI transmission and prevention of HIV. Session 2: aimed to increase participant's self-efficacy Session 3: model on which participants were thought how to put condom <u>There was no comparison intervention</u>	Alcohol before sex HIV/AIDS knowledge Condom use Ability to ask the potential partner questions Abstinence from sex Vaginal intercourse with condom Oral intercourse with condom Anal intercourse with condom Talking with partner about condom use Refusing sexual intercourse with someone not using condom Number of sexual partners

Jahanfar and Rampal (2009)	RCT – intervention vs placebo intervention Assessment times: Posttest only Data collection: Questionnaire	Malaysia N: 530 Age: 17-27 Gender: female – 237, male – 293	HIV/AIDS <u>Intervention content:</u> Designed: Information-motivation-behavioural skills models Duration: 4 hour lecture, 20 min break in between Delivery: 8 adult educators, 6 peer facilitators; peer facilitators responsible for: comedy pantomimes, empathy exercises and poster activities. Selection of peer educators based on advice from university authority and interviews. Both adult and peer facilitators received intensive training with the duration of two days; A training manual was used by both adult and peer educators. They were monitored during the intervention. Brief summary of content: Four themes: AIDs risk-reduction; motivational enhancement approach; harm reduction model and health promotion. It was included abstinence before marriage as first best choice in accordance to the religious beliefs however it was also presented the option of condom use if the person is willing to do sex before marriage. It included: small group discussions, games, brainstorming, experimental exercises, skill-building activities and role play. <u>Comparison intervention:</u> placebo - career development conducted by peer facilitators who were trained in advance (4 hours of training in total)	HIV/AIDS knowledge Safer sex behaviour Safe sex attitudes
Singh 2003	RCT – intervention vs unknown Assessment times:	India N: 200	HIV/AIDS <u>Intervention content:</u>	HIV/AIDS knowledge Personal motivation Social motivation Behavioural intention

	Post-test – one month after Data collection: Questionnaire	Age: 18-22 Gender: female	Designed: Information-motivation-behavioural skills model Duration: 3 sessions, 1 session per week Delivery: unknown Brief summary of content: Session 1: information component - issues related to HIV transmission Session 2: motivation component – two videos that aimed to challenge the unfavourable personal attitudes and social norms that hinder preventive practices. Session 3: behavioural skills component – ways information can be sought, how to discuss about safer sexual practices with partner. Comparison intervention was not mentioned at all	Perceived difficulty Perceived effectiveness
Shearer 2014	RCT – intervention vs waitlist control condition Assessment times: 1 month follow up Data collection: Questionnaire	US Total number of participants: 100 Age: 18-25 Gender: 80.2% female and 20.8 male	All STIs <u>Intervention content</u> Designed: none specified but based on previous literature Duration: two hours long, three modules Delivery: computer-based, online course via WebCampus learn system Briefly summary of content: Module 1: Risk perception – references to actual prevalence data; online exercise to count the number of	Engagement in risky sex behaviours Condom use intentions Normative belief around condom use Condom use attitudes Condom use self-efficacy STI knowledge

			sexual partners Module 2: Condom use negotiation – online journal in which participants could list their barriers and discuss in a forum Module 3: Condom use skills – video was shown how to use a condom; participants were presented with exercises where they had the opportunity to identify condom errors in condom use <u>Waitlist control condition</u>	
Sweeny 2013	RCT – intervention vs placebo intervention Assessment times: Post test One month after Data collection: Survey	US N: 82 Age: 18-29 Gender: females Ethnicity: Caucasian (56.1%) or African-American (28%), bi-racial (9.8%), Asian-American (3.7%), or Latina (2.4%). Excluded: Students who had HPV vaccine already or began taking the HPV vaccine;	HPV <u>Intervention content</u> Designed: Theory of Planned Behaviour Duration: one session, one hour Delivery: principal investigator, maximum of 8 participants per intervention group Briefly summarised content: Presentation slides - basic factual information about HPV; limitations of using condoms; importance of discussing protective methods with partners; recommendations about annual Pap tests; discussion and information sources about STI testing and HPV vaccine; asymptomatic nature of HPV <u>Comparison intervention</u> - placebo – computer-based intervention about study skills- a YouTube video of duration 45 min.	HPV knowledge Future risk-reduction intentions: sexual partners, discussion of STIs with partners, receiving HPV vaccine, receiving a Pap smear test, test for STI Attitude towards HPV prevention Social norms Perceived behavioural control

		Did not engage in oral, anal and/or vaginal sex		
Metha 2013	RCT – intervention vs alternative intervention Assessment times: Post-test follow-up - between 1 and 3 months - unclear Data collection: Survey	US N: 90 Age: 18-25 Gender: only men Ethnicity: African American – 11 Caucasian – 64 Asian – 15 Excluded: Men who had taken HPV vaccine	HPV <u>Intervention content:</u> Designed: Health Belief Model, focus group with participants before the study, previous literature view Duration: one session of two hours Delivery: PowerPoint presentation, role plays, brain storming session, and discussions; both experimental and control interventions were implemented from the same researcher Briefly summarised content: Includes: information on negative consequences of HPV; statistics about HPV prevalence; information about HPV vaccine; correcting misperceptions about HPV; discussion about the fear of taking the vaccine, how to deal with costs of the vaccine and with busy schedules; discussion of benefits for prevention of the disease; enhancing self-efficacy by making nine steps in which the vaccine can be taken. <u>Comparison intervention:</u> traditional knowledge-based intervention	Perceived susceptibility Perceived severity Perceived benefits Perceived barriers Self-efficacy HPV Knowledge Intent to vaccinate
Pedlow 2004	RCT – intervention vs alternative intervention Assessment times: 2 month follow up; post-test	US N: 112 women Age: 18-24 Gender: female	All STIs <u>Intervention content:</u> Design: Information-motivation-behavioural skills (IMB); Social Cognitive theory; stages of change model; theory of reasoned action; principles of harm reduction	Unprotected vaginal sex Condom protected vaginal sex in the past 2 months Used coupon for STI testing

	Data collection: Questionnaire		Duration: single session, approximately 90 min Delivery: by the investigator; fidelity was checked: checklist that was immediately completed post-intervention – unclear what was the aim of this checklist and the results. Briefly summarised content: 10 sections; the emphasis of the sections and the inclusion of the certain sections dependent upon participant's needs; Intervention manual including all 10 sections; A personalised normative feedback form was prepared by the investigator based on the data from the pre-intervention measures and given to each participant. Use of motivational interviewing: using reflective listening, avoiding argumentation, client-cantered; clarifying misconceptions; reinforcing what she already knows; providing referral to obtain information in the future. <u>Comparison intervention:</u> Information only intervention, a private 27 minute video	Tested for STIs in the past two months (by self-report) Diagnosed with STI in the past 2 months (by self-report) Sexual partners Sexual communication about STIs Refusing to have unprotected vaginal or anal sex HIV knowledge STI knowledge Partner norms Peer norms Condom use attitude Behavioural intentions
Sikkema 1995	RCT – intervention vs alternative intervention Assessment times: Post-intervention One-month follow up Data collection:	US N: 55 Age: 19-22 Gender: Female only	HIV/AIDS <u>Intervention content:</u> Design: Focus group with college students and pilot testing of the programme Duration: four, 75 to 90min sessions, four week period Delivery: female doctoral student	Self-efficacy Sexual intercourse without condom Oral sex without condom Number of condoms used from the provided

	Survey		Content: Targeted aspects to reduce risk behaviours: problem-solving techniques to deal with personal triggers that lead to risky sexual behaviours; role-playing, modelling; alternatives to hypothetical or previous experienced sexual situations; strategies to avoid risky behaviour were discussed such as carrying condom use; group members role-played and rehearsed behavioural responses in small group of three members <u>Comparison intervention:</u> education only, 90 min; led by the same doctoral student who led the intervention session; the same intervention as in intervention group but without behavioural procedures for actual training and practice of skills.	HIV/AIDS knowledge Refusal of risk behaviour Suggestion of specific lower risk behavioural alternative
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Section D: Summary of findings table*

*Abbreviations used: CG = control group; IG = intervention group; BA= baseline; PT = post-test; FF = first follow up; SF = second follow up; M = mean;

Study	Targeted outcomes	Immediate Post-test (PT)	First follow up (FF)	Second follow up (SF)
Perez et al (2016)	HPV vaccine knowledge	BA to PT - increases for both IG and CG, p=0.99	PT to FF – increase for IG only, p=0.04, decrease for CG BA to FF – increase for IG (from M=5.27 to M =5.63); decrease for CG (from M=5.56 to 5.41)	No second follow up
	HPV and cervical cancer knowledge	BA to PT – increase for IG, p=0.03; compared to CG	PT to FF – no change for IG, p = 1.00; no change for CG BA to FF – increase for IG, p = 0.02; no change for CG	
	Perceived motivation	BA to PT - increase for IG, p=0.008 compared to CG	PT to FF - decline in both groups, IG (from M=2.85 to M = 2.53) CG (from M = 2.44 to M = 2.25) BA to FF – increase for IG, p=0.04 compared to CG	
	Intentions for vaccination	BA to PT – increase in IG (P<0.001) compared to CG	PT to FF – decrease in IG – p=0.006, CG unknown BA to FF – decrease in IG and CG (P=0.47)	
	Attitude towards vaccination	BA to PT – increase in IG (p <0.01) compared to CG (no significant change)	PT to FF – decrease in IG (p=0.02), compared to CG (no significant change). BA to FF – decrease in both groups – IG (from M = 53.78 to 47.25; from M =51.41 to 52.90)	

	Perceived social norms for getting vaccination	No statistically significant results	No statistically significant results	
	Perceived cervical cancer risk	BA to PT – no statistically significant change for either group (p=0.09)	PT to FF– decrease in intervention group (p=0.01) BA to FF – no change in either group (p=0.53)	
	Perceived difficulty	No significant change for either group (P=0.21)		
	Perceived efficacy	No significant change for either group (P=0.35)		
	Vaccine seeking behaviour	Only measured at follow up	No significant differences at 1 month (P=0.89) for either group; results of two groups compared; IG had 6.90 times higher odd to engage in vaccine seeking behaviour compared to CG.	
Mantell et al (2015)	number of vaginal intercourse occasions unprotected by either male condoms or female condoms	No post-test	BA to FF – reduction in both IG (0.53 lower, p = 0.02) and in CG (0.41 lower, p<0.0001)	BA to SF – reduction in both IG (0.39 times lower; p <0.0001) and CG (0.40 times lower; p<0.0001)
	number of female condoms used		BA to FF – increased in both IG (16.8 times; p<0.0001) and CG (135.6 times; p<0.0001)	BA to SF – increased in both IG (12.7 times; p<0.01) and CG (58.0 times; p<0.001)
	proportion of FC-protected vaginal intercourse occasions		BA to FF - increased in both CG (0.15 times; p<0.0001) and in IG (0.08 times, p <0.0001)	BA to SF – increased in both CG (0.17 times, p<0.0001) and in IG (0.11; p<0.0001)
	proportion of vaginal intercourse occasions protected by either a female or male condom		BA to FF – increase in both CG (0.29 times; p <0.0001) and IG (0.85 times, p <0.0001)	BA to SF – increased in both CG (0.37 times; p<0.0001) and IG (0.34 times; p<0.0001)
	male condom/FC use at last sex occasion		BA to FF – increase in both CG (5.0 times; p <0.0001) and IG (4.4 times; p <0.0001)	BA to SF – increase in both CG (3.1 times; p<0.0001) and IG (5.9 higher, p <0.0001)

	Perceived susceptibility to HIV		BA to FF – decrease in both CG (-0.28 times; p=0.01) and IG (-0.36 times; p<0.0001)	BA to SF – decrease in both CG (-0.21 times; p=0.01) and IG (-0.25; p<0.01)
	Intention to use FCs		BA to FF – increase in both CG (0.49 times; p<0.0001) and IG (0.54 times; p<0.0001)	BA to SF – increase in both CG (0.18 times; p=0.10) and IG (0.48 times; p<0.0001)
	Peer norms for condom use		BA to FF – increase in both CG (0.18; p<0.0001) and IG (0.31, p<0.0001)	BA to SF – increase in both CG (0.17, p<0.001) and IG (0.28, p<0.0001)
	Condom use self-efficacy		BA to FF – increase in both CG (0.39 times; p<0.0001) and IG (0.28 times; p<0.0001)	BA to SF – increase in both CG (0.29 times; p<0.0001) and IG (0.29 times; p<0.0001)
	partner's perceived attitude toward male condom use		BA to FF – increase in both CG (0.40 times; p<0.01) and IG (0.34 times; p=0.01)	BA to SF – increase in both CG (0.41 times; p<0.001) and IG (0.23 times; p=0.10)
	partner's perceived attitude towards female condom use		BA to FF – increase in both CG (0.25 times, p=0.05) and IG (0.27 times, p=0.03)	BA to SF – increase in both CG (0.21 times, p=0.10); IG (0.31 times, p=0.02)
	personal attitude towards condom use		BA to FF – increase in both CG (0.73 times; p<0.001) and IG (0.85; p<0.0001)	BA to SF – increase in both CG (0.43 times; p<0.001) and IG (0.45 times, p<0.01)
Lustria et al (2016)	Intention to get tested	Presented differences between groups at post-test. For IG, M=3.09; For CG, M=2.76	No follow up	
	STI test ordering behaviour	27% of IG compared to 20% of CG ordered a test kit		
	Perceived risk of STI	BA to PS – increase in IG (from M=2.59 to M=2.77) and small decline in CG (from M=2.53 to M=2.51)		
Mortimer et al (2015)	Proportion of participants who self-reported for being tested for STI	No post test	Does not indicate the difference at follow up. Shows the difference between IG and CG groups that are being tested during the study - 15.3%, in IG compared to 7.6% in CG.	No second follow up

	Intention towards being STI tested		Significantly greater intentions at follow up in IG ($p=0.009$) compared to CG.	
	Attitude towards being STI tested		significantly more positive in IG ($P=0.025$) compared to CG.	
Saad et al (2012)	HIV knowledge	At PT – higher in IG ($M = 30.20$) compared to CG ($M= 22.69$)	At FF – higher in IG ($M=28.68$) compared to CG ($M = 23.10$)	At SF – higher in IG ($M=32.27$) compared to CG ($M =24.02$)
	STI knowledge	At PT – higher in IG ($M=19.25$) compared to CG ($M=8.65$)	At FF – higher in IG ($M = 18.09$) compared to CG ($M=9.29$)	At SF – higher in IG ($M=21.95$) compared to CG ($M =10.37$)
	Attitude towards STI prevention	At PT – higher in IG ($M=54.13$) compared to CG ($M=45.31$)	At FF – higher in IG ($M = 54.04$) compared to CG ($M = 45.50$)	At SF – higher in IG ($M=58.89$) compared to CG ($M=46.23$)
	STI sexual risk behaviour	Not reported	At FF – lower in IG ($M = 0.2$) vs CG ($M = 1.49$)	At SF – lower in IG ($M = 0.2$) vs CG ($M = 1.47$)
Hopfer (2012)	HPV knowledge	Not reported	Not reported	No second follow up
	HPV vaccination intent	Not reported	At FF – peer-expert IG ($OR=2.07$; 95% $CI=1.05, 4.10$; $p=.036$) twice likely compared to CGs to vaccinate; peer-only IG ($OR=1.61$, 95% $CI=.80, 3.28$, $p=.185$) did not increase significantly the odds to vaccinate compared to CGs; expert-only IG ($OR=.48$, 95% $CI=.13, 1.69$; $p=.25$) decreased the odds to vaccinate compared to CGs.	
	HPV Vaccine Self-Efficacy	Not reported	Not reported	
	HPV Vaccine Uptake	Not reported	At FF – peer-expert IG (22%) higher than CG (12%); the difference was statistically significant: $\chi^2 (3, 404)=8.6$, $p<.035$	
Bulduk and Erdogan (2012)	HIV/AIDS knowledge	No post-test	BA to FF - increase in CG (from $M=9.27$ to $M=9.53$) and IG (from $M = 9.53$ to $M=14.18$) Group*time interaction by means found statistical difference ($F=26.084$, $p=.000$)	FF to SF – decrease in IG (from $M=14.18$ to $M=13.7$) and increase in CG (from $M=36.63$ to $M = 37.59$)

	Condom use		BA to FF – increase in IG (from M =38.44 to M=49.88) and decrease in CG (from M = 38.00 to M=36.63) Group*time interaction by means found statistically difference (F = 64.814, p =.000)	FF to SF – increase in IG (from M = 49.88 to 50.44) and in CG (from M = 36.63 to M = 37.59)
	Ability to ask the potential partner questions		BA to FF – decrease in IG (from M=15.47 to M = 14.61) and CG (from M = 15.80 to M=14.59) No statistical difference for the group*time interaction of the mean scores ((F 5 .278, p 5 .758)	FF to SF – decrease in CG (from M=14.59 to M=14.71) and slight increase in IG (from M=14.61 to M = 14.64)
	Abstinence from sex		BA to FF – decrease in CG (from M=34.05 to M=31.68) and increase in IG (from M= 34.29 to M = 45.90) Group*time interaction by means found statistical difference (F = 51.706, p = 0.000)	FF to SF - increase in CG (from M=31.68 to M=33.12) and decrease in IG (From M = 45.90 to M = 45.88)
	Vaginal intercourse with condom		BA to FF – decrease in CG (from M= 1.37 to M = 1.20); increase in IG (from M =1.31 to M=2.44) Group*time interaction by means found statistical difference (F = 11.754; p =0.000)	FF to SF – increase in CG (from M=1.20 to M =1.42) and increase in IG (from M=2.44 to M =3.14)
	Oral intercourse with condom		BA to FF – decrease in CG (M=1.92 to M=1.78); increase in IG (M=1.75 to M=2.66) Group*time interaction by means found statistical difference (F=6.224; p=0.003)	FF to SF – decrease in CG (from M = 1.78 to M = 1.46); increase in IG (from M =2.66 to M=2.73)

	Anal intercourse with condom		BA to FF – decrease in CG (from M=1.39 to M=1.27) ; increase in IG (from M=1.27 to M=1.42) Group*time interaction by means found statistical difference (F=5.229; p=0.007)	FF to SF –decrease in CG (from M=1.27 to M=1.34); increase in IG (from M=1.42 to M=2.05)
	Talking with partner about condom use		BA to FF – increase in CG (from M=2.22 to M=2.32) and in IG (from M=2.27 to M=3.66) Group*time interaction by means found statistical difference (F=10.908; p =0.000)	FF to SF – increase in IG (from M=3.66 to M =3.97); decrease in CG (from M=2.32 to M=2.29)
	Refusing sexual intercourse with someone not using condom		BA to FF – decrease in CG (from M=0.71 to M=0.24), increase in CG (from M=0.58 to M=1.00) Group*time interaction by means found statistical difference (F=11.865; p=0.000)	FF to SF – increase in CG (from M=0.24 to M=0.27); decrease in IG (from M=1.00 to M=0.90)
	Sexual partner		BA to FF – decrease in CG (from M=2.56 to M=2.47); decrease in IG (from M=3.61 to M=3.34) Group*time interaction by means found no statistical difference (F=0.394; p=0.675)	FF to SF – decrease in CG (from M=2.47 to M=2.29); decrease in IG (from M=3.34 to M=3.19)
Sikkema (1995)	Self-efficacy	Ability to practice lower risk sexual behaviour – IG scored significantly higher than CG, F=5.36, p<0.01	Ability to practice lower risk sexual behaviour – maintained significant result, F=8.48, p<0.01 Overall self-efficacy level – significantly higher for IG than CG, F=4.06, p <0.05	No second follow up
	Sexual intercourse without condom	BA to FF- decrease in IG (from M=0.82 to M=0.24); decrease in CG (from M=1.10 to M=0.48)	FF to SF – increase in IG (from M=0.24 to M=0.39); decrease in CG (from M=0.48 to M=0.42)	
	Oral sex without condom	BA to FF – decrease in IG (from M=0.60 to M=0.05); decrease in CG (from M=0.95 to M=0.48)	FF to SF –increase in IG (from M=0.05 to M=0.22); increase in CG (from M=0.48 to M=0.78)	

	Number of condoms used from the provided	Not reported	Not reported	
	HIV/AIDS knowledge	Significantly higher scores in IG than in CG ($F=5.36$; $p<0.03$), IG (from $M=58\%$ to $M=79\%$) and CG (from $M=50\%$ to $M=70\%$)	No significant difference at FF. From PT to FF, IG remained $M=79\%$ and CG increased slightly to $M=72\%$	
	Refusal of risk behaviour	From BA to PT – increase for IG (from $M=4.52$ to $M=7.57$), increase for CG (from $M=4.81$ to $M=2.75$)	Not reported	
	Suggestion of specific lower risk behavioural alternative	Significantly more often in IG than in CG; $F=5.77$, $p<0.02$. ; IG (from $M=3.10$ to $M=7.14$) ; CG (from $M=2.81$ to $M=4.00$)	Not reported	
Singh (2003)	HIV/AIDS knowledge	No post test	BA to FF – increase IG (from $M=33.87$ to 44.57); decrease CG (from $M=33.68$ to $M=33.40$)	No second follow up
	Personal motivation		BA to FF – decrease IG (from $M=62.85$ to $M=42.30$); no change CG ($M=61.25$)	
	Social motivation		BA to FF – decrease IG (from $M=22.44$ to $M=15.52$) ; decrease CG (from $M=24.22$ to 24.25)	
	Behavioural intention		BA to FF – decrease in IG (from $M=23.45$ to 13.52) and in CG (from $M=22.80$ to $M=22.62$)	
	Perceived difficulty		BA to FF – increase in IG (from $M=35.47$ to $M=45.66$) and in CG (from $M=42.16$ to $M=42.93$)	
	Perceived effectiveness		BA to FF – decrease in IG (from $M=62.68$ to 36.31) and in CG (from $M=59.56$ to $M=58.20$)	
Jahanfar and Rampal (2009)	HIV/AIDS knowledge	At PT - significant difference between IG and CG ($p=0.000$) ; IG (from $M=24.74$ to $M=30.70$) and CG (from $M=24.39$ to $M=25.40$)	No first follow up	No second follow up

	Safer sex behaviour	At PT – no significant difference between IG and CG (p=0.530) ; IG (from M=10.95 to M=12.27); and CG (from M=10.81 to M=10.84)		
	Safe sex attitudes	At PT – significant difference between IG and CG (p=0.000); IG (from M=9.42 to M=9.47)		
Pedlow et al (2004)	Unprotected vaginal sex	Not reported	From BA to FF – decrease in IG(M=9.2 to M =8.1) and in CG (M=14.7 to 10.6)	No second follow up
	Condom-protected vaginal sex in the past 2 months	Not reported	From BA to FF – decrease in IG (from M=6.3 to M=5.0); CG (from M=14.7 to M=10.6)	
	Used coupon for STI testing	Not reported	From BA to FF – 14 people out of 54 in IG and 13 people out of 56 in CG	
	Tested for STIs in the past two months (by self-report)	Not reported	From BA to FF – 17 people to 13 people in IG and 13 to 16 people in CG	
	Diagnosed with STI in the past 2 months (by self-report)	Not reported	3 people in IG and 4 people in CG, statistically insignificant difference, p=0.73	
	Sexual partners	Not reported	BA to FF – decreases in IG(from M=1.6 to M=1.1) and in CG(from M=1.4 to M=1.2)	
	Sexual communication about STIs	Not reported	BA to FF – decrease in IG (from 41% to 33%); decrease in CG (from 29% to 25%)	
	Refusing to have unprotected vaginal or anal sex	Not reported	BA to FF – decrease in IG (from 28% to 19%); decrease in CG (from 18% to 14%)	
	HIV knowledge	BA to PT – greater increase in IG (from M=37.5 to M=42.6) than CG (from M=38.1 to M=39.0)	PT to FF – decrease in IG (from M = 42.6 to M=41.8) and increase in CG (from M=39.0 to M=39.1)	
	STI knowledge	BA to PT – greater increase in IG (from M=13.2 to M=22.0) than in CG (from M=13.2 to M=16.6)	PT to FF - decrease in IG (from M=22.0 to M=19.6) ; decrease in CG (from M = 16.6 to M=15.5)	
	Partner norms	BA to PT – increase in IG (from M =7.9 to 9.7); increase CG (from M=5.9 to M=7.1)	PT to FF – decrease in IG(from M=9.7 to M=9.5); increase CG (from M=7.1 to M=7.3)	

	Peer norms	BA to PT – increase in IG (M=11.0 to M=12.6); increase in CG (M=9.6 to M=10.2)	PT to FF – increase in IG (M=12.6 to M=12.1); decrease in CG (M=10.2 to M=9.8)	
	Condom use attitude	BA to PT – increase in IG (from M = 128.6 to M=131.0); increase in CG (from M=126.5 to M=132.4)	PT to FF – decrease in IG (from M = 131.0 to M=130.9); decrease in CG (from M=132.4 to M=128.5)	
	Behavioural intentions	BA to PT – increase in IG (from M=37.9 to M=39.3); increase in CG (from M= 37.6 to M= 38.2)	PT to FF – decrease in IG (from M=39.3 to M=39.0); decrease in CG (from M=38.2 to 38.0)	
Shearer 2014	Engagement in risky sex behaviours	No post-test	Compared two groups at follow up. Only condom use reported. Mentioned in text others such as number of partners. At follow up, IG - 3.74 times more likely to use condoms than CG. P= 0.04, statistically significant change.	No second follow-up
	Condom use intentions		Not reported control condition results. Hard to judge whether there was an effect. The study concludes that there is increase in IG knowledge and other aspects based only on the change of the scores in IG from BA to FF (table 7 in the study).	
	Normative belief around condom use			
	Condom use attitudes			
	Condom use self-efficacy			
	STI knowledge			
Sweeney 2013	HPV knowledge	From BA to PT – 1.54 to 1.87 in IG; 1.55 to 1.55 in CG	From PT to FF – 1.87 to 1.77 in IG; 1.55 to 1.57 in CG	No second follow-up
	Future risk-reduction intentions: sexual partners, discussion of STIs with partners, receiving HPV vaccine, receiving a Pap smear test, test for STI	From BA to PT – 1.33 to 1.67 in IG; 1.32 to 1.33 in CG	From PT to FF – 1.67 to 1.44 in IG; 1.33 to 1.24 in CG	
	Attitude towards HPV prevention	From BA to PT – 1.78 to 1.90 in IG; 1.83 to 1.86 in CG;	From PT to FF - 1.90 to 1.86 in IG; from 1.86 to 1.87 in CG;	

	Social norms	From BA to PT – 2.30 to 2.58 in IG; 2.12 to 2.13 in CG;	From PT to FF - 2.58 to 2.38 in IG; 2.13 to 2.04 in CG	
	Perceived behavioural control	From BA to PT – 3.29 to 3.50 in IG; 3.41 to 3.44 in CG	From PT to FF – 3.50 to 3.35 in IG; 3.44 to 3.36 in CG	
Metha 2013	Outcomes not clear from the method section; cannot be judged			
	Perceived susceptibility	From BA to PT - M = 3.51 to 3.67 in CG; M= 3.69 to 5.84 – IG;	From PT to FF – 3.67 to 5.67 in CG; 5.84 to 4.80 - IG	No second follow up
	Perceived severity	From BA to PT – M =9.06 to 9.11 in CG; 9.22 to 10.44 in IG;	From PT to FF – 9.11 to 8.83 in CG; 10.44 to 11.10 in IG	
	Perceived benefits	From BA to PT – 7.08 to 7.40 in CG; 5.76 to 9.04 in IG;	From PT to FF – 7.40 to 5.67 in CG; 9.04 to 7.90 in IG	
	Perceived barriers	From BA to PT – 5.35 to 5.49 in CG; 6.58 to 3.53 in IG;	From PT to FF – 5.49 to 6.50 in CG; 3.53 to 4.30 in IG;	
	Self-efficacy	From BA to PT – 6.80 to 6.93 in CG; 6.60 to 8.49 in IG;	From PT to FF – 6.93 to 6.00 in CG; 8.49 to 8.80 in IG;	
	HPV Knowledge	From BA to PT – 4.73 to 4.78 in CG; 4.67 to 5.20 in IG;	From PT to FF – 4.78 to 4.33 in CG; 5.20 to 4.90 in IG;	
	Intent to vaccinate	From BA to PT – 2.28 to 2.27 in CG; 2.16 to 2.78 in IG;	From PT to FF – 2.27 to 1.67 in CG; 2.78 to 2.70 in IG;	

Section E: Focus Group

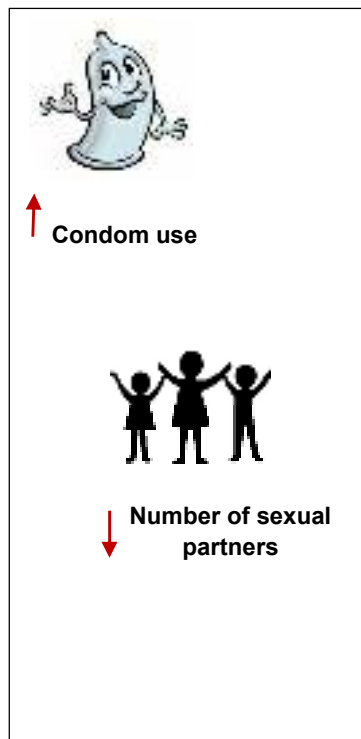
Ethical considerations paper

- Please, be respectful to the views expressed by others during this discussion.
- Please, keep confidential what other people have shared within this discussion, do not repeat it outside this room.
- This exercise is about your opinion. However, if you wish to refer to a people you have helped, please keep their anonymity. This means do not share their names, what they study, from which college they are, gender, age etc. Refer it in this way: ``a person that I know/ have helped would benefit from...'' (example)

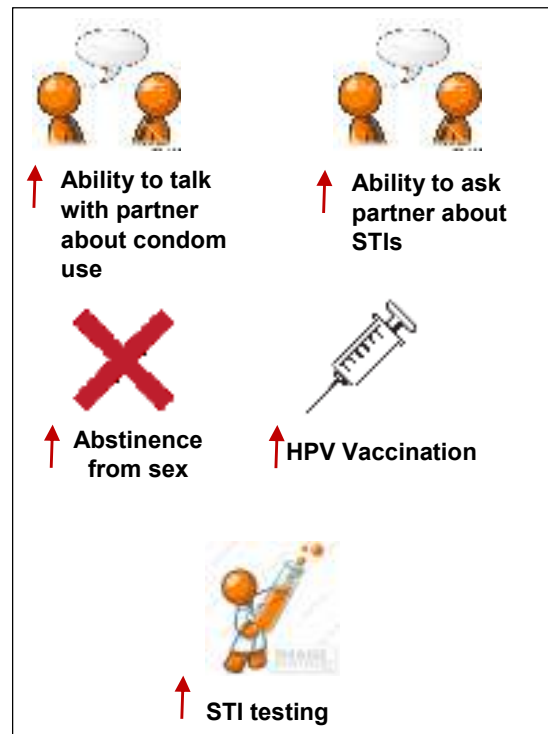
Cards for the Focus Groups discussion

CARD 1 - Targeted aims of the intervention

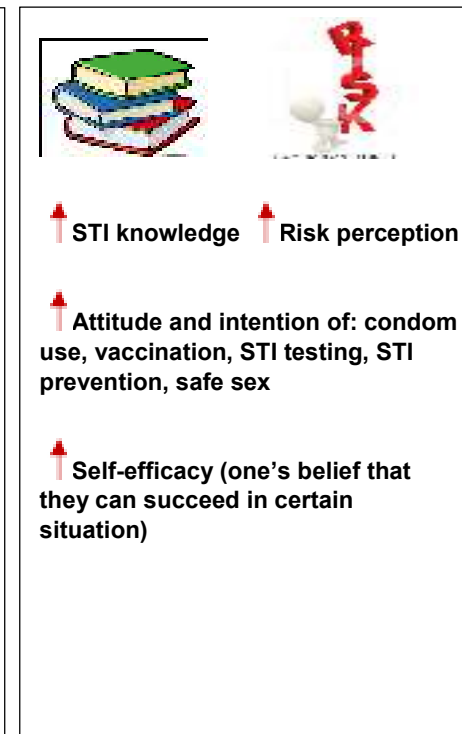
High-risk sexual behaviour



Preventative behaviours



Other aims



Q1. If you were to design a program at Oxford, will you use any of the above aims? If yes, please, choose up to **three** aims which you would make your priority and tell me why you chose them. If no, please tell me why.

Q2. Would you add any other aims to those lists?

CARD 2 - Components of the intervention

Educating participants about:

Building skills of participants:

Motivating participants to:

-HIV transmission -STI occurrence - HPV negative consequence -asymptomatic nature of HPV -importance of Pap test -importance of STI testing -cost of HPV vaccinations and insurance options -ways to find condom supplies -personalised educational information	-Communication about safer sexual practices with their partners -Communication about HPV vaccine with family and other people -Negotiation skills for safer sex -Combination: skills that enable students to refuse engagement in high-risk sexual behaviour and skills that enable students to cope with their personal triggers that lead to high-risk sexual behaviour -Personalised skills development according to participant's identified need	-motivational interviewing techniques -reminder tools to complete all 3 HPV vaccination doses -challenging the unfavourable personal attitudes and social norms -discussion about fear of vaccination and benefits of the prevention of the vaccination - development of steps which encourage the action of vaccination can be taken -book now STI testing tool
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Q1. If you were to design a program at Oxford, will you use any of the above components? If yes, please, choose up to **three of them which you would make your priority and tell me why you chose them. If no, please tell me why.**

Q2. Would you add any other components to those lists?

CARD 3 - Duration of the intervention

- ❖ 1 session of 2 hours
- ❖ 1 session of 1 hour
- ❖ 1 session of 1 hour 30 min
- ❖ 1 session of 3 min 46 sec
- ❖ 1 session of 3 min 39 sec
- ❖ 1 session of 1 min 25 sec
- ❖ 1 session of 4 min 11 sec
- ❖ 1 session of 4 min 15 sec
- ❖ 4 sessions from 75 min to 90 min each
- ❖ 4 sessions of 2 hours each
- ❖ 2 sessions of 4-5 hours each
- ❖ 3 sessions of 3 hours and a half

Q1. If you were to design a program at Oxford, will you use any of the above durations? If yes, please, choose **one of them which you would make your priority and tell me why you chose it. If no, please tell me why.**

Q2. Would you add any other durations to the above list?

CARD 4 - Delivery method of the intervention

 Female PhD student	 Peer-led	 Health professionals and peer-facilitator	 Computer	 The researcher who designed the intervention
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Q1. If you were to design a program at Oxford, will you use any of the above delivery methods? If yes, please, chose up to **three delivery methods which you would make your priority and tell me why you picked them. If no, please tell me why.**

Q2. Would you add any other delivery methods to those lists?

CARD 5 -Targeted population of the interventions

Gender:



only female



only male



female and male

Q1. If you were to design a program at Oxford, will you use any of the above delivery methods? If yes, please, chose **one of the above gender options and tell me why you chose it. If no, please tell me why.**

Q2. Would you add any other gender options to the ones above?

CARD 6 - Targeted population of the interventions (continues)

Sexual activity of participants in the intervention:

~~SEXUALLY~~ ACTIVE

INACTIVE

INACTIVE + ~~ACTIVE~~

Q1. If you were to design a program at Oxford, will you use any of the above delivery methods? If yes, please, chose **one of the above sexual activity groups and tell me why you chose it. If no, please tell me why.**

Q2. Would you add any other aspects of sexual activity of participants to the above choices?

CARD 7 - Implementation of the intervention at Oxford

If you were to implement the above designed programme at Oxford:

Q1. Who will you involve in organising the implementation of the program?

Q2. What recourses are available to you and how will you use them?

Q3. How will you motivate students to attend the program?

Q4. What potential challenges could you face?

Focus group invitation letter

Dear _____,

I would like to invite you to participate in a focus group on the topic of university students' sexual health which is part of my MPhil research. I am contacting you because you are involved in organising LGTB related events that improve the well-being of university students. Your opinion about how to ensure their sexual well-being is very important for future sexual programme development.

When? 28th, Friday at 5:30 in St Cross

Benefit of your involvement

- Socialising by meeting with other student representatives at Oxford
- Some yumi refreshments (including G&D ice-cream)
- Interesting information about sexual health programs already conducted in other universities

Focus group content

- At the beginning of the focus group you will be asked to sign a consent form (attached to this email).
- Your opinion will be searched on current well-designed behavioural STI prevention programs - their strengths and/or limitations and their possible usefulness for students at Oxford
- You will be asked to think about the process of designing and implementing a program that aims to improve student sexual health at Oxford, and the obstacles that might be presented during this process.

Next steps

Please, reply to this e-mail and confirm your presence on the date. If you do not wish to participate you will be not contacted again.

Best wishes,

Informed consent

DEPARTMENT OF SOCIAL POLICY AND
SOCIAL INTERVENTION



MPhil student

PARTICIPANT CONSENT FORM

CUREC 2:

Understanding student representatives views on sexual health interventions

Purpose of Study:

- 1) Whether the evaluated interventions of the systematic reviews are found to be useful by the university students in their practice;
- 2) Whether there are any possible gaps in interventions designs and/or intervention outcomes or intervention implementation that need to be addressed in future research as suggested by the university students, and
- 3) What could be the process of implementation of the interventions of the systematic review at Oxford, in case they are implemented.

*Please initial
each box*

- | | | |
|---|---|---|
| 1 | I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without any adverse consequences or academic penalty. | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 2 | I understand that research data collected during the study may be looked at by designated individuals from the University of Oxford where it is relevant to my taking part in this study. I give permission for these individuals to access my data. The student researcher ___ and her supervisor ___ will only have access to this data. During the focus group, a student ___ will be taking notes of the group discussion but she will not take part in analysing or transcribing the data and will not have a copy of the audio records. | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 3 | I understand that this project has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee. | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 4 | In case you have any concerns about the FGDs you could contact: curec@admin.ox.ac.uk . I understand how to raise a concern or make a complaint. | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 6 | I consent to being audio recorded. The data will be securely stored in a USB/laptop with password. If you have any concerns about that, please contact the researcher ___ | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 7 | Your answers will be used in research outputs. When transcribed your answers will be anonymised. I understand how audio recordings will be used in research outputs. | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 8 | I declare that I will not share any personal information (address, phone, name, photo etc.) of third parties (such as students that I have helped). | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |
| 9 | I agree to take part in the above study | <div style="border: 1px solid black; width: 60px; height: 25px; margin: 0 auto;"></div> |

Name of Participant	Date	Signature
Name of person taking consent	Date	Signature

Section F: Risk of bias in the studies

Bulduk 2012

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: Participants were randomized with a lottery sampling method into the two groups (page 234)
Allocation concealment (selection bias)	Unclear risk	Comment: There was no information about allocation concealment
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: There was not sufficient information to permit judgment
Blinding of outcome assessment (detection bias)	High risk	Comment: The authors of the paper were supervising the delivery process in order to ensure fidelity to protocol from the peer-leaders (page 235). Thus, they were not blinded.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: Attrition data was not reported.
Selective reporting (reporting bias)	Low risk	Comment: All of the targeted outcomes in the Method section were reported at the indicated first and second follow-up (refer to Summary of Findings table in Appendix)
Other bias	Unclear risk	Comment: Baseline differences were not reported.

Hopfer 2012

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: The study used random number generator (refer to page 175)
Allocation concealment (selection bias)	Unclear risk	Comment: Allocation concealment not reported
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: Blinding of participants was not reported. Delivered by computer, no need to be concerned with blinding of personnel.
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: Blinding was not reported
Incomplete outcome data (attrition bias)	Unclear risk	Comment: Attrition rates were not reported
Selective reporting (reporting bias)	High risk	Comment: Not all of the studies pre-specified outcomes have been reported. Refer to Summary of Findings table in the Appendix.
Other bias	Low risk	Comment: At baseline there were no significant differences between intervention and control groups (refer to table 2, page 178)

Jahanfar 2009

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: Computer-generated random number sequence
Allocation concealment (selection bias)	Unclear risk	Comment: It was not mentioned.
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: It was not mentioned.
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: It was not described in the study. It was said that the peer and adult facilitators were monitored during the intervention (page 176). It is unclear whether they were monitored by the outcome assessors/researchers or not.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: Attrition data was not mentioned.
Selective reporting (reporting bias)	Low risk	Comment: All of the targeted outcomes indicated in the Method section were reported in the Result section (refer to Summary of Findings table in the Appendix).
Other bias	Unclear risk	Comment: Baseline assessment to determine difference was said to be conducted in the Method section (refer to page 174). However, the results of this assessment was not reported.

Lustria 2016

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: randomly assigned using a computer algorithm (refer to page 1217).
Allocation concealment (selection bias)	Unclear risk	Comment: not reported in this study.
Blinding of participants and personnel (performance bias)	Low risk	Comment: participants were blinded to the allocation. There was no staff personnel delivering the intervention. It was computer delivered (refer to pages 1216-1217).
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: insufficient information to permit judgment.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: attrition rates were not reported.
Selective reporting (reporting bias)	Low risk	Comment: all of the outcomes indicated in the Method section were discussed in the Results Section. Refer to Summary of Findings table in Appendix.
Other bias	Unclear risk	Comment: Baseline difference were not reported.

Mantell 2015

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Comment: There is no information about the way randomization to conditions was done.
Allocation concealment (selection bias)	Unclear risk	Comment: Insufficient information to permit judgment.
Blinding of participants and personnel (performance bias)	High risk	Comment: The intervention facilitators were not blinded to participant's condition (refer to page 1131). The blinding of participants was unclear (refer to page 1131).
Blinding of outcome assessment (detection bias)	Low risk	Comment: All study staff were blinded to intervention condition (refer to page 1131).
Incomplete outcome data (attrition bias)	Unclear risk	Comment: Attrition rates were not reported.
Selective reporting (reporting bias)	Low risk	Comment: All of the studies pre-specified outcomes have been reported. Refer to the Summary of Findings table.
Other bias	Low risk	Comment: There were no significant differences by intervention condition in any of the demographic, attitudinal, HIV/STI, pregnancy, contraception, sexual behavior, or condom use variables (refer to page 1134).

Metha 2013

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: random assignment was done through the use of software generator (refer to page 106).
Allocation concealment (selection bias)	Unclear risk	Comment: insufficient information to permit judgment. The authors does not explain the allocation concealment procedure. Only a small paragraph is included about the randomization procedure in this study (refer to page 106).
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: There is no information about the blinding of the personnel or participants. Ways to prevent contamination of treatment was not discussed.
Blinding of outcome assessment (detection bias)	High risk	Comment: Both experimental and control interventions were delivered by the same researcher (refer to page 106). Thus, the researcher was not blinded which could lead to detection bias.
Incomplete outcome data (attrition bias)	High risk	Comment: Valid reasons for attrition rate were explained, however, a large differences in proportions of missing data between intervention group have occurred - 22.2% for experimental and 15.3% for control group (refer to page 106). The author did not include attrition analysis. It also concludes that the attrition had significant effect on the results and that valid comparison of scores with baseline and post-test scores could not be made (p 112).
Selective reporting (reporting bias)	Unclear risk	Comment: In the method section is not specified which outcomes in specific are going to be examined. Thus, this makes it hard to judge whether there was selective reporting or not.
Other bias	High risk	Comment: Baseline differences occurred in perceived benefits and perceived barriers scores (refer to 110 page). They did not discuss how they dealt with them and to what extent they thought this could have impacted the study.

Mortimer 2015

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: used a computer random generator (refer to page 807)
Allocation concealment (selection bias)	Low risk	Comment: It was concealed through its automisation (refer to page 807)
Blinding of participants and personnel (performance bias)	High risk	Comment: participants were not blinded to condition (refer to page 806)
Blinding of outcome assessment (detection bias)	Low risk	Comment: the Investigators were blinded to the participant's allocation (page 808)
Incomplete outcome data (attrition bias)	Unclear risk	Comment: It was mentioned that there was high attrition rate. However, it was not discussed how the missing data was handled. Attrition analysis was not performed.
Selective reporting (reporting bias)	High risk	Comment: the outcome "proportion of participants who self-reported for being tested for STI" was said to be tested at follow up in Method Section (page 807) but yet its value at follow up was not reported in the Result Section. Instead its value during the study was reported (page 808).
Other bias	Unclear risk	Comment: Baseline differences were not reported to be tested

Pedlow 2004

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: A random number table was used (refer to p.30)
Allocation concealment (selection bias)	Unclear risk	Comment: Concealment method was not discussed.
Blinding of participants and personnel (performance bias)	High risk	Comment: The participants were made aware of their condition when they arrived at their intervention appointment (refer to p.30).
Blinding of outcome assessment (detection bias)	High risk	Comment: The principal investigator delivered the intervention, thus he/she was not blinded and aware of the allocation of group participants to certain condition.
Incomplete outcome data (attrition bias)	Low risk	Comment and quote: The authors recorded attrition rate of only 6% (p.68) The authors concluded that "there were insufficient occurrences of missing data to warrant comparison of participants with missing data to those without" (55-56 p)
Selective reporting (reporting bias)	High risk	Comment: Outcomes were said to be investigated at posttest and follow up. However, not all of the results of the outcomes were discussed in the result section at posttest (refer to Summary of Finding table, Appendix). Further, there was an additional reporting of outcomes which were not specified in the method section (refer to page 71 and 72)
Other bias	Low risk	Comment: Baseline differences were thoroughly investigated by using ANOVA and chi-square tests (refer to page 60). Baseline differences occurred in two outcomes - frequency of unprotected sex and frequency of protected sex. However it was made an attempt to control for those differences by using those baseline values as covariates in the analyses.

Perez 2016

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Comment: Participants were asked to self-enroll in either the intervention or control conditions (refer to page 286).
Allocation concealment (selection bias)	Unclear risk	Comment: It is not reported at all
Blinding of participants and personnel (performance bias)	Unclear risk	Quote: "Participants remained blinded to study condition to preserve the random group assignment" (refer to page 286). However, it is not clear how this blinding was done. It is not clear also whether the same facilitator conducted both the experimental intervention and control intervention.
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: It is written in the Method section that the principal investigator has consented all participants (refer to page 286). However, it was not clear whether the consent form included the study condition of each participant or not.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: It was not discussed at all
Selective reporting (reporting bias)	Low risk	Comment: All of the targeted outcomes outlined in the Method section were reported in the Results Section. For details refer to Summary of Findings table.
Other bias	Low risk	Baseline differences were present at only one indicator, age, multivariate analyses were adjusted for age.

Saad 2012

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: They used computer-generated random selection method. 4 out of 12 facilities were randomised by using this method (p 551).
Allocation concealment (selection bias)	Unclear risk	Comment: Insufficient information to permit judgment. The authors does not explain the allocation concealment procedure.
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: The study did not adress this. Everything reported about the use of randomization, sampling, allocation and recruitment is in only one paragraph on page 551.
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: The study did not adress this. Everything reported about the use of randomization, sampling, allocation and recruitment is in only one paragraph on page 551.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: The author claim that there are "low attrition rates" on page 557. However, that is only mentioned in the Discussion section. In the paper, neither in the Results section neither in the Method section there is a specified procedure which deals with attrition rates or the attrition rates (in total number/percentage) that have occurred.
Selective reporting (reporting bias)	Low risk	Comment: Complete reporting. Refer to Summary of Findings table in Appendix.
Other bias	Low risk	Baseline imbalance: when compared the intervention group did not differ in sociodemographic characteristic than the control group. However, they differ in HIV/STI attitudes. This difference was taken into consideration and this difference was controlled in subsequent analysis.

Shearer 2015

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Comment: Random assignment was established through the use of computer algorithm. Numbers were used to assign the participants to the condition (p.24)
Allocation concealment (selection bias)	Unclear risk	Comment: Lack of information about allocation concealment.
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: Insufficient information to permit judgment.
Blinding of outcome assessment (detection bias)	Unclear risk	Quote: It was stated that after randomization " participants were invited via e-mail to access the web-based intervention" (p.24). Comment: There is no information on whether those e-mails were sent by the researchers, thus making them aware of which participants is allocated to which group.
Incomplete outcome data (attrition bias)	High risk	Comment: High attrition rates at follow up. Appropriate statistical procedures to test whether this rate caused a problem with final results was conducted - analysis of full and completer samples. The result of the analysis showed no difference between those who complete and those who did not complete the follow up assessment (refer to pages 37-38).
Selective reporting (reporting bias)	High risk	Comment: Incomplete reporting. From the outcome "engagement in risky sex behaviours" was reported only condom use. In the Method section it was mentioned other aspects such as number of sexual partners that were included in that outcome measurement. For the rest of the outcomes the study reported the results only of intervention group from baseline to follow-up. This lack of reporting makes it impossible to judge whether there was an effect of the intervention (refer to Summary of Findings table in the Appendix).
Other bias	Low risk	Comment: Baseline differences, no significant difference (table 3, p.57)

Sikkema 1995

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	It was stated that " the participants were randomly assigned to skills training and education only groups" (p.151). However, it was not stated how the randomization was performed.
Allocation concealment (selection bias)	Unclear risk	Comment: It was not discussed in the paper.
Blinding of participants and personnel (performance bias)	High risk	Comment: The experimental intervention and the control intervention were conducted by the same person - a female doctoral student, thus she was aware of the allocation of the participants and was not blinded.
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: It was not reported in the paper.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: attrition rates were not discussed in the paper.
Selective reporting (reporting bias)	High risk	Comment: In the Measures section of the study it was stated that all of the outcomes will be measured at post test and follow up, yet a lot of them were only reported either at posttest or at follow up. Further, there was an outcome - number of condoms used from the provided, that was said to be measured in the Measures section but not reported neither at all at follow-up or post-test. For more details refer to Summary of Findings table in the Appendix.
Other bias	High risk	Baseline differences: the groups differ at baseline. The intervention (skills training) participants had higher scores on HIV-related knowledge than education-only participants (p.153)

Singh 2003

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Comment: It was not reported the procedure of randomising the participants.
Allocation concealment (selection bias)	Unclear risk	Comment: It was not reported any allocation concealment.
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: Blinding was not mentioned in the text of the study
Blinding of outcome assessment (detection bias)	Unclear risk	Comment: Blinding was not mentioned in the text of the study
Incomplete outcome data (attrition bias)	Unclear risk	Comment: Attrition was not mentioned in the text of the study
Selective reporting (reporting bias)	Unclear risk	Comment: This aspect cannot be judged as in their method section there is no information about the targeted outcomes.
Other bias	Unclear risk	Comment: Baseline differences were not reported.

Sweeney 2014

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Comment: It was not discussed The authors just stated briefly that the participants were randomly assigned (p.22)
Allocation concealment (selection bias)	Unclear risk	Comment: insufficient information to permit judgment
Blinding of participants and personnel (performance bias)	Unclear risk	Comment: insufficient information to permit judgment.
Blinding of outcome assessment (detection bias)	High risk	Comment: The experimental intervention was delivered by the principal investigator, thus he/she was aware of which participants were in which condition.
Incomplete outcome data (attrition bias)	Unclear risk	Comment: there was an attrition rate of 13.33% (p.21) Unclear how the missing data was handled. The author did not report the inclusion of any attrition analysis.
Selective reporting (reporting bias)	Low risk	Comment: all of the mentioned outcomes in the method section were reported in the results section. Refer to Summary of Findings table.
Other bias	Unclear risk	Comment: baseline differences were not discussed at all.