

Wong 1998 (Continued)

Other bias	High risk	Not randomised study and baseline imbalance between experimental group and control
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Lau 2010

Methods	RCT. An experienced HIV prevention worker of a NGO briefed prospective participants about the study in the rest area of checkpoint in Hong Kong while the drivers were waiting for custom clearance	
Participants	Male Hong Kong Chinese cross-border truck drivers (age 18 years old or above), who reported having had sex with either a FSW or a female non-regular sex partner (NRP) in mainland China in the last 12 months (NRP is operationally defined as female sex partners who were not commercial sex partners, nor spouse, nor girlfriends) and were willing to provide us with their mobile phone number	
Interventions	Members of the intervention group received the VCT service (30-45 minutes to complete). The baseline risk level of these VCT participants was assessed (e.g., STD history, number of sex partners, sexual risk behaviours, and relevant risk perceptions) by a well-trained fieldworker. Discussion was made (e.g., other relevant HIV-related perceptions and planning prior to the testing) before the administration of the rapid test. Other topics were then discussed in the post-test counselling procedure (e.g., under what circumstances condoms should be used, window period for HIV detection, meaning/implications associated with a positive or negative testing result, and action plans). The three aforementioned education pamphlets and a letter written by a person living with HIV/AIDS (about meaning and issues concerning HIV positive status) were presented to the participants, who were further encouraged to ask questions. The Abbott Determine HIV-1/2 test kit was used. During the study period, the same fieldworker contacted all the participants of both groups via mobile phone biweekly to establish rapport and to conduct the two follow-up surveys	
Outcomes	Condom use, Penetrated before putting on condoms when having sex with FSW(%), Drank alcohol frequently before having sex with FSW in mainland China(%), Used psychoactive substances before having sex with FSW in mainland China(%), Self-reported having contracted STD (%)	
Notes	Baseline, first follow up (1 month), second follow up (2 months)	

*Risk of bias*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants were randomly allocated to Group I or Group C by opening a randomisation envelope (block randomisation with block size of eight)

**Lau 2010** (Continued)

Allocation concealment (selection bias)	Low risk	The fieldworker was concealed of the allocation sequence.
Blinding (performance bias and detection bias) All outcomes	Low risk	Allocation was evident, although the outcomes would not have been affected by a lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description.
Selective reporting (reporting bias)	Low risk	All outcomes reported.
Other bias	Low risk	Ransomisation has essentially balanced the characteristics of the intervention and control groups

**Surratt 2010**

Methods	Parallel RCT.	
Participants	Eligible participants were women aged 18 to 50 who had (a) traded sex for money or drugs at least three times in the past 30 days, and (b) used heroin and/or cocaine three or more times a week in the past 30 days	
Interventions	Similar to the Standard intervention, the SWF intervention was also designed as a brief protocol consisting of two 60-minute sessions delivered 2 weeks apart. It provides parallel coverage of many of the topics covered in the Standard intervention, yet it discusses them in language suggested by the target population as more relevant and meaningful to female sex workers. In addition, as indicated earlier, the intervention addresses issues of special relevance to sex workers, including common misconceptions about HIV risk, techniques for avoiding violent situations, risks associated with unprotected oral sex, and common barriers to safer sex	
Outcomes	Risk behaviours: Days of substance use in past 30 days, Times unprotected vaginal sex in past 30 days, Times unprotected oral sex in past 30 days, Times sex work while high in past 30 days, Physical victimization in past 90 days, Sexual victimization in past 90 days,	
Notes	3 month follow up, 6 month follow up	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described



**Surratt 2010** (Continued)

Allocation concealment (selection bias)	High risk	Not described
Blinding (performance bias and detection bias) All outcomes	High risk	Not blinding
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description on this.
Selective reporting (reporting bias)	Low risk	All study outcomes reported
Other bias	Low risk	Randomisation has essentially balanced the characteristics of the SWF intervention and standard intervention control groups

**Characteristics of excluded studies** [ordered by study ID]

Study	Reason for exclusion
Albert 1995	Not intervention study.
Burgos 2010	Study was not conducted in high income country.
Cameron 2002	Not intervention study.
CDC 1999	Community intervention, not only sex workers also other targeted included, outcome could not only measure sex workers
Chan 1997	No control group.
Corby 1998	<i>Conference proceeding only. Only the abstract was available as this study has never been published. Authors of the study did not reply our e-mail and could not be contacted, and no further information was obtained.</i>
de Graaf 1997	Not intervention study.
Etcheverry 2010	Not intervention study.
Feldblum 2007	Study was not conducted in high income country.
Ghys 2001	Study was not conducted in high income country.
Greenberg 1998	Participants are not only sex workers (10-36%), results are not specified on sex workers
Hoffman-Goetz 2005	Not intervention study.
Johnson 2002	Not intervention study focused on sex workers.

(Continued)

Kwiatkowski 1999	Participants are injection drug users.
Lau 2002	Not intervention study.
Lau 2003	Not intervention study.
Mantell 2008	Not intervention study.
Miller 1998	No control group.
Morse 1992	Not intervention study.
National 2002	Not only sex workers also other targeted included, outcome could not only measure sex workers
Paone 1999	Not intervention study.
Parrado 2004	Not intervention study.
Reisner 2008	Qualitative research.
Richardson 2001	Study was not conducted in high income country.
Sankary 1998	Conference proceeding only. Only the abstract was available as this study has never been published. First author who knows further detail could not be contacted for missing contact information per the suggestion of the other co-author who could be contacted, and no further information was obtained
Schroeder 2006	Focused on drug user not sex worker.
Stary 1991	Not intervention study.
Van Damme 2000	Study was not conducted in high income country.
Vickerman 2010	Study was not conducted in high income country.
Ward 1996	Study was not conducted in high income country.
Weir 1999	Study was not conducted in high income country.
Yahne 2002	No control group.
Ziersch 2000	The failure of the quasi-experimental design. The outcome evaluation was inconclusive



## DATA AND ANALYSES

### Comparison 1. Comparison intervention versus control

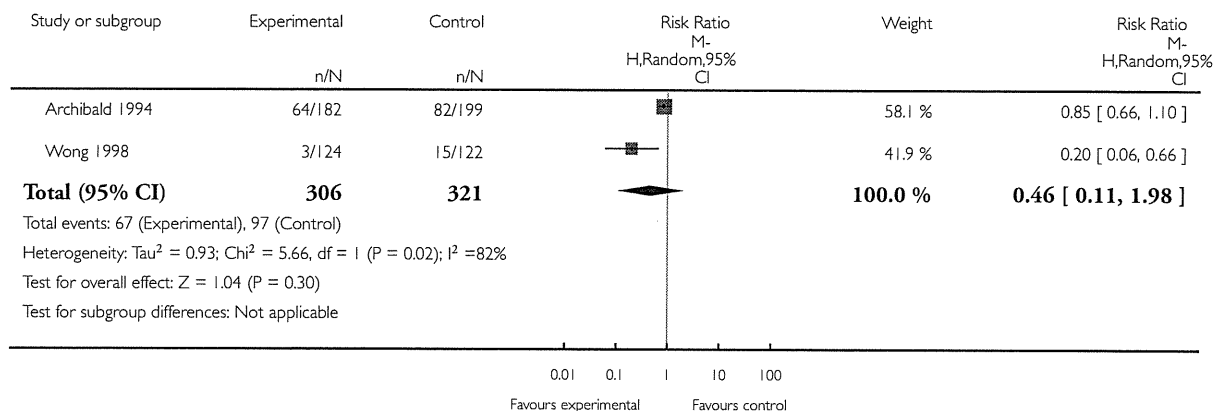
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 STI incidence for sex workers	2	627	Risk Ratio (M-H, Random, 95% CI)	0.46 [0.11, 1.98]
2 STI prevalence for clients of sex workers	1	288	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.01, 0.72]
3 Condom use for sex workers	3	1133	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.99, 1.09]
3.1 Randomised control trial	1	506	Risk Ratio (M-H, Fixed, 95% CI)	1.00 [0.96, 1.03]
3.2 Quasi-experimental pretest-posttest with control group	2	627	Risk Ratio (M-H, Fixed, 95% CI)	1.08 [0.99, 1.18]
4 Condom use for clients of sex workers	1	26	Risk Ratio (M-H, Fixed, 95% CI)	1.10 [0.69, 1.75]
5 Knowledge of HIV transmission for sex workers	1	381	Risk Ratio (M-H, Fixed, 95% CI)	1.82 [1.55, 2.14]
6 Knowledge of HIV transmission for clients of sex workers	1	287	Risk Ratio (M-H, Fixed, 95% CI)	1.93 [1.46, 2.55]
7 Visited female sex workers (for clients of sex workers)	1	286	Risk Ratio (M-H, Fixed, 95% CI)	0.54 [0.25, 1.18]
8 Perceiving very high efficacy of condom use for HIV prevention (For clients of sex workers)	1	287	Risk Ratio (M-H, Fixed, 95% CI)	1.35 [0.89, 2.04]
9 physical victimization for sex workers	1	506	Risk Ratio (M-H, Fixed, 95% CI)	0.99 [0.63, 1.56]
10 Sexual victimization for sex workers	1	506	Risk Ratio (M-H, Fixed, 95% CI)	0.99 [0.53, 1.86]

### Analysis 1.1. Comparison 1 Comparison intervention versus control, Outcome 1 STI incidence for sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 1 STI incidence for sex workers

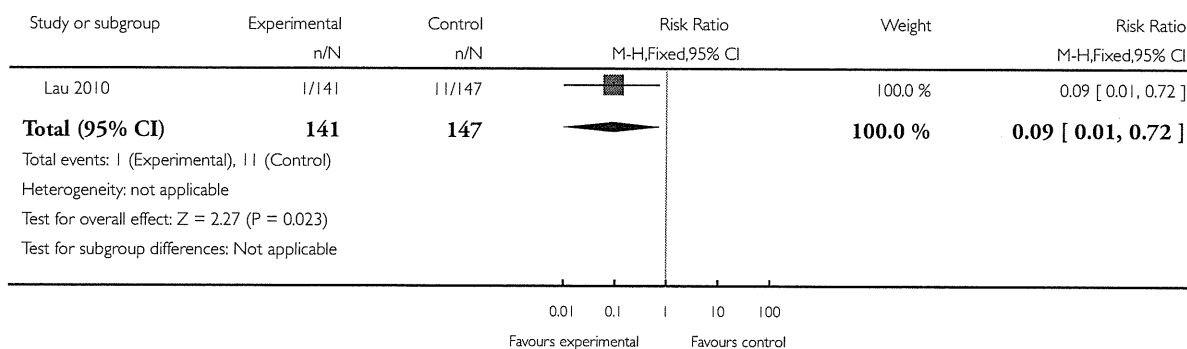


### Analysis 1.2. Comparison 1 Comparison intervention versus control, Outcome 2 STI prevalence for clients of sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 2 STI prevalence for clients of sex workers



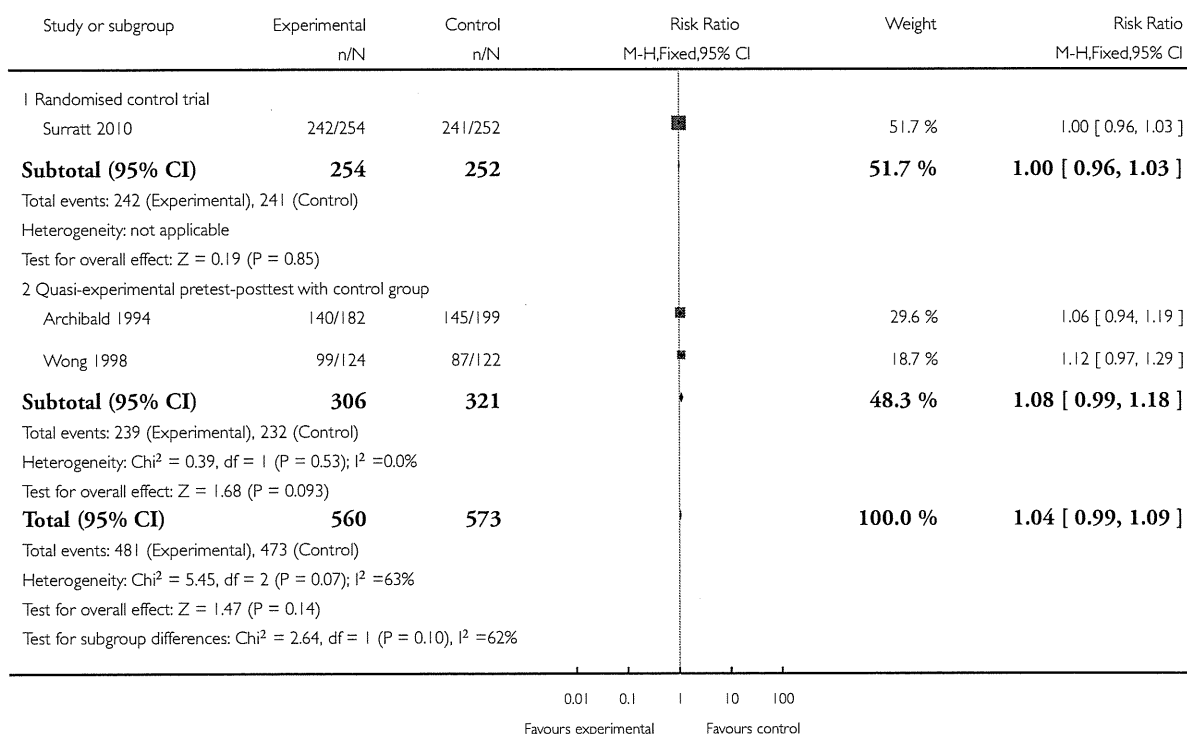


### Analysis 1.3. Comparison 1 Comparison intervention versus control, Outcome 3 Condom use for sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 3 Condom use for sex workers

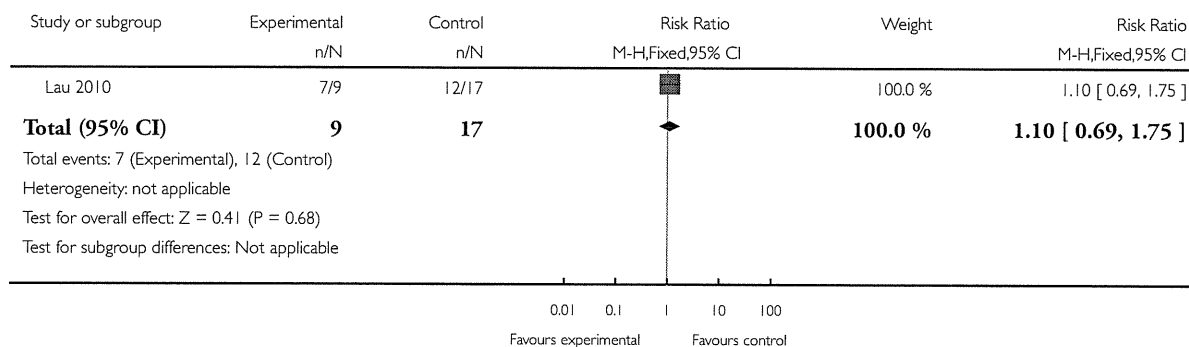


#### Analysis 1.4. Comparison 1 Comparison intervention versus control, Outcome 4 Condom use for clients of sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 4 Condom use for clients of sex workers

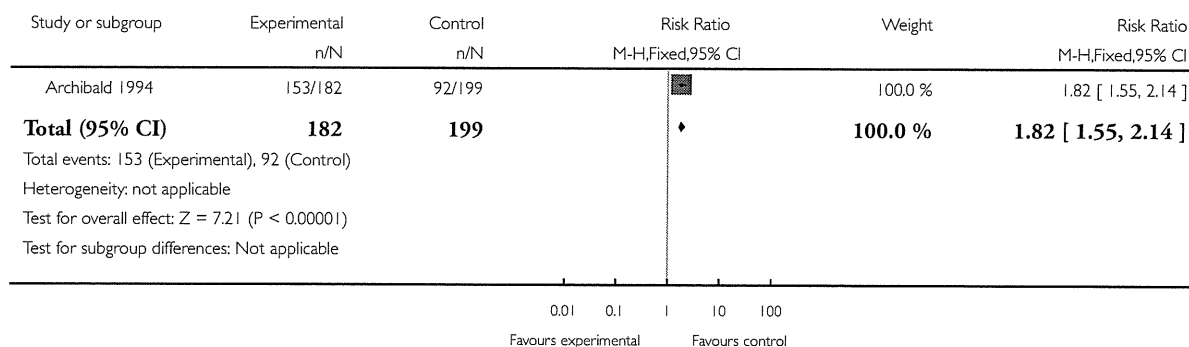


#### Analysis 1.5. Comparison 1 Comparison intervention versus control, Outcome 5 Knowledge of HIV transmission for sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 5 Knowledge of HIV transmission for sex workers



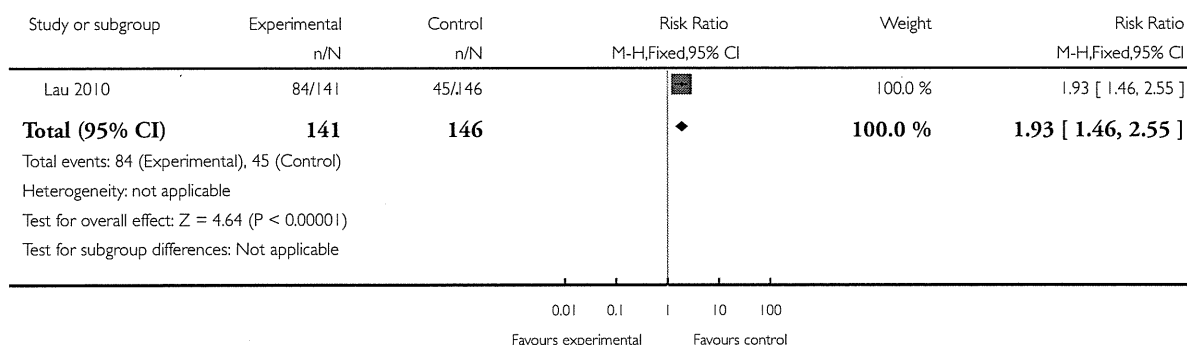


### Analysis 1.6. Comparison 1 Comparison intervention versus control, Outcome 6 Knowledge of HIV transmission for clients of sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 6 Knowledge of HIV transmission for clients of sex workers

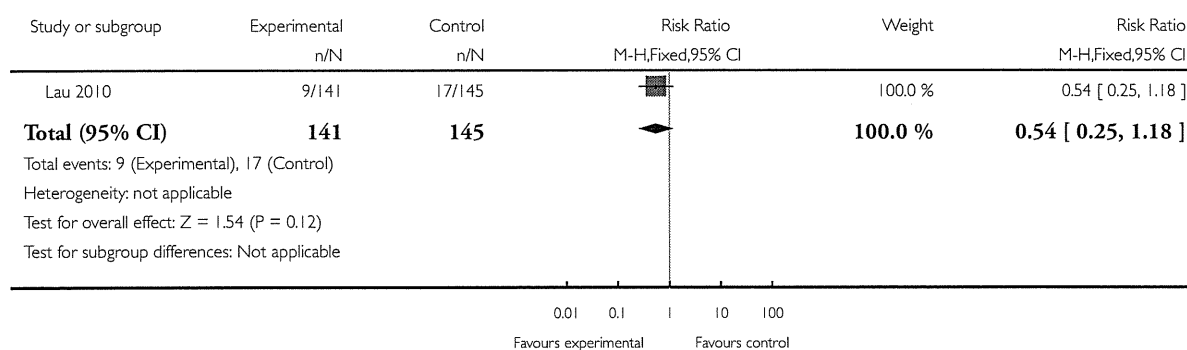


### Analysis 1.7. Comparison 1 Comparison intervention versus control, Outcome 7 Visited female sex workers (for clients of sex workers).

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 7 Visited female sex workers (for clients of sex workers)

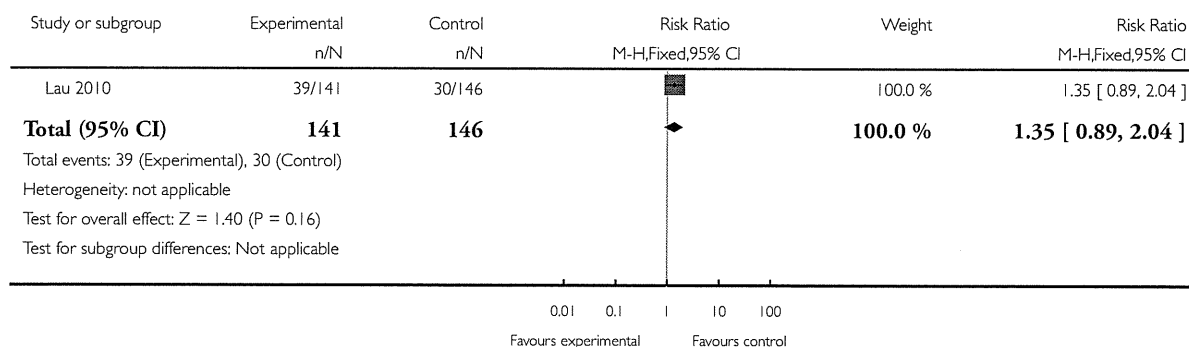


### Analysis 1.8. Comparison 1 Comparison intervention versus control, Outcome 8 Perceiving very high efficacy of condom use for HIV prevention (For clients of sex workers).

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 8 Perceiving very high efficacy of condom use for HIV prevention (For clients of sex workers)

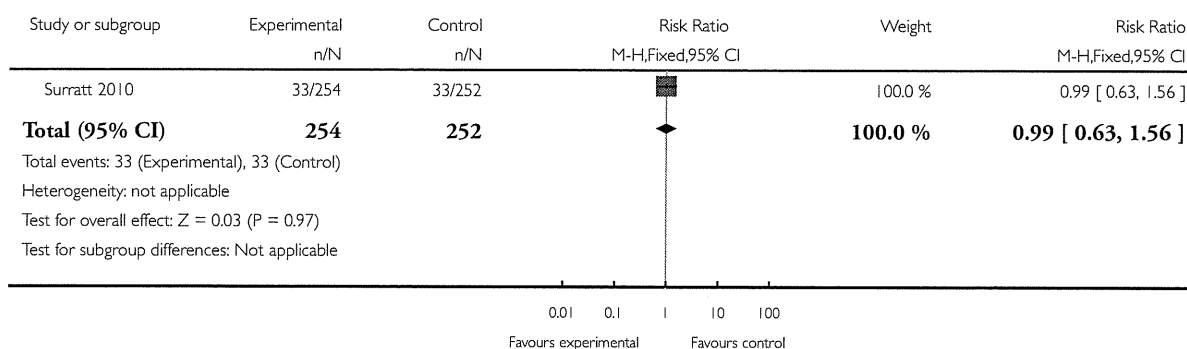


### Analysis 1.9. Comparison 1 Comparison intervention versus control, Outcome 9 physical victimization for sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 9 physical victimization for sex workers



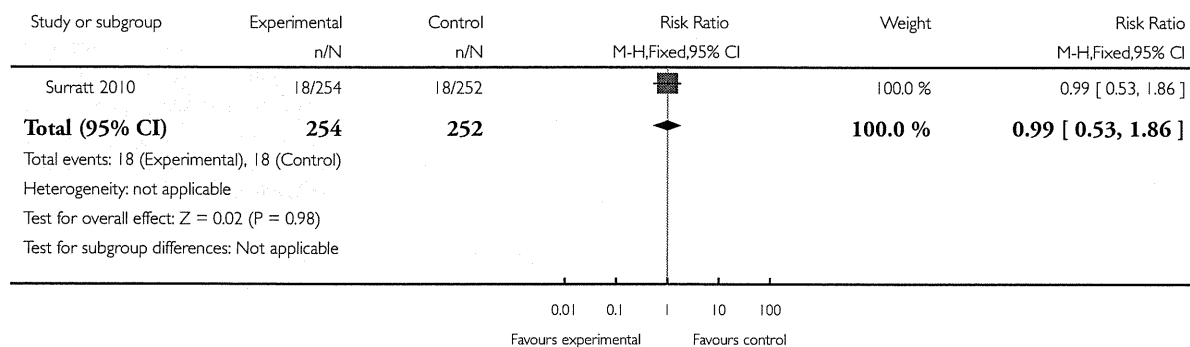


### Analysis 1.10. Comparison 1 Comparison intervention versus control, Outcome 10 Sexual victimization for sex workers.

Review: Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries

Comparison: 1 Comparison intervention versus control

Outcome: 10 Sexual victimization for sex workers



## APPENDICES

### Appendix I. Table I Examples of search strategies

Table 1 Examples of search strategies

PubMed: Date range ?1 January 1980- 23 July 2010	
#44	Search #39 AND #40 AND #41 AND #42 Limits: Publication Date from 1980/01/01 to 2010/07/23
#43	Search #39 AND #40 AND #41 AND #42
#42	Search intervention[tiab] OR interventions[tiab] OR risk reduction behavior[mh] OR risk reduction[tiab] OR risk reducing[tiab] OR Health Knowledge, Attitudes, Practice[mh] OR incidence[mh] OR incidence[tiab] OR prevalence[mh] OR prevalence[tiab] OR sexual behavior[mh] OR sexual behavior[tiab] OR sexual behaviour[tiab] OR intervention studies[mh]
#41	Search prostitute[tiab] OR prostitutes[tiab] OR sex worker[tiab] OR sex workers[tiab] OR prostitution[mh] OR prostitution[tiab]
#40	Search (randomized controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR placebo [tiab] OR drug therapy [sh] OR randomly [tiab] OR trial [tiab] OR groups [tiab]) NOT (animals [mh] NOT

(Continued)

	humans [mh])
#39	Search HIV Infections[MeSH] OR HIV[MeSH] OR HIV[tw] OR hiv-1*[tw] OR hiv-2*[tw] OR hiv1[tw] OR hiv2[tw] OR hiv infect*[tw] OR human immunodeficiency virus[tw] OR human immunodeficiency virus[tw] OR human immuno-deficiency virus[tw] OR human immunodeficiency virus[tw] OR ((human immun*) AND (deficiency virus[tw])) OR acquired immunodeficiency syndrome[tw] OR acquired immuno-deficiency syndrome[tw] OR acquired immune-deficiency syndrome[tw] OR ((acquired immun*) AND (deficiency syndrome[tw])) OR "sexually transmitted diseases, viral"[MH]
<b>Cochrane CENTRAL Controlled Trials Register: Date range 1 January 1980 ? 27 July 2010</b>	
#1	MeSH descriptor HIV Infections explode all trees
#2	MeSH descriptor HIV explode all trees
#3	hiv OR hiv-1* OR hiv-2* OR hiv1 OR hiv2 OR HIV INFECT* OR HUMAN IMMUNODEFICIENCY VIRUS OR HUMAN IMMUNODEFICIENCY VIRUS OR HUMAN IMMUNE-DEFICIENCY VIRUS OR HUMAN IMMUNO-DEFICIENCY VIRUS OR HUMAN IMMUN* DEFICIENCY VIRUS OR ACQUIRED IMMUNODEFICIENCY SYNDROME OR ACQUIRED IMMUNODEFICIENCY SYNDROME OR ACQUIRED IMMUNO-DEFICIENCY SYNDROME OR ACQUIRED IMMUNE-DEFICIENCY SYNDROME OR ACQUIRED IMMUN* DEFICIENCY SYNDROME
#4	MeSH descriptor Lymphoma, AIDS-Related, this term only
#5	MeSH descriptor Sexually Transmitted Diseases, Viral, this term only
#6	(#1 OR #2 OR #3 OR #4 OR #5)
#7	prostitute* OR sex worker* OR prostitution
#8	MeSH descriptor Prostitution, this term only
#9	(#7 OR #8)
#10	intervention* OR risk reduction OR risk reducing OR incidence OR prevalence OR sexual behavior OR sexual behaviour
#11	MeSH descriptor Health Knowledge, Attitudes, Practice, this term only
#12	MeSH descriptor Risk Reduction Behavior, this term only



(Continued)

#13	MeSH descriptor Sexual Behavior, this term only
#14	MeSH descriptor Intervention Studies, this term only
#15	(#10 OR #11 OR #12 OR #13 OR #14)
#16	(#6 AND #9 AND #15)
#17	(#6 AND #9 AND #15), from 1980 to 2010
<b>EMBASE: Date range 1 January 1980 ? 23 July 2010</b>	
#6	#1 AND #2 AND #3 AND #4 AND [humans]/lim AND [embase]/lim AND [1980-2010]/py
#5	#1 AND #2 AND #3 AND #4
#4	intervention OR interventions OR 'risk reduction'/de OR 'risk reduction' OR 'risk reducing' OR 'attitudes to health' OR 'prevalence'/de OR prevalence OR 'incidence'/de OR incidence
#3	'prostitute'/de OR prostitute OR prostitutes OR 'prostitution'/de OR prostitution OR 'sex worker' OR 'sex workers' OR 'callgirl'/de OR callgirl OR callgirls
#2	random*:ti OR random*:ab OR factorial*:ti OR factorial*:ab OR cross?over*:ti OR cross?over*:ab OR crossover*:ti OR crossover*:ab OR placebo*:ti OR placebo*:ab OR (doubl*:ti AND blind*:ti) OR (doubl*:ab AND blind*:ab) OR (singl*:ti AND blind*:ti) OR (singl*:ab AND blind*:ab) OR assign*:ti OR assign*:ab OR allocat*:ti OR allocat*:ab OR volunteer*:ti OR volunteer*:ab OR 'crossover procedure'/exp OR 'crossover procedure'/de OR 'crossover procedure' OR 'double-blind procedure'/exp OR 'double-blind procedure'/de OR 'double-blind procedure' OR 'single-blind procedure'/exp OR 'single-blind procedure'/de OR 'single-blind procedure' OR 'randomized controlled trial'/exp OR 'randomized controlled trial'/de OR 'randomized controlled trial'
#1	'human immunodeficiency virus infection'/exp OR 'human immunodeficiency virus infection'/de OR 'human immunodeficiency virus infection' OR 'human immunodeficiency virus'/exp OR 'human immunodeficiency virus'/de OR 'human immunodeficiency virus' OR hiv:ti OR hiv:ab OR 'hiv-1':ti OR 'hiv-1':ab OR 'hiv-2':ti OR 'hiv-2':ab OR 'human immunodeficiency virus':ti OR 'human immunodeficiency virus':ab OR 'human immuno-deficiency virus':ti OR 'human immuno-deficiency virus':ab OR 'human immunodeficiency virus':ti OR 'human immunodeficiency virus':ab OR 'human immune-deficiency virus':ti OR 'human immune-deficiency virus':ab OR 'acquired immune-deficiency syndrome':ti OR 'acquired immune-deficiency syndrome':ab OR 'acquired immunodeficiency

(Continued)

syndrome':ti OR 'acquired immunodeficiency syndrome':ab OR 'acquired immunodeficiency syndrome':ti OR 'acquired immunodeficiency syndrome':ab OR 'acquired immuno-deficiency syndrome':ti OR 'acquired immuno-deficiency syndrome':ab

## HISTORY

Protocol first published: Issue 2, 2006

Review first published: Issue 12, 2011

Date	Event	Description
15 November 2010	New search has been performed	New full review.
15 February 2010	New citation required and major changes	Made protocol a "clean slate" for new author team.
11 November 2008	Amended	Converted to RevMan 5, and re-published without new citation

## CONTRIBUTIONS OF AUTHORS

Erika Ota (EO) and Windy Wariki (WW) designed, set up and drafted the review. Narumi Hori (NH), Rintaro Mori (RM) and Kenji Shibuya (KS) commented upon and revised the article. All the authors approved the final review..

## DECLARATIONS OF INTEREST

We declare that we have no conflict of interest.

## SOURCES OF SUPPORT

### Internal sources

- Department of Global Health Policy, Graduate School of Medicine, The University of Tokyo, Japan.

### External sources

- Health Labour Sciences Research Grant, Japan.

## DIFFERENCES BETWEEN PROTOCOL AND REVIEW

Violence against sex workers, whether physical, psychological or sexual victimisation, was not listed in the protocol as a secondary outcome. This was added as a relevance to the high risk of transmission of HIV infection.

## INDEX TERMS

### Medical Subject Headings (MeSH)

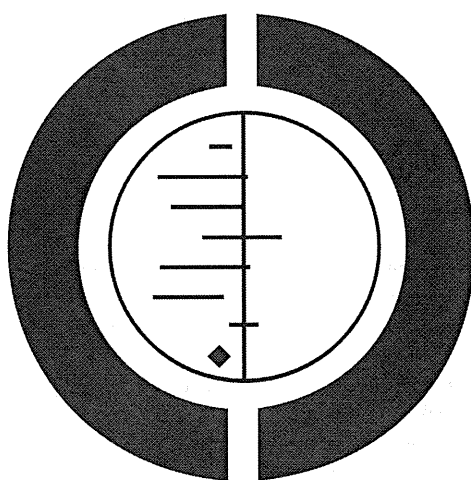
\*Sex Workers; Condoms [utilization]; Counseling; Developed Countries; HIV Infections [\*prevention & control; transmission]; Health Knowledge, Attitudes, Practice; Negotiating; Randomized Controlled Trials as Topic; Safe Sex

### MeSH check words

Female; Humans; Male

# **Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries (Review)**

Wariki WMV, Ota E, Mori R, Koyanagi A, Hori N, Shibuya K



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Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries (Review)

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[Intervention Review]

## Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries

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### ABSTRACT

#### Background

Various interventions have been adopted to reduce HIV transmission among sex workers and their clients but the effectiveness of these strategies has yet to be investigated using meta-analytic techniques.

#### Objectives

To evaluate the effectiveness of behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries.

#### Search methods

The Cochrane Central Register of Controlled Trials (CENTRAL), the Cochrane HIV/AIDS group specialized register, the Cochrane Database of Systematic Reviews, MEDLINE, PsycINFO, Sociological Abstracts, CINAHL, Dissertation Abstract International (DAI), EMBASE, LILACS, BIOSIS, SciSearch, INDMED, Proquest, and various South Asian abstracting databases were included in the database list. The publication sites of the World Health Organization, the US Centers for Disease Control and Prevention, and other international research and non-governmental organizations also appeared in the database list.

#### Selection criteria

Randomized controlled trials (RCTs) and quasi-RCTs examining the effects on HIV transmission risk of different behavioral interventions or comparing behavioral interventions with no intervention, where described any one of the outcome measures, such as HIV incidence and prevalence, STI incidence and prevalence, change in self-reported of condom use, and other HIV-related outcome.

#### Data collection and analysis

Two authors independently assessed trials, extracted data and assessed the risk bias. Heterogeneity amongst trials was also tested.

**Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries (Review)**

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