



Bystander Interventions to Prevent Sexual Assault

Toolkit technical report

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Bystander interventions to reduce sexual violence: YEF Technical Report

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Summary

This technical report reviews the evidence on the effect of bystander intervention programmes. This technical report is based primarily on a recent systematic review and meta-analysis by Kettrey et al. (2019), though other reviews were also consulted. Kettrey et al. (2019, p. 9) study bystander interventions for young people in educational settings. The studies are nearly all from the United States.

Bystander interventions are described as those that "... approached participants as allies in preventing and/or alleviating sexual assault among adolescents and/or college students". In order to successfully act as a bystander and prevent an incident of sexual violence from occurring, bystanders need to not only be aware of the event, but also the warning signs and determine an appropriate course of action. The warning signs for an act of sexual violence may include exhibitions of controlling behaviour or an incident where an individual is leading an intoxicated person to an isolated area.

Intervention components in bystander intervention programmes may include educational sessions delivered in groups and led by a facilitator, or use of videos, posters or other forms of advertising campaigns. These programmes aim to increase participants' abilities to: (1) notice an 'event' (i.e., a potential sexual assault); (2) identify the situation as warranting or needing intervention; (3) taking responsibility for intervening; and (4) deciding upon an appropriate way to intervene.

The core presumed causal mechanism underlying bystander intervention programmes is to train possible witnesses to sexual assault, or its precursors, to proactively and effectively intervene. These programmes aim to improve bystanders' knowledge and skills to intervene on behalf of victims, or potential victims, of sexual violence. Programmes such as this treat young people as allies and instead of focusing on changing one's own behaviour, they aim to involve bystanders in "part of the solution of sexual assault". This approach may make the

participants less defensive and more receptive to the intervention. It is thus less likely to have 'backlash effects' of promoting undesirable attitudes or behaviour.

The review of Kettrey et al. (2019) rates as high quality, but achieves a low evidence security rating of 2 because of the small number of included studies.

The reduction in the perpetration of sexual violence is 40.5% at 3-4 month follow up, falling to 14% at 6-12 month follow up, based on self-reported sexual assault perpetration. No moderator analysis on perpetration is reported because of the small number of included studies.

There are two, recent, studies from the UK, one in a university and one in a community setting. Both obtain similar results to those reported above. These two studies illustrate that bystander interventions, which have largely been implemented and tested in the United States, do appear to be transferable to the UK context.

There are no process evaluations or cost analysis. But a study discussing implementing such programmes in the European context stresses the need for cultural adaptation.

Core intervention components in bystander intervention programmes aim to increase participants' understanding and knowledge of sexual assault and the warning signs for sexual violence (Kettrey et al., 2019, p. 6). They also aim to improve bystanders' abilities to identify situations where it is appropriate (and safe) to intervene and to apply appropriate skills and/or tactics for taking action (Kettrey et al., 2019).

Objective and approach

The objective of this technical report is to review the evidence on the effect of bystander intervention programmes. This technical report is based primarily on a recent systematic review and meta-analysis by Kettrey et al. (2019). The following inclusion and exclusion criteria were used to inform the selection of systematic reviews.

Inclusion criteria

Included in this technical report were systematic reviews and meta-analyses of the effectiveness of bystander intervention programmes to reduce sexual assault perpetration.

Kettrey et al. (2019) was the only systematic review and meta-analysis identified that focused solely on the impact of bystander intervention programmes on sexual violence or sexual assault outcomes. Jouriles et al. (2018) also conducted a meta-analysis of bystander intervention programmes, but their review also included programmes to reduce relationship and dating violence.

Therefore, Kettrey et al. (2019) is the preferred review, but this report is also informed by Jouriles et al. (2018). Additional systematic reviews were also consulted to provide supplemental information about bystander intervention programmes to reduce sexual assault (i.e., Fenton et al., 2016; Mujal et al., 2018; Storer et al., 2016).

Exclusion criteria

Reviews were excluded for the following reasons:

- Review was an additional publication of an existing review where a previous publication reported a greater amount of detail. For example, Kettrey and Marx (2021) was a journal article based on the Campbell review by Kettrey et al. (2019).
- Review focussed on specific subgroups of participants, for example first-year university students (Evans et al., 2019) or sexual and/or gender minority students (Kirk-Provencher et al., 2023).
- Review focussed on factors relating to bystander intervention rather than the effectiveness of interventions designed to increase bystander behaviour (e.g., Labhardt et al., 2017; Mainwaring et al., 2022).

- Review was not a systematic review (e.g., Addis & Snowdon, 2021).
- Review examined the effectiveness of intervention programmes, designed to reduce non-sexual violence outcomes, that may include components on bystander training (e.g., dating and relationship violence: Lee & Wong, 2020; Melendez-Torres et al., 2022; Piolanti & Foran, 2022, or bullying: Storer et al., 2017).

There is a significant amount of literature in this field and even more literature related to the response, or lack of response, by individuals when they witness a crime or an emergency (i.e., the bystander effect). This literature base was considered irrelevant to the current toolkit topic, as this typically explores the impact of the presence of other people on whether or not someone will intervene or respond to a crime (Fischer et al., 2011). The aim of this report is to examine the effectiveness of specific intervention programmes that target bystander behaviour in order to reduce sexual assault or sexual violence in the community.

Outcomes

Multiple outcomes are included in reviews of the effectiveness of bystander intervention programmes to reduce sexual violence perpetration. For example, Kettrey et al. (2019) include outcomes such as:

- Bystanders' attitudes towards sexual violence and victims of sexual assault/violence (e.g., rape myth acceptance)
- Bystanders' knowledge and skills for identifying warning signs of sexual assault or appropriate approach for helping or intervening
- Self-efficacy of bystanders to intervene
- Bystanders' intentions to intervene
- Bystanders intervening behaviours
- Sexual assault perpetration

While there were a number of outcomes the target was always bystanders. Kettrey et al. (2019) state that the sexual assault perpetration outcome was measured in samples of participants that took part in evaluations of bystander intervention programmes. Therefore, this is not a measure of the effectiveness of bystander intervention programmes to reduce the prevalence of sexual violence perpetrated by others in the community. Many scholars have discussed that even though reduction of sexual assault perpetration and victimisation is

ultimately the goal of bystander intervention programmes, these outcomes are rarely reported in evaluations of such initiatives (DeGue et al., 2014; Fenton et al., 2016).

Description of interventions

Kettrey et al. (2019, p. 9) included bystander interventions for young people. These interventions are described as those that “... approached participants as allies in preventing and/or alleviating sexual assault among adolescents and/or college students”. In order to successfully act as a bystander and prevent an incident of sexual violence from occurring, bystanders need to not only be aware of the event, but also the warning signs and determine an appropriate course of action (Kettrey et al., 2019). The warning signs for an act of sexual violence may include exhibitions of controlling behaviour or an incident where an individual is leading an intoxicated person to an isolated area (Kettrey et al., 2019).

This approach is believed to be possibly less confrontational than other strategies to prevent or reduce sexual assault, particularly in relation to programmes that treat all participants as possible perpetrators or victims (Kettrey et al., 2019). It is thus less likely to have ‘backlash effects’ of promoting undesirable attitudes or behaviour.

Bystander intervention programmes to reduce sexual assault have been implemented in both single-sex and mixed-sex groups. In the review by Jouriles et al. (2018) the majority of interventions were implemented in mixed-sex groups, but of those that were implemented with only one sex, most were implemented with all male groups ($n = 5$) in comparison to those implemented with all female groups ($n = 2$).

Intervention components

Core intervention components in bystander intervention programmes aim to increase participants’ understanding and knowledge of sexual assault and the warning signs for sexual violence (Kettrey et al., 2019, p. 6). They also aim to improve bystanders’ abilities to identify situations where it is appropriate (and safe) to intervene and to apply appropriate skills and/or tactics for taking action (Kettrey et al., 2019).

As such, bystander intervention programmes may target attitudes towards victims of sexual assault to try to increase empathy and encourage bystanders to intervene and prevent sexual violence. These approaches also aim to improve participants' self-belief and self-efficacy in being able to effectively intervene.

Intervention components in bystander intervention programmes may include educational sessions delivered in groups and led by a facilitator, or use videos, posters or other forms of advertising campaigns (Kettrey et al., 2019). The content and framing of sexual assault varies between bystander interventions, but Kettrey et al. (2019) highlight how these programmes share common goals. Namely, they aim to increase participants' abilities to: (1) notice an 'event' (i.e., a potential sexual assault); (2) identify the situation as warranting or needing intervention; (3) taking responsibility for intervening; and (4) deciding upon an appropriate way to intervene (Burn, 2009; Kettrey et al., 2019).

Bystander training itself can also be a component of other intervention programmes (e.g., dating and relationship violence intervention programmes; Lee & Wong, 2020) as well as being a standalone intervention programme. The purpose of the current technical report is to examine standalone intervention programmes, where the sole aim of the intervention is to implement bystander training.

Implementation setting and personnel

Kettrey et al. (2019) outline that bystander intervention programmes are typically implemented in large groups and can involve a single intervention session as part of a broader training (e.g., university orientation) or be implemented as a wider strategy (e.g., media campaigns across university buildings). In their review, Kettrey et al. (2019) identified 22 evaluations of bystander intervention programmes that were implemented in university settings and only 5 evaluations that were implemented in schools.

Jouriles et al. (2018) only included bystander intervention programmes that were implemented in university settings. They report that some of these initiatives did not involve a facilitator. For example, interventions may have involved screening of a video or displayed posters. Other programmes did include a facilitator, which are described as a combination of

either peer or non-peer facilitators (Jouriles et al., 2018). Further information is not provided about who would classify as a non-peer facilitator, but we could assume that these are programme staff directly involved in the programme implementation or trained members of university staff.

Duration and scale

Jouriles et al. (2018) included a variety of different programmes that were implemented for differing amounts of time. Some programmes were implemented for 20 minutes, whereas others were implemented for up to 360 minutes (i.e. 6 hours).

Theory of change/presumed causal mechanisms

The core presumed causal mechanism underlying bystander intervention programmes is to train possible witnesses to sexual assault, or its precursors, to proactively and effectively intervene. These programmes aim to improve bystanders' knowledge and skills to intervene on behalf of victims, or potential victims, of sexual violence. Programmes such as this treat young people as allies and instead of focusing on changing one's own behaviour, they aim to involve bystanders in "part of the solution of sexual assault" (Kettrey et al., 2019, p. 7).

In this way, the causal mechanisms in bystander intervention programmes directly target intermediate outcomes, such as bystander intervening behaviour, empathy for victims of sexual assault or decreased rape myth acceptance (Kettrey et al., 2019).

Evaluations often measure the impact of the bystander intervention programme on participants' own self-reported behaviours (Fenton et al., 2016). Similarly, Kettrey et al. (2019) argue that bystander intervention programmes can also be effective in changing participants' own behaviour. This strategy involves removing some possible blame and subsequent defensiveness amongst participants and avoids treating all participants as potential perpetrators or victims – yet still educates participants about important issues surrounding sexual violence.

Fenton et al. (2016, p. 34) suggest that any possible changes in participants' own behaviours could be explained by "... some of the shifts in participant psychology that are achieved

through taking part in some bystander programmes act as protective factors which produce the outcome of a reduction in participants' own self-reported perpetration of violence". For example, Katz (1995), who developed and evaluated the first bystander program designed to prevent sexual assault, studied a programme that aimed to alter understandings of masculinity amongst a sample of male college athletes in the US, namely the view that to be masculine means exerting dominance over females. This is an example of bystander intervention programmes treating participants as part of the solution rather than part of the problem, but also affording them the opportunity to reflect upon their own actions. Instead of treating all male participants as perpetrators of sexual violence, they instead are asked to challenge their peers' actions. This approach may make the participants be less defensive and more receptive to the intervention (Kettrey et al., 2019).

Evidence base

Descriptive overview

In the review of Kettrey et al. (2019) the majority of the included evaluations were of interventions in the US, but they included one study from Canada and one study from India. Evaluations included by Kettrey et al. (2019) were mostly implemented in colleges or universities ($n = 22$) and a small number were implemented in schools ($n = 5$). Most evaluations were conducted using a randomised controlled trial design where individuals ($n = 12$) or groups of individuals ($n = 9$) were randomly assigned to experimental conditions. Six included evaluations used non-random study designs (Kettrey et al., 2019).

Assessment of the evidence rating

At the time of writing, the review by Kettrey et al. (2019) represents the best available evidence on the effectiveness of bystander intervention programmes to reduce sexual assault. Our decision rule for determining the evidence rating is summarised in the technical guide.

An evidence rating was not produced for the other systematic reviews and meta-analyses that informed the content of this technical report. The reviews by Fenton et al. (2016), Mujal et al. (2018), and Storer et al. (2016) did not conduct a meta-analysis and so an impact rating could not be estimated.

Jouriles et al. (2018) included evaluations of bystander intervention programmes that were designed to reduce dating violence, sexual assault, or both outcomes in their meta-analysis. They report the impact of bystander intervention programmes on participants' attitudes/beliefs and their behaviour as bystanders. No outcomes relating to sexual assault perpetration are reported, and the interventions included were not only bystander programmes to reduce sexual assault. Therefore, no impact rating was calculated.

A modified version of the AMSTAR2 critical appraisal tool was used to appraise the reviews that inform the current technical report. According to this tool, the review by Kettrey et al. (2019) was rated as high confidence.

Kettrey et al. (2019) present their inclusion criteria in relation to a PICO's framework. They included randomised controlled trials or quasi-experiments with matching procedures, or at least sufficient data to estimate baseline equivalence of bystander programmes implemented with participants in universities or schools (grades 7 to 12). Undergraduate students were eligible and postgraduate university students were excluded. Included intervention programmes were those that aimed to train bystanders in order to reduce sexual assault and the evaluations compared the treatment against a comparison group that did not receive a bystander intervention programme or other type of sexual assault prevention programme.

Kettrey et al. (2019) report a robust and thorough search strategy and clearly outline their included keywords. They also state that study selection and data extraction were performed in duplicate.

Information about included studies is provided in an appendix and in a subsequent publication of Kettrey et al. (2019)'s review (i.e., Kettrey & Marx, 2021). Risk of bias was assessed using the Cochrane risk of bias tool and the results were clearly described.

Kettrey et al. (2019) reported the results of a meta-analysis using appropriate methods and examined multiple possible sources of heterogeneity. Although, for sexual assault perpetration outcomes, moderator analysis was not possible (Kettrey et al., 2019).

The authors declare the sources of funding for the review and declare that they did not have any conflict of interests (Kettrey et al., 2019).

Kettrey et al. (2019) report a direct effect of bystander intervention programmes on self-reported sexual assault perpetration. Two evaluations reported the impact of interventions on these outcomes 3-4 months after the end of the intervention and four evaluations reported an effect size for outcomes measured at 6-12 month follow-ups (Kettrey et al., 2019). The 6-12 month follow-up was chosen as our headline impact estimate and there was a small amount of heterogeneity between these studies ($I^2 = 35.7\%$). The review was rated as 'high' according to the AMSTAR tool, and so the evidence rating is 2, marked down on account of the small number of evaluations.

Impact

Summary impact measure

Based on the meta-analysis by Kettrey et al. (2019) the findings suggest that bystander intervention programmes were effective in reducing participants' self-reported sexual assault perpetration. They report results for evaluations that used random and non-random assignment separately and for sexual assault perpetration measured 1 - 4 months or 6 – 12 months after the end of the intervention. No interventions reported the impact of bystander intervention programmes immediately following the end of an intervention programme.

The mean effect sizes extracted from Kettrey et al. (2019) are summarised in Table 1.

Table 1

Mean effect sizes for sexual assault perpetration outcomes

Review	<i>n</i> studies	ES (<i>g</i> and OR)	95% CI	% reduction	Evidence rating on crime and violence
Kettrey et al. (2019)	2	<i>g</i> = 0.33 OR = 1.82	-0.70, 1.36	40.5%	2

3-4 month follow-up					
Kettrey et al. (2019) 6-12 month follow-up	4 (3 RCTs 1 QED)	$g = 0.10$ OR = 1.199	-0.10, 0.30	14%	2

Note: ES = the weighted mean effect size; p = the statistical significance of the mean ES; OR = odds ratio; g = Hedge's g ; n = number of studies; ns = not significant; ** = headline impact estimate

In order to convert the g measures to a percentage reduction, we first used the equation: $\ln(\text{OR}) = g / 0.5513$ (Lipsey & Wilson, 2001). Then we assumed that there were equal numbers ($n = 100$) in the experimental and control conditions, and that 17% of persons in the control condition committed an offence. This transformation is outlined in Annex 1.

Kettrey et al. (2019) also reported the impact of bystander intervention programmes on a number of additional outcomes. Due to the large number of outcomes, we have selected only the most relevant additional outcomes (i.e., actual bystander behaviour and bystanders' behavioural intentions). The reduction in the perpetration of sexual violence is 40.5% at 3-4 month follow up, falling to 14% at 6-12 month follow up.

The results show that bystander intervention programmes have a desirable impact on actual bystander intervening behaviour, measured as the 'extent to which they [participants] have engaged in bystander behaviour (e.g., "walked a friend from a party who has had too much to drink")' (Kettrey et al., 2019, p. 26). Desirable impacts of bystander training programmes were seen at 1-4 month follow-up ($g = 0.27$, 95% CI 0.19, 0.36; $I^2 = 2.2\%$; $n = 11$) and 6-12 month follow-up ($g = 0.12$, 95% CI -0.08, 0.32; $I^2 = 14.2\%$; $n = 4$). The mean effect size for 6-12 month follow-up was not statistically significant.

Bystander intervention programmes were found to have a desirable impact on bystander intentions too. This outcome is described as measuring the likelihood that participants will engage in bystander behaviour (e.g., "I stop and check in on someone who looks intoxicated

when they are being taken upstairs at a party” (Kettrey et al., 2019, p. 25). Immediately following the end of the intervention, the results show a desirable impact on bystander intentional behaviour ($g = 0.17$, 95% CI -0.18, 0.52; $I^2 = 87.6\%$; $n = 6$), and at 1-4 month follow-up ($g = 0.41$, 95% CI 0.15, 0.68; $I^2 = 70.16\%$; $n = 6$). Desirable intervention effects were also found when bystander intentional behaviour was measured at 6-12 month follow-up ($g = 0.23$, 95% CI 0.03, 0.43; $I^2 > 0.00$; $n = 3$).

Moderators and mediators

Given the small number of studies that reported the impact of bystander intervention programmes on sexual assault perpetration outcomes, Kettrey et al. (2019) did not conduct any moderator analyses related to sexual violence perpetration. Kettrey et al. did conduct moderator analyses for a number of other effects on bystander outcomes.

Evidence from the United Kingdom

Two studies are available from the United Kingdom, which have been published since the search was conducted for the Kettrey et al. (2021) review.

Fenton and Mott (2019) report findings from the evaluation of ‘The Intervention Initiative’ (TII), which is a facilitated bystander intervention educational that was implemented with first-year Law students at a university in the Southwest of England. A distinctive feature of the programme was that it was built into the curriculum rather than being a stand-alone activity into which students could self-select.

Because of low rates of data collection completed by the control group, the reported effects are pre-post effects with no control. There were 354 participants in the programme of which 131 completed both the pre and post-test questionnaires.

TII was delivered in four 2-hour sessions to 14 groups of between 15 and 25 students. A campus-wide social marketing “Anti-Abuse” Campaign led by the Student Union took place during an overlapping time period.

Participants showed significant improvements for the majority of outcomes, namely: rape myth acceptance; domestic abuse myth acceptance; bystander efficacy; readiness to help (both denial and responsibility). But there was an insignificant effect on bystander behaviour. There was little evidence of backlash, with a small percentage (2-4%) showing a worsening of scores, compared to a much larger percentage (over 20%) showing an increase.

Analysis comparing students who were and were not exposed to the social marketing campaign shows that to have had an additional effect with respect to rape myth acceptance, but not to any other outcome.

The second study, by the same team of researchers, adapted IIT for a community-based version called Active Bystander Communities (ABC). Participants were recruited opportunistically from the Exeter area, and attended a three-session facilitated programme. Anyone over 16 was eligible to attend. There were 70 participants in total of whom 58 attended all sessions. Participants were arranged into five groups of a maximum of 20 people according to both session location and preferred time of day for the sessions. There was no control group.

Significant effects were observed at endline for Myth Acceptance (self and perception of peers), Bystander Efficacy, Behavioural Intent (self and perception of peers) and Perceived Law. In all cases, but for Perception of Peer Myth Acceptance (perceptions of peers beliefs), the effects were sustained to four months. The change in Bystander Behaviours at endline and 4 months follow-up was not statistically significant. Backlash was minimal.

These two studies illustrate that bystander interventions, which have largely been implemented and tested in the United States, do appear transferable to the UK context.

Implementation and Cost analysis

No studies explicitly address implementation issues. However, a paper by Fenton and Mott (2017), who have been involved in the UK studies described above argue that cultural adaptation is required.

Cost analysis

No cost data are available

What do we need to know? What don't we know?

- The focus on self-reported behaviour has benefits, but may not be an accurate reflection of non-socially desirable behaviour. It could be that the awareness raising component of bystander training make individuals less likely to accurately report their sexual assault perpetration.
- To further build the evidence base on how these interventions might work in the UK
- It would be desirable to know what might mediate or moderate the relationship. For example, does this work best with individuals of certain ages? Is there a particular programme or format that is better?
- It would be desirable to know whether the desirable impact lasts beyond one year.

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Annex 1: Effect size calculation

This annex shows the calculation based on the results and assumptions given in the text. We assume 200 observations made, evenly divided between treatment and control groups. That means there are 100 recorded observations in the control group and 100 recorded observations the treatment group. Assuming that 17% of individuals in the control group self-reported sexual assault, the mean effect sizes reported by Kettrey et al. (2019) can be easily transformed to a percentage reduction.

If the odds ratio for the sexual assault perpetration outcome measured 6-12 months after the end of the intervention is OR = 1.199 (Kettrey et al., 2019), then using the table below and the formula for an OR, we can estimate the value of X. The odds ratio is estimated as: $A \cdot D / B \cdot C$, where A is the number of participants that do not report sexual assault perpetration in the treatment group, B is the number of participants that do report sexual assault perpetration in the treatment group, C is the number of participants that do not report sexual assault perpetration in the control group, and D is the number of participants that do report sexual assault perpetration in the control group. Therefore, the value of X is 14.59 for the 6-12 month follow-up sexual assault perpetration outcome.

	No		
	assault	Assault	Total
Treatment	100-x	x	100
Control	83	17	100

Therefore, the relative reduction in crime is $(17 - 14.59) / 17 = 14.18\%$. The corresponding values for X for sexual assault perpetration measured at 3-4 months (OR = 1.82) after the end of an interventions is 10.12. Thus, the relative reduction is 40.5%.

The prevalence of sexual assault perpetration is likely to vary between studies and across individuals. Furthermore, it can be influenced by a number of different factors such as the type of behaviour, the type of report (i.e., self-reported or official records of arrests or convictions), or the time frame in which behaviours occurred (i.e., the past 3 months or lifetime prevalence). If we were to adjust our assumption that 25% of the control group perpetrated sexual assault, the relative reduction in the intervention group is not greatly affected.

For example, if we assume that 40% of the control group perpetrated sexual assault 6-12 months following participation in an intervention, the 2x2 table would be as follows for and the value of X is 35.73. Therefore, the relative reduction is 10.68% (i.e., $(40 - 35.73)/40$).

	No violence	Violence	Total
Treatment	100-x	X	100
Control	60	40	100

Similarly, if we assume that 10% of the control group perpetrated sexual assault 6-12 months following participation in an intervention the value of X is 8.48 and the relative reduction is 15.2%. Given the difference in the assumed prevalence of sexual assault perpetration, the percentage relative reduction does not vary in a similar fashion. Table 4 shows this further.

Table 4

Variation of the relative reduction in sexual assault perpetration outcomes reported by Kettrey et al. (2019).

	Kettrey et al. (2019), 3-4 month follow up OR = 1.82	Kettrey et al. (2019), 6-12 month follow up OR = 1.199
Assumed prevalence in control group	Relative reduction	
10%	42.45%	15.2%

17%	40.5%	14.18%
40%	32.97%	10.68%

Annex 2: Process evaluation evidence

	Success factors	Challenges	What parents and children say

Annex 3 – AMSTAR Quality Rating

Modified AMSTAR item		Scoring guide	Bystander intervention programmes to reduce sexual assault	
			Kettrey et al. (2019)	Jouriles et al. (2018)
1	Did the research questions and inclusion criteria for the review include the components of the PICOS?	To score 'Yes' appraisers should be confident that the 5 elements of PICO are described somewhere in the report	Yes	Yes
2	Did the review authors use a comprehensive literature search strategy?	At least two bibliographic databases should be searched (partial yes) plus at least one of website searches or snowballing (yes).	Yes	Yes
3	Did the review authors perform study selection in duplicate?	Score yes if double screening or single screening with independent check on at least 5-10%	Yes	No
4	Did the review authors perform data extraction in duplicate?	Score yes if double coding	Yes	Yes
5	Did the review authors describe the included studies in adequate detail?	Score yes if a tabular or narrative summary of included studies is provided.	Yes	Yes
6	Did the review authors use a satisfactory technique for assessing the risk of bias (RoB)	Score yes if there is any discussion of any source of	Yes	Partial Yes

	in individual studies that were included in the review?	bias such as attrition, and including publication bias.		
7	Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes if the authors report heterogeneity statistic. Partial yes if there is some discussion of heterogeneity.	Yes	Yes
8	Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes if authors report funding and mention any conflict of interest	Yes	Partial Yes
	Overall		High	Medium



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