

# Identifying Barriers to Condom Use Among Female Sex Workers: a Systematic Review and Meta-analysis

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## Research article

**Keywords:** Meta-analysis, Female sex worker, Condom use

**Posted Date:** August 18th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-48093/v1>

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## Abstract

**Background:** Many studies have shown a lot of factors which are as barriers to the condom use among female sex workers (FSWs). However, there is not a comprehensive study to report the number and magnitude of these barriers. This study aimed to resolve this gap by comprehensive systematic review and meta-analysis.

**Methods:** We have searched the electronic databases include Web of Science, PubMed, and Scopus until September 2019. For each database we formulated a separate search strategy using keywords such as “condom use” and “sex worker” and the related synonyms. Epidemiological epidemiology addressed the factors associated with unprotected sex for the female sex worker. The heterogeneity across studies and probability of publication bias was investigated by  $I^2$  statistic and Begg's and Egger's tests respectively. The pooled effect size were expressed as odds ratio (OR) with 95% confidence intervals (CI) using a random-effects model.

**Results:** Out of 5854 studies obtained in initial search, 35 studies with sample size 14218 participants had eligibility criteria which were included in the final analysis. Ten factors include marital status, alcohol use, history of violence, history of sexual abuse, history of STIs, STIs knowledge, HIV risk perception, drug use, knowledge about the condom use, condom use self-efficacy were identified in those studies. *History of sexual abuse with OR=1.87 and the knowledge on AIDS with OR=1.07 had the strongest association and weakest association with condom use respectively.*

**Conclusion:** Many factors with different degrees of association influence on the condom use among female sex workers. However, *history of sexual abuse*, a history of violence, and *HIV risk perception* were considered as the major determinants of the condom use. The structural interventions, policy change and empowerment of female sex workers are recommended to increase consistent condom use in FSWs.

## Background

The sexually transmitted infections (STIs) are the major health concerns in the world, which transmitted from one person to another person through sexual contacts [1]. Majority of STIs lack clinical symptom or have mild symptoms, and accordingly increases the risk of transmitting disease substantially [2, 3]. The statistics state that regardless of the human immunodeficiency virus (HIV) over one billion adults were suffering from STIs [4]. Approximately, 500 million people have syphilis, gonorrhea, chlamydia or trichomoniasis. Furthermore, about 530 million people have genital herpes and 290 million women have human papillomavirus. On the other hand, about 110,000 deaths have been attributable to STIs in the world [5].

The recommended strategy for reduction and control of STIs is to avoid the unprotected sexual contact. Condom use is suggested as one of the simplest, most inexpensive and efficient ways to prevent STIs [6]. The condom not only prevent unwanted pregnancies reliably, but also plays an important role in the reduction of the risk of HIV transmission to sexually active women [7].

The most vulnerable sub-group of the population for the acquisition of STIs are female sex workers (FSWs)- individuals who deliver sexual services to their clients [8, 9]. Due to the engagement of FSWs with too many partners, they have 13 times more risk for HIV acquisition compared to the general population [10]. The studies showed that despite high risk of STIs among FSWs, rate of condom use is not high [11, 12]. Several epidemiological studies have reported different factors which effect on the use of condoms among female sex workers [5, 13, 14]. However, the results reported by the studies are inconsistent. The results of a systematic review conducted in 2015 showed that the condom use was highest with commercial partners, increasing from 53.7% in 2000 to 84.9% in 2011. During this same period, condom use increased with regular partners from 15.2% to 40.4% and with unspecified partners from 38.6% to 82.5% [13]. Another systematic review was conducted in 2015 reported that Individual-level factors related to sex workers' knowledge, perception and power, the structural environment of sex work, access to resources, poverty, stigma, the legal environment and the role of media

influence on the condom negotiation process among sex workers. Moreover, interpersonal level factors which encompassed dynamics with clients and peer-related factors, presented as both barriers and facilitators to sex workers' condom negotiation process [15]. However, in terms of unclear search strategies, low number of studies and searching for a single main database, these studies are limited and therefore the results are not reliable. Moreover, they used the different tools and questionnaires to assess individual and environmental factors of sex workers, therefore, the results may be questionable.

However, there is no comprehensive and reliable information about all factors investigated by studies, and the results of the different studies are contradictory. In this study, we aimed to identify all factors affecting condom use among FSWs and assess the strength of their association with the condom use using meta-analysis.

## **Methods**

This meta-analysis has been conducted and reported based on Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) [16]. This review was not registered in any database.

### **Eligibility criteria**

In this study, the study population and the outcome of interest were female sex workers and the condom use respectively. All observational studies (cross-sectional, case-control and cohort) investigate the factors affecting condom use among sex workers which were included in the study without any time limitation [17]. We applied two limitations to include studies, accordingly only peer-reviewed and the studies in English had eligibility to include in this study.

### **Information sources and search**

We searched three international databases include Web of Science, PubMed, and Scopus until December 1, 2019. No time or language restrictions were adopted. The following search terms were used individually and in combination: (Condoms OR "Condom Manufacture" OR "Manufacture, Condom" OR "condom use") AND (Sex Workers OR Prostitutes OR "Sex Worker Client" OR "Sex Worker" OR "Female sex worker") AND (Barriers OR facilitators). Moreover, reference lists of the eligible articles were searched to obtain eligible studies.

### **Study selection**

The search results were entered into EndNote software, then duplicate cases were removed from the data file. Based on the above-mentioned criteria, two authors independently reviewed the title and abstract and full text of the remained studies. Any disagreement was resolved by discussion between two reviewers. The degree of agreement between authors in the selected studies was measured using Kappa statistical (78.9%).

### **Data extraction**

After selection of the eligible studies, we extracted the required data from the studies and entered to a data extraction form. Data such as first author, country, age, study design (case-control, cohort and cross-sectional), adjusted odds ratio (or crude odds ratio otherwise), type of OR (adjusted, unadjusted) with associated 95% confidence interval (95% CI) was extracted.

### **Methodological quality**

The quality of relating studies was assessed using the Newcastle Ottawa Statement (NOS) Manual. NOS scale is a checklist of items that define the amount of bias in a variety of studies and assign at maximum nine stars to the studies.

### **Heterogeneity and reporting biases**

In this study, Heterogeneity was assessed by the chi-squared test and  $I^2$  statistics [18]. Accordingly,  $I^2$  statistic can be present as follows:

$$I^2 = \left[ \frac{(Q - df)}{Q} \right] \times 100$$

In this model,  $\chi^2$  statistic and df indicate the degree of freedom [18]. Moreover, we used the Beggs' [19] and the Egger' test [20] to check the publication bias in the studies.

## Summary measures

We reported the association between the condom use and the related factors using OR with 95% Confidence Interval. In this study, the results were reported using a random-effect model. Furthermore, we performed statistical analyses at a significance level less than 0.05. The meta-analyses were performed using Stata version 14 (StataCorp, College Station, TX, USA).

## Results

### Results of search

Figure 1 demonstrates the process of performing meta-analysis. We identified a total of 5854 references through searching in databases (PubMed 2834, the web of science 1364 and Scopus 1656) until September 2019 and screening the reference lists. We excluded 3548 duplicates and 2205 irrelevant references through reading title and abstracts. Accordingly, for further assessment, 101 references were retrieved. We excluded 66 studies because neither they were not original articles (i.e. letter, commentary, review) nor they did not meet our inclusion criteria and nor we had access to their full text of the studies. Finally, 35 articles fulfilled the inclusion criteria (Fig.1), were assessed for the final phase.

These 35 studies were different in terms of population, geographical location, study design, and quality. The total number of participants was 14218 in 35 articles. Descriptive characteristics of the studies presented in table1.

The quality of the studies was investigated using NOS manual. Based on this scale, 15 studies<sup>(19) (21) (22) (25) (30) (31) (32) (34) (39) (42) (47) (48) (49) (50) (51)</sup> had the highest quality score and good-quality and three<sup>(20) (38) (46)</sup> studies had the lowest quality score.

### Synthesis of results

In total, ten factors were identified which associated with the condom use. The strength of the association between the factors with the condom use is given in Table 2. The association between ten factors and the use of condom is presented in Figs 2–10. Based on these forest charts, OR estimate of marital status was 1.15 (95% CI: 0.74, 1.50) (Fig. 2), among *alcohol use* 1.15 (95% CI: 0.74, 1.56) (Fig.3), among *history of violence* 1.84 (95% CI: 1.36, 2.31) (Fig.4), among *history of sexual abuse* 1.87 (95% CI: 1.36, 2.38) (Fig.5), among *history of STIs* 1.54 (95% CI: 1.10, 1.97) (Fig.6), among *HIV risk perception* 1.81 (95% CI: 1.58, 2.05) (Fig.7), among *STIs knowledge* 1.07 (95% CI: 0.54, 1.59) (Fig.8), among *knowledge about condom use* 1.53 (95% CI: 1.15, 1.91) (Fig.9), among *drug use* 1.62 (95% CI: 1.10, 2.14) (Fig.10), among *condom use self-efficacy* 1.75 (95% CI: 1.52, 1.98) (Fig.11). Accordingly, a history of sexual abuse with OR by 1.87 had the strongest association, and the knowledge on STIs had the weakest association with condom use by 1.07.

Thirty-five studies were included<sup>[21-40]</sup>. 20 studies assessed the association of education with condom use among FSWs. Educational attainment were the strongest predictors of consistent condom use with (OR = 19.6, CI = 7.0–54.6) [21].<sup>[21-37, 39-</sup>

46]. Moreover, 24 studies assessed association of age and the condom use among FSWs. Accordingly, FSWs who were younger (13–24 yr) had high chance for using the condom (OR = 4.8, 95% CI = 3.1–7.5).

### Publication bias

Publication bias was assessed using Begg's and Egger's tests. According to Begg's test, there were no evidences of publication bias to report association between each factor with the condom use ( $P < 0.05$ ).

## Discussion

In this study, we aimed to identify all factors influence on the condom use among FSWs. In addition, we aimed to present a robust and reliable estimate of degree of association between the identified factors with the condom use.

In this meta-analysis, ten factors include marital status, alcohol use, history of violence, history of sexual abuse, history of STIs, STIs knowledge, HIV risk perception, drug use, knowledge about the condom use, the condom use self-efficacy identified which influence on the condom use in FSWs. Accordingly, sexual abuse decreases the probability of condom use by 87%, which is the strongest predictor among the other factors. On the other hand, STIs knowledge *increases probability of condom use by 7% which was the weakest predictor among predictors*, although it was not statistically significant.

In this meta-analysis, sexual violence was identified as the major factor affecting the use of condoms in FSWs. In fact, sexual violence and sexual abuse have a significant negative impact on sexual health of FSWs as one of the main victims of sexual violence which results in reduction of the condom use [47-49]. Experience of sexual and physical violence and sexual abuse of FSWs has been mentioned as one of the major barriers to condom use in various studies [50-52]. Sexual violence in FSWs can lead to decrease in self-confidence and fear of sexual and physical violence, and finally to low resistance to negotiate about the condom use. Therefore, it increases the rate of sexually transmitted diseases [48].

In this study, being single is associated with the inconsistent condom use. Obstacles to using a condom in singles may be the inadequate education and information [53], inappropriate emotional relationships with family or sexual partners, and lack of male support for the condom acceptance [54].

In our study, the alcohol use and the drug use were identified as a barrier to the condom use. In fact, drug abuse through effect on proper decision making decreases probability of the condom use. Due to need for drug and shelter, the addicted FSWs are weaker than other FSWs which deliver unsafe sex in return for more money [55]. In addition, alcohol and drug abuse strongly impact the judgment and safe behavior and choices of women and put them at bigger risk [56, 57].

Female sex workers need more condom use with their partners and they often encounter challenges, such as lack of knowledge [58], inefficacy in negotiating condoms with partners [59], understanding HIV risk [60]. A positive attitude toward condom use and one's ability to use a condom is strongly associated with more condom use [61].

Another factor affecting condom use is increased self-efficacy [62]. The self-efficacy of the condom use is defined as one's ability to negotiate with the client to the condom use [63]. Self-efficacy beliefs not only affect how well individuals motivate themselves and persevere in the face of difficulties but also effect on the choices they make at important decisional points [64].

FSWs with higher school education levels had significantly higher self-efficacy of condom use [63]. Any factors in understanding the risk of STI, and knowledge of the condom use and self-efficacy by the condom use can be effective factors in the condom use. Awareness of the ways of transmission and methods of HIV prevention and acceptance by sex-workers seem to be effective in modifying high-risk behaviors and reducing HIV and STI prevalence. One of the reasons for the improper performance of women in high-risk groups is the lack of awareness about protective behaviors among this of

women [60]. Various studies have shown a relationship between the condom use and understanding of its benefits in HIV prevention [65-67].

Due to the complexity of sexual behavior and sexual partner in any relationship, even though awareness and skill and self-efficacy, women may not have the ability and power to prevent STI and protective behaviors. In some cases, condoms are not used even with a positive attitude toward condoms, risk perception, and even desire and intention behavior [68-70]. Therefore, the condom use behavior cannot be predicted well based on individual factors [69]. However, several factors can effect on the use of condom. Knowledge of STIs and the self-efficacy by the use of condoms alone cannot be effective in using condoms alone. Poverty, need for shelter, and the need for FSWs to drugs can be factors influencing the self-efficacy of the condom use [71]. Low self-efficacy and poverty have often been reported as reasons for not using condoms by the FSW[72, 73]. Client refusal because they understand that condoms reduce pleasure during sex. Therefore, some FSWs have sex without a condom. Almost all FSWs report that the reason for not using a condom is a financial problem and low self-efficacy to persuade the customer[74]. studies in other countries show varying rates of the condom use during a paid sexual transaction .When sexual partners offered more money for sex without a condom, FSWs tended to accept the cash over the protection [75]. Poverty hinders and facilitates the condom negotiations of sex workers. Half of the studies include severe economic deprivation and the need for basic survival as barriers to negotiation [14, 73, 75].

In this meta-analysis, it is likely that part of the relationship between factors identified with not using a condom was under confounding factors, and the other part related to other high-risk behaviors that were not examined.

This study had some limitations should be mentioned. First, the results of this meta-analysis are based on data extracted from observational studies that are related to intrinsic biases that cannot be changed, therefore, we could not confirm the causal impact of the identified factors on using the condom. We also searched for original articles in English that may lead to misinterpretation of the results. We could not assess the effect of age, vacation levels, and income levels using meta-analysis. Despite these limitations, this meta-analysis could estimate the relationship between identified factors and high-risk behaviors effectively. In this meta-analysis, regardless of age, country, race, publication date, we considered a variety of observational studies. We evaluated 4050 articles, including 33 studies with 13500 participants. Therefore, this study provides an acceptable conclusion for factors that influence on condom use in FSWs.

### **Implications:**

This study implication for health providers and policy-makers. First, many factors are associated with the condom use among FSWs. These factors include wide scope of socio-economic, cultural and political deserve to be paid attention by policy-makers. Therefore, wide spectrum of interventions is needed to increase condom use among FSWs. Lack of proper education and timely information to female sex workers is one of the obstacles to understanding the risk and acquiring the necessary skills to protect against HIV and sexually transmitted diseases. Therefore, sex education in high-risk groups can be effective tool in developing these skills and lead to increased self-efficacy in the condom use. In addition, due to the illegality of sex work, poverty, and stigma make FSWs avoid negotiating with partners for the condom use. These results are needed for policymakers to re-consider public health strategies and regulatory frameworks in the commercial sex industry. Finally, empowering of women vulnerable women through training about sexually transmitted diseases, methods of preventing STIs, and skills of using condoms as part of their reduction programs are recommended.

## **Conclusion**

Many factors contribute to the condom use among FSWs. Poverty, violence, sexual abuse, HIV risk perception, alcohol use, drug use are major determinants for the condom use. Therefore, empowerment of women, sexual health education and prevent drug abuse among FSWs are recommended to increase rate of the condom use.

## **Abbreviations**

The sexually transmitted infections (STIs)

Human immunodeficiency virus (HIV)

Female sex workers (FSWs)

Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)

Newcastle Ottawa Statement (NOS)

## Declarations

### Ethical approval

Not applicable.

### Consent for publication

Not applicable.

### Availability of data and materials

The corresponding author is responsible for data. Access to all relevant raw data will be free to any scientist.

### Competing interests

The authors have no conflict of interest.

### Funding

Not applicable.

### Authors' contributions

**T.O:** Search, reviewing, data extraction, writing the primary draft, and final approval

**M.M-K:** Search, reviewing, writing the primary draft, and final approval of the manuscript

**Y.M:** Design, statistical analysis, and final approval of the manuscript

### Acknowledgments

Not Applicable

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## Tables

Table 1 Description of studies included in final stage of meta-analysis

<i>1st author, year</i>	<i>country</i>	<i>Age (yr)</i>	<i>Study design</i>	<i>sex</i>	<i>Effect size</i>	<i>adjustment</i>	<i>Sample size</i>	<i>NOS quality</i>
<i>Adu-ppong,2007 [21]</i>	<i>Ghana</i>	<i>26.1</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Crude</i>	<i>450</i>	<i>6</i>
<i>Aho,2013 [41]</i>	<i>Guinea</i>	<i>27.1</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>223</i>	<i>6</i>
<i>Alam,2013 [22]</i>	<i>Bangladesh</i>	<i>0-24, 25+</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>1395</i>	<i>7</i>
<i>Andrews, 2015 [23]</i>	<i>Laos</i>	<i>21</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>258</i>	<i>4</i>
<i>Avila, 2017 [56]</i>	<i>Argentine</i>	<i>0-29, 29+</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Crude</i>	<i>273</i>	<i>8</i>
<i>Budhwani,2017 [24]</i>	<i>Dominican Republic</i>	<i>23</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>78</i>	<i>7</i>
<i>Bukenya,2013 [25]</i>	<i>Uganda</i>	<i>22-30</i>	<i>Cohort</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>905</i>	<i>5</i>
<i>Cai,2016 [76]</i>	<i>China</i>	<i>0-25, 25+</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Crude</i>	<i>220</i>	<i>6</i>
<i>Fehrenbacher,2016 [28]</i>	<i>India</i>	<i>30</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>200</i>	<i>7</i>
<i>Gallo,2011 [77]</i>	<i>Kenya</i>	<i>18-55</i>	<i>Case-crossover</i>	<i>female</i>	<i>Odds ratio</i>	<i>Crude</i>	<i>140</i>	<i>5</i>
<i>Grayman,2005 [29]</i>	<i>Vietnam</i>	<i>0-25, 25+</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>610</i>	<i>5</i>
<i>Gu,2014 [30]</i>	<i>China</i>	<i>33.9</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>200</i>	<i>5</i>
<i>Hong,2007 [31]</i>	<i>China</i>	<i>23.5</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>278</i>	<i>5</i>
<i>Joesoef,2000 [32]</i>	<i>Indonesia</i>	<i>23-29</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>1873</i>	<i>8</i>
<i>Kayembe,2014 [42]</i>	<i>Congo</i>	<i>20-44</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>267</i>	<i>7</i>
<i>Kerrigan, 2003 [43]</i>	<i>Dominican Republic</i>	<i>18-47</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>288</i>	<i>7</i>
<i>Lausevic,2016 [44]</i>	<i>Montenegro</i>	<i>18-50</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>142</i>	<i>6</i>
<i>Li,2010 [33]</i>	<i>China</i>	<i>23.4</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>318</i>	<i>7</i>
<i>Tran,2008 [78]</i>	<i>Vietnam</i>	<i>0-19, 29+</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>192</i>	<i>6</i>
<i>Mirzaee,2017 [45]</i>	<i>Iran</i>	<i>19-29</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>635</i>	<i>6</i>
<i>Markosyan,2014 [35]</i>	<i>Armenia</i>	<i>33.7</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>108</i>	<i>6</i>
<i>Markosyan,2011 [34]</i>	<i>Armenia</i>	<i>33.7</i>	<i>Cross-sectional</i>	<i>female</i>	<i>Odds ratio</i>	<i>Adjusted</i>	<i>120</i>	<i>4</i>

Murray,2007 <sup>[36]</sup>	Dominican Republic	0-27,28+	Cross-sectional	female	Odds ratio	Adjusted	258	7
Nishimura-Takahashi,1998 <sup>[79]</sup>	Philippines	23.9	Cross-sectional	female	Odds ratio	Crude	121	5
Parriault,2015 <sup>[80]</sup>	French	32.4	Cross-sectional	female	Odds ratio	Adjusted	447	5
Sou,2015 <sup>[37]</sup>	Canada	30-42	Cross-sectional	female	Odds ratio	Crude	685	7
Tamene,2015 <sup>[38]</sup>	Ethiopia	25.63	Cross-sectional	female	Odds ratio	Adjusted	495	6
Tood,2011 <sup>[39]</sup>	Afghanistan	28.5	Cross-sectional	female	Odds ratio	Crude	520	5
Wang,2010 <sup>[81]</sup>	China	26	Cross-sectional	female	Odds ratio	Adjusted	454	8
Wong,2003 <sup>[82]</sup>	Cambodia	22	Cross-sectional	female	Odds ratio	Adjusted	140	4
Ye,2012 <sup>[40]</sup>	China	16-35	Cross-sectional	female	Odds ratio	Adjusted	504	7
Xueref,2003 <sup>[46]</sup>	Madagascar	23	Cross-sectional	female	Odds ratio	Adjusted	316	8
Bandyopadhyay,2018 <sup>[83]</sup>	India	29.7	Cross-sectional	female	Odds ratio	Adjusted	296	8
Chen,2014 <sup>[27]</sup>	China	24.6	Cross-sectional	female	Odds ratio	Crude	581	7
Carrasco,2018 <sup>[26]</sup>	Dominican Republic	0-19, 36+	Cross-sectional	female	Odds ratio	Adjusted	228	8

**Table 2:** Summary for meta-analysis results of ten factors associated with the condom use

Variables	Overall(Odds ratio)	% 95 CI	Number of studies
marital status	1.15	0.74, 1.50	9
alcohol use	1.15	0.74, 1.56	9
history of violence	1.84	1.36, 2.31	5
history of sexual abuse	1.87	1.36, 2.38	5
history of STI	1.54	1.10, 1.97	3
HIV risk perception	1.81	1.58, 2.05	4
STI knowledge	1.07	0.54, 1.59	5
knowledge about condom use	1.53	1.15, 1.91	6
drug use	1.62	1.10, 2.14	6
condom use self-efficacy	1.75	1.52, 1.98	5

## Figures

### Identification

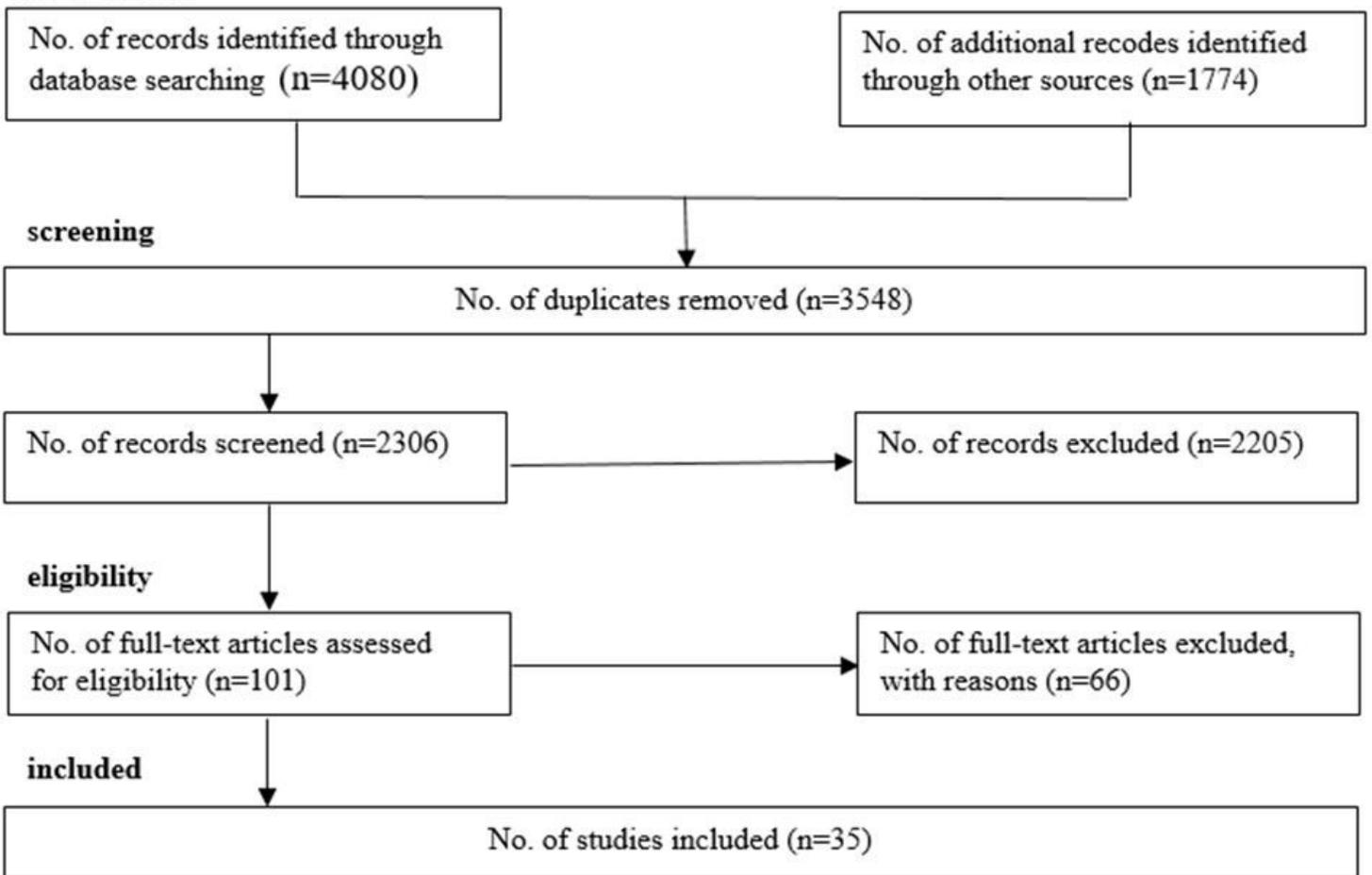
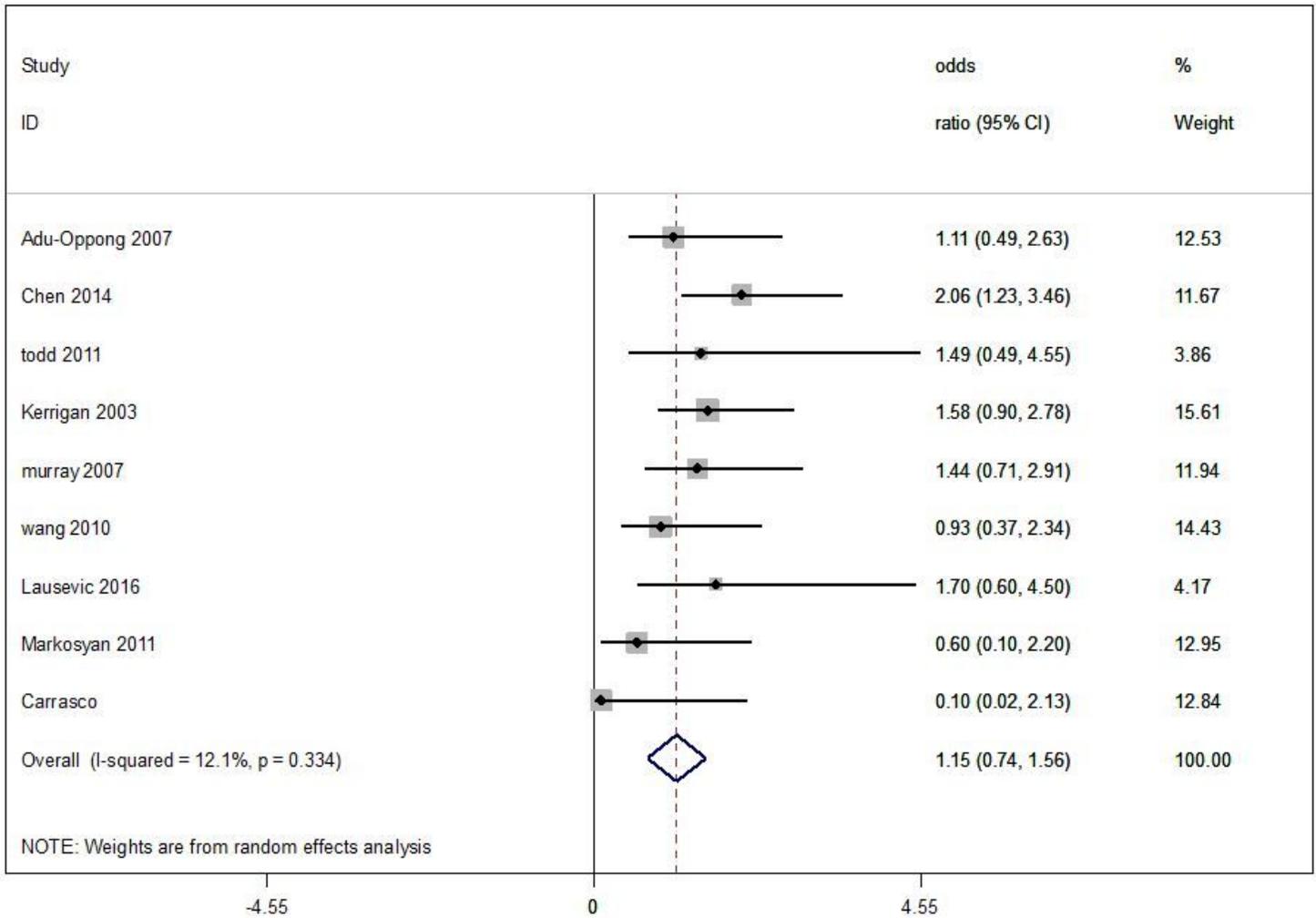


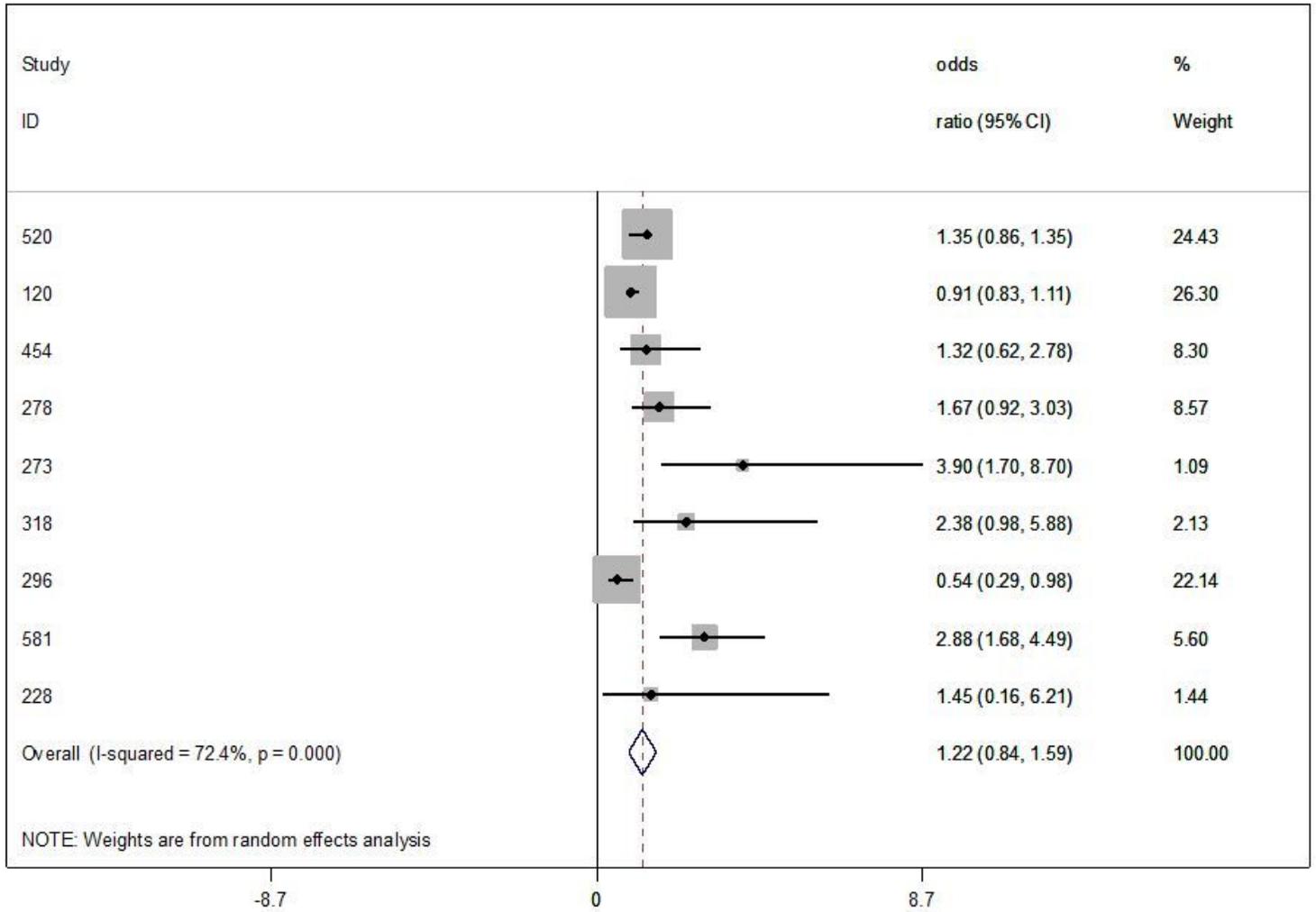
Figure 1

Flow of information through the different phase of the systematic review.



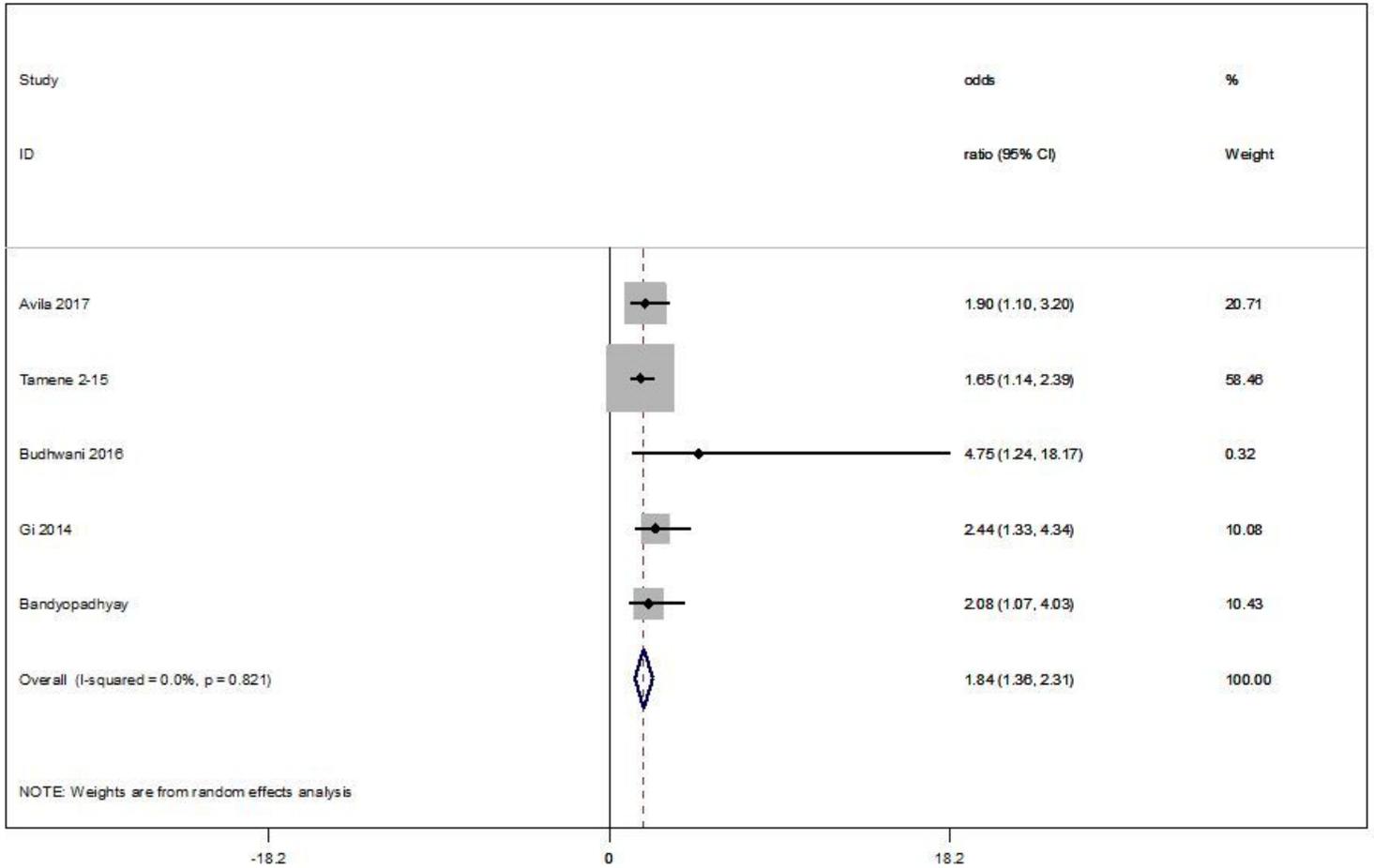
**Figure 2**

Forest plot of Barriers to the use of condoms in marital status.



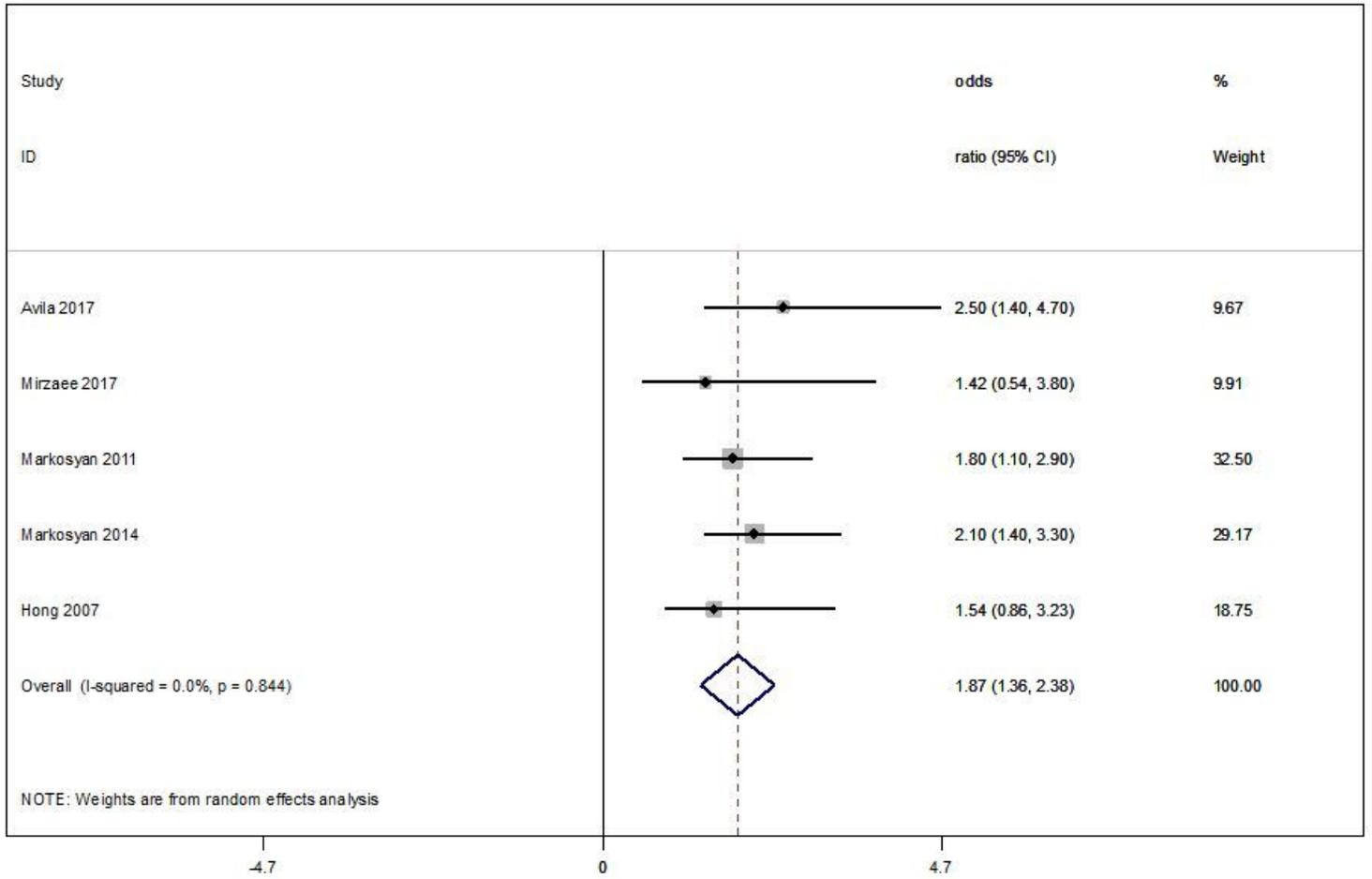
**Figure 3**

Forest plot of Barriers to the use of condoms in alcohol use.



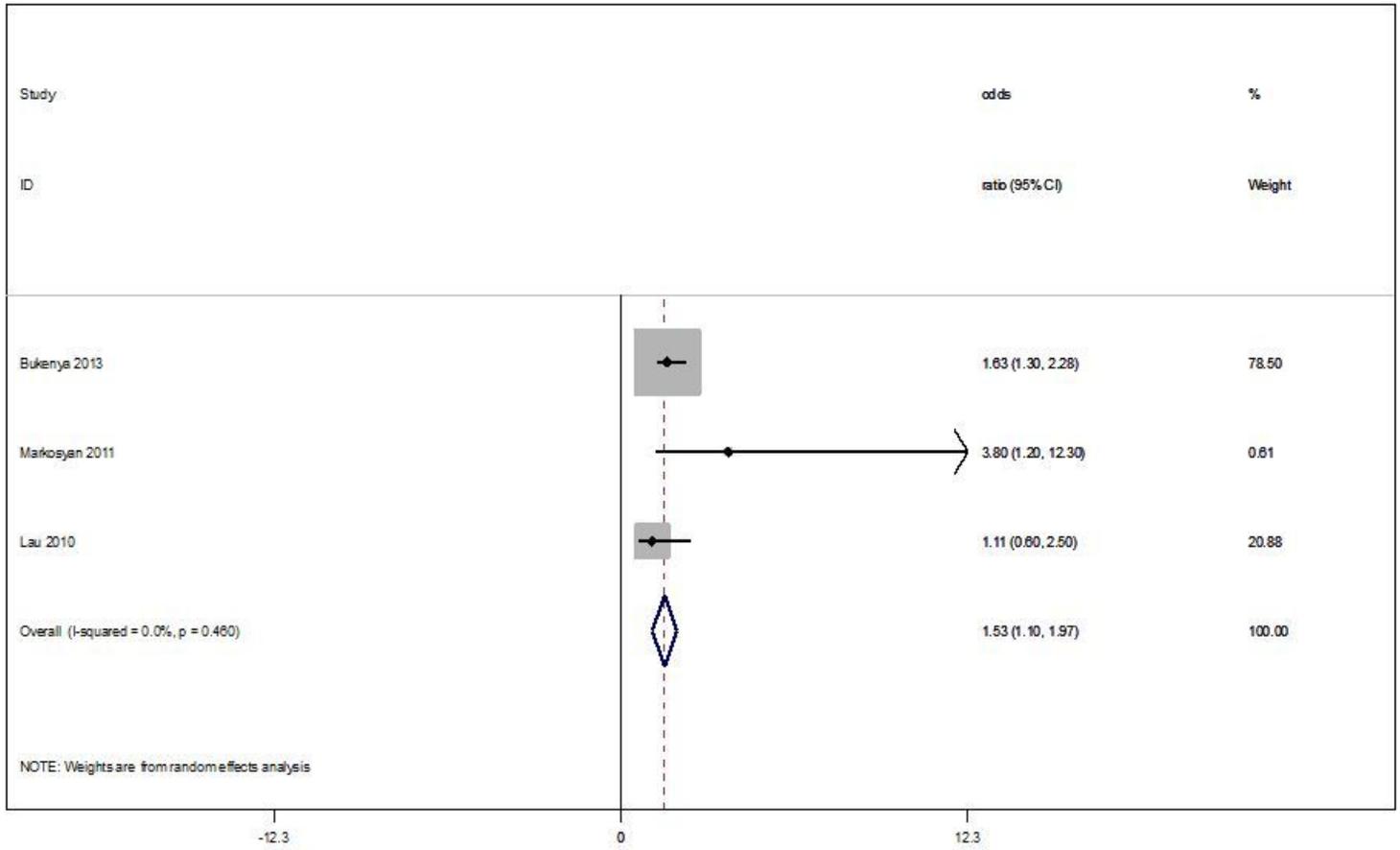
**Figure 4**

Forest plot of Barriers to the use of condoms in history of violence.



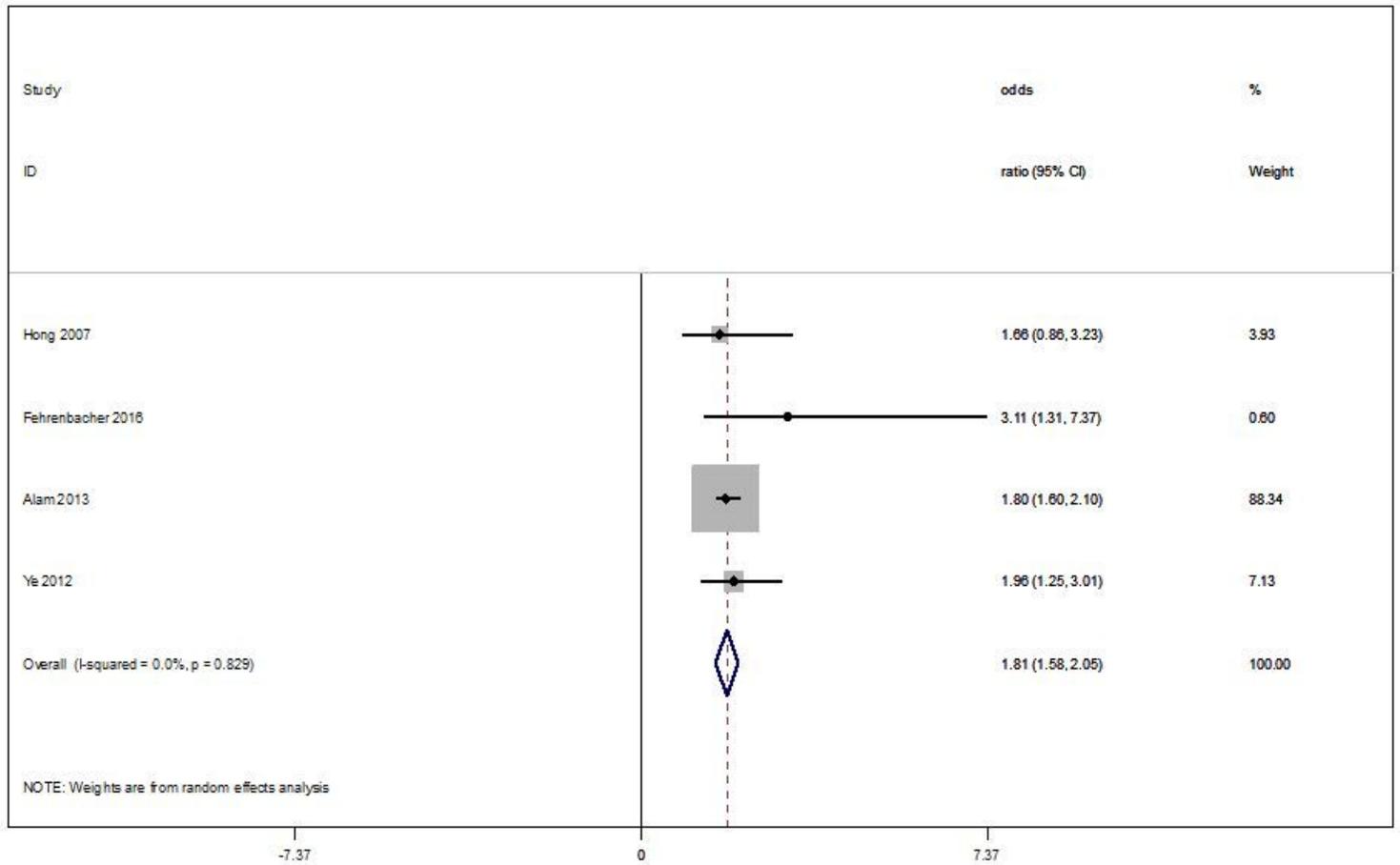
**Figure 5**

Forest plot of Barriers to the use of condoms in history of sexual abuse.



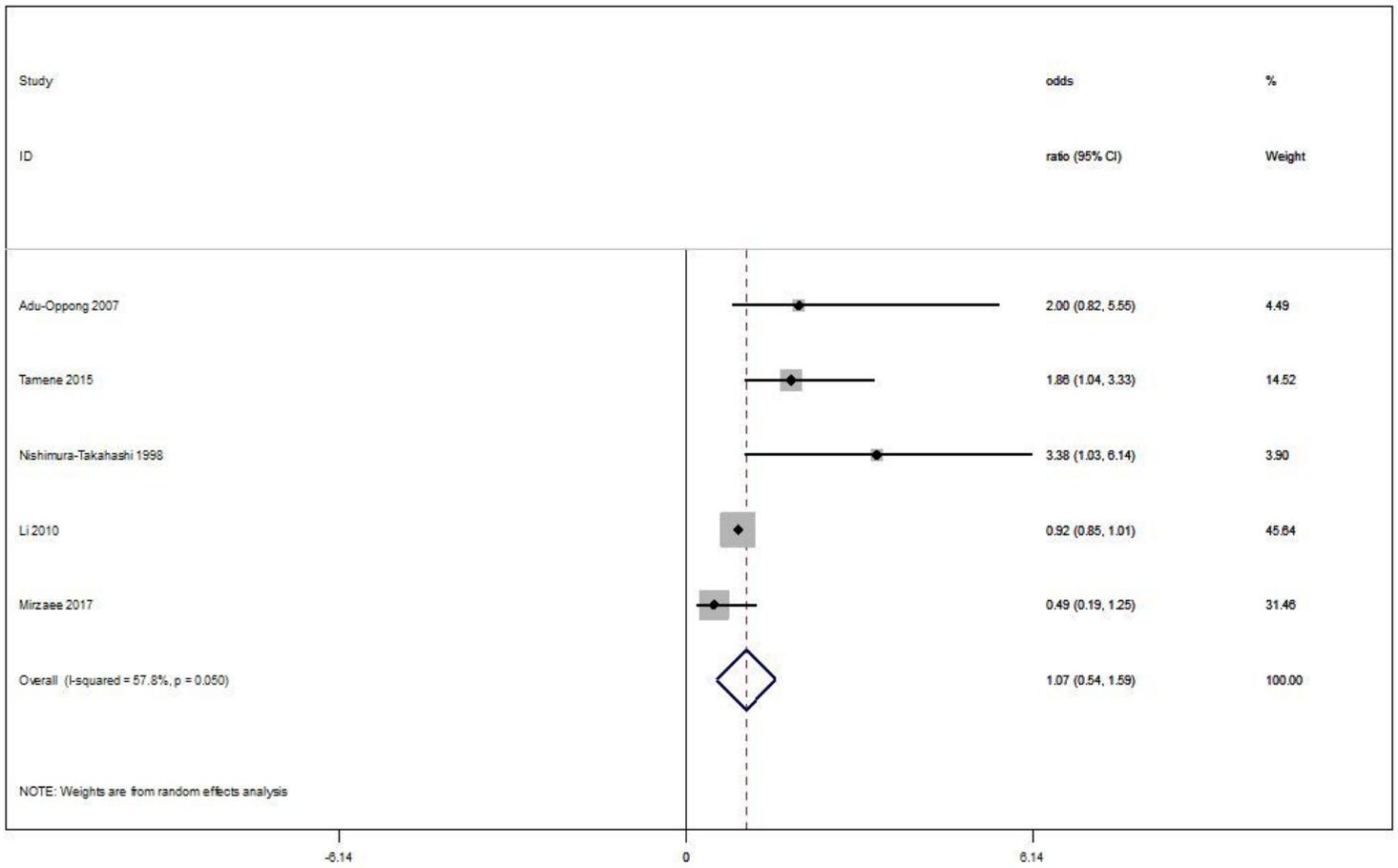
**Figure 6**

Forest plot of Barriers to the use of condoms in history of STI.



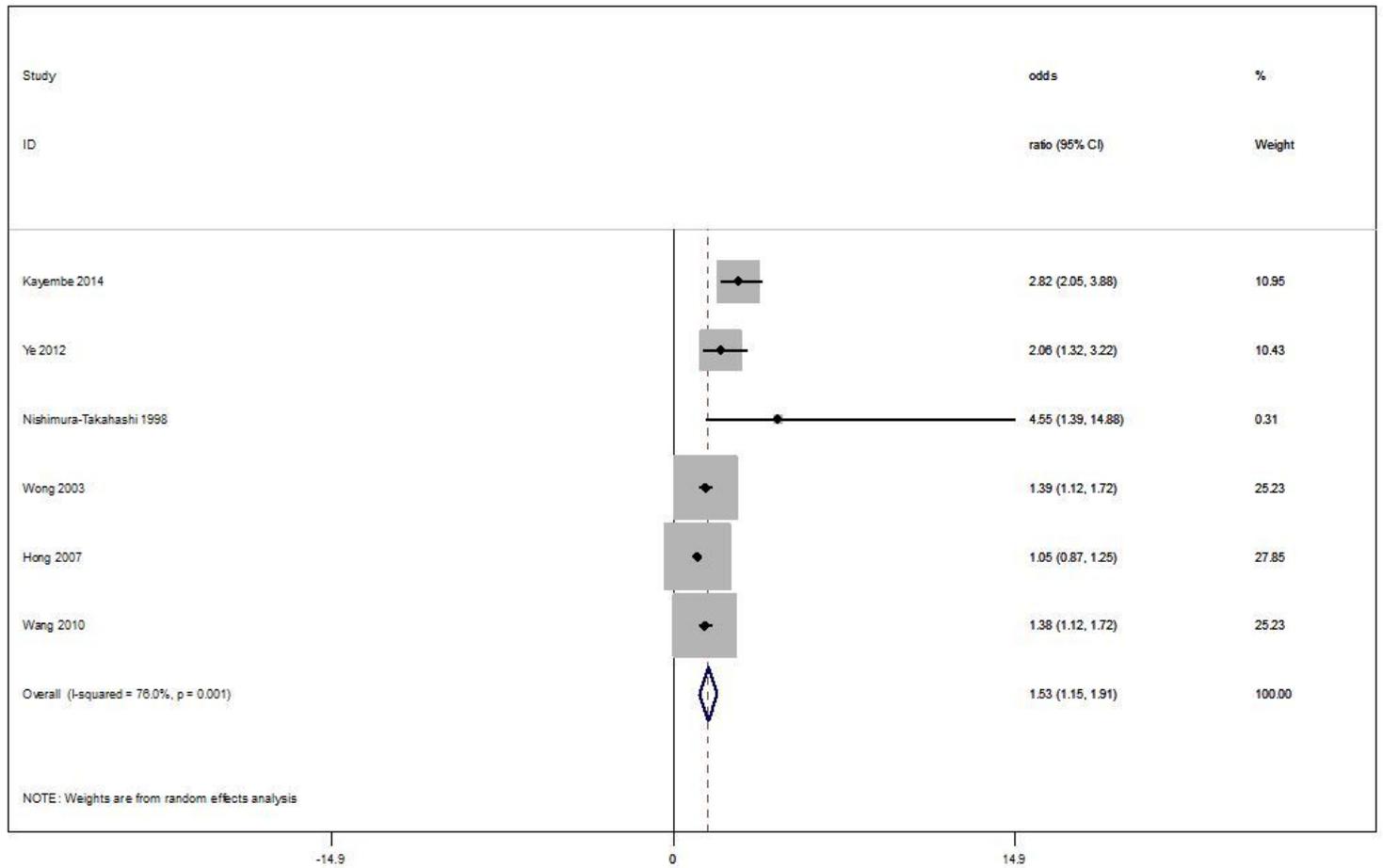
**Figure 7**

Forest plot of Barriers to the use of condoms in HIV risk perception.



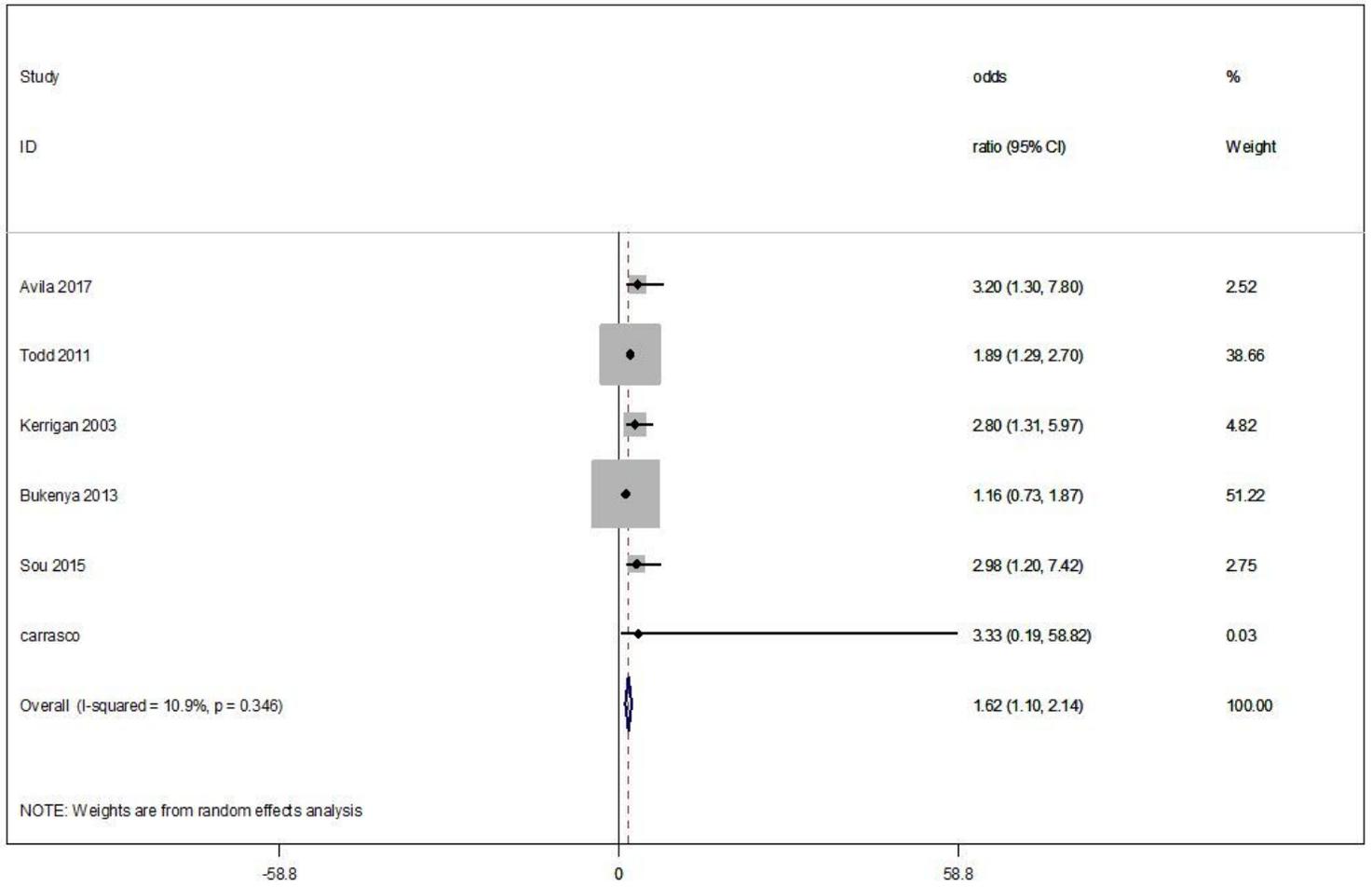
**Figure 8**

Forest plot of Barriers to the use of condoms in HIV/STI knowledge.



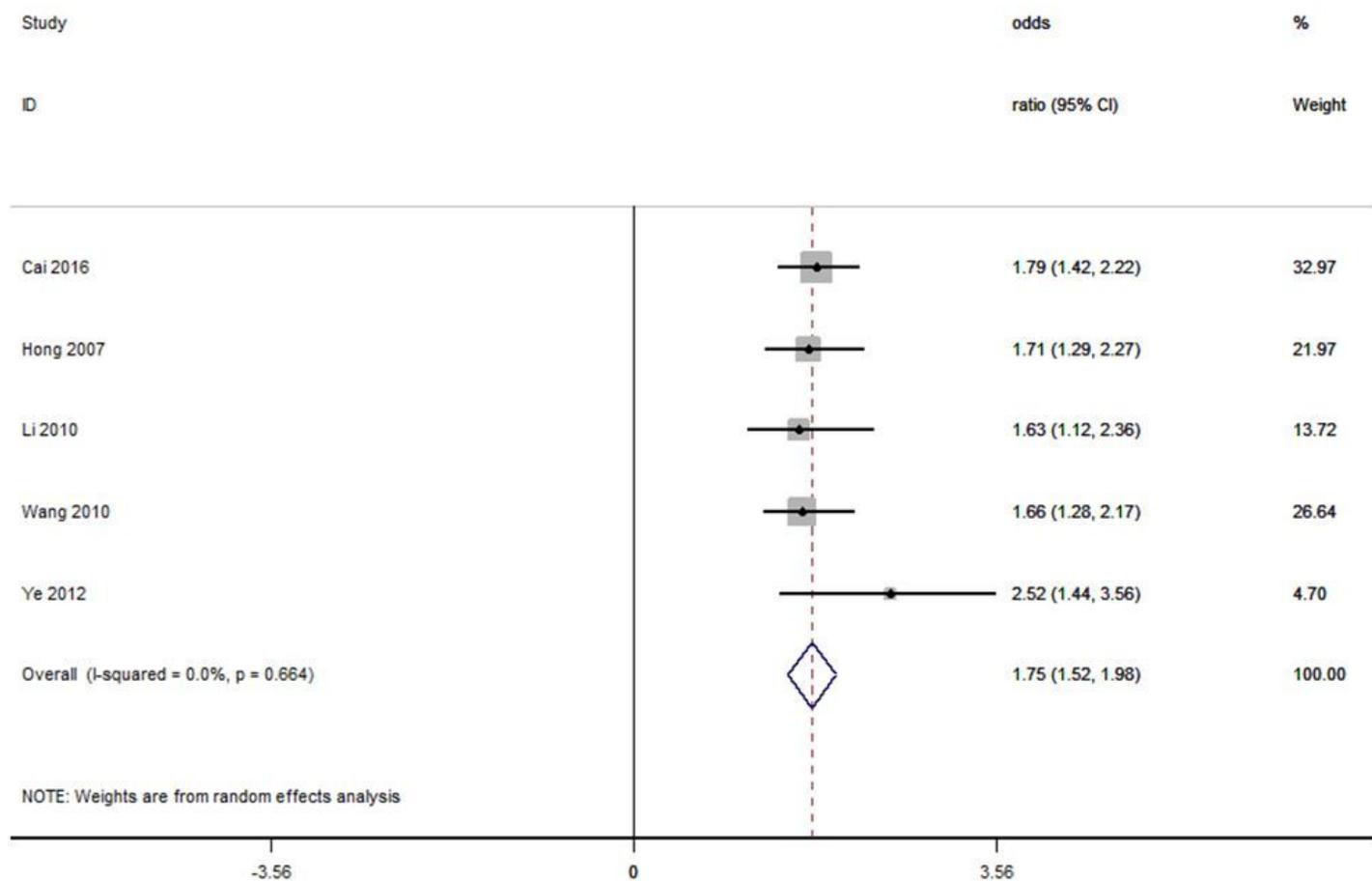
**Figure 9**

Forest plot of Barriers to the use of condoms in knowledge about condom use.



**Figure 10**

Forest plot of Barriers to the use of condoms in drug use.



**Figure 11**

Forest plot of Barriers to the use of condoms in condom use self-efficacy.

## Supplementary Files

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