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Domestic Violence against Infertile Women: A Systematic Review and Meta-Analysis

Farangis Sharifi,¹ Jamshid Jamali,² Mona Larki,³ *Robab L. Roudsari^{3,4}

*¹Student Research Committee, ⁴Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran; ²Social Determinants of Health Research Center, Mashhad University of Medical Sciences, Mashhad, Iran; ³Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
Corresponding Author's e-mail: rlatifnejad@yahoo.com

Abstract

Domestic violence (DV) against infertile women is an important health concern, which affect their well-being. This systematic review and meta-analysis investigated the prevalence of DV against infertile women. The study was done based on the preferred reporting items for systematic reviews and meta-analysis (PRISMA) on international electronic databases. Inclusion criteria were cross-sectional studies published in English and Persian journals, which investigated the prevalence of DV against infertile women up to May 2020. Out of 634 studies, 26 cross-sectional studies were systematically reviewed, from which 16 studies were included in the meta-analysis. Violence varied widely in infertile women, from 14.987 to 88.918%. The results of meta-analysis showed that the prevalence of violence was equal to 47.163% (95% CI 34.660 to 59.850%). Psychological and emotional violence was the most common types of violence. Considering high rate of DV, policymakers are recommended to address the problem by providing supportive cares including educational and counseling services.

Keywords: Women's Infertility, Violence, Domestic Violence, Intimate Partner Violence

Introduction

Violence against women, especially partner and sexual violence, is one of the most important public health problems against women, and in addition to violating human rights; it affects physical, sexual, reproductive, emotional, mental, and social health of individuals and families. Unfortunately, more than a third (35%) of women in the world have reported that they have experienced physical or sexual violence in their lifetime by their partner. The world health organization (WHO) multinational research has shown that spousal physical or sexual violence varies from 15% in Japan to 70% in Ethiopia and Peru. Also, 38% of murders of women are committed by their husbands.^{1, 2} Spousal violence often has negative effects on chronic conditions, physical diseases, and health risk behaviours.³ Domestic violence (DV) also has a significant effect on women's reproduction and health. Women exposed to violence are in unsuitable health condition and receive less medical care than the others.⁴ Risk factors for DV include low levels of education, having a mother with a history of violence, young age, socio-economic status and low income, unemployment and childhood abuse, alcohol abuse, gender inequality, male dominance on women, and the attitude of accepting violence.^{2, 5} The problems caused by violence against women are numerous including harm to the health and well-being of women and children, the effect on economic development, and failure to achieve the millennium development goals(MDGs).^{1, 2} Infertility is a public health issue affecting a large part of the world's population. Research has shown that one in every four couples does not have children, and many studies have indicated the psychological and social effects of infertility.⁶⁻¹⁴ It has been demonstrated that 1.8- 41.6% of infertile women experience different types of violence.¹⁵⁻¹⁷ DV against infertile women can include physical, psychological, and sexual abuse.¹⁸ Infertility causes significant stress and leads to sudden changes in women's relationships with family members and society.¹⁹ In some societies, women are considered as the cause of infertility, and factors, such as education level, employment status, independence, and social status determine risk of violence in infertile women.⁴ DV has been also reported to be associated with forced marriage, treatment with in-vitro fertilization (IVF) approach, drug abuse, women's improper emotional status, smoking, addiction or drug abuse, and mental and physical diseases.²⁰ Although, a systematic review by Staller et al., (2015) showed the evidence for relationship between infertility and intimate partner violence (IPV) but, they acknowledged that the available documents to be included in their review have been limited and they just included 21 studies in the review. Moreover, the

study carried out by Staller et al., (2015) was just a systematic review and narrative report of IPV and no meta-analysis was conducted on prevalence of violence in infertile women.²¹ Also, it seems that with more than 5 years passed since conduction of the last review study, there is a need for conducting an updated review in this area to include more recent studies on violence against infertile women. Also, Hajizadeh Valaklaei et al., (2017) in a study entitled as "Factors Related to Violence against Infertile Women" used a qualitative method and ecological approach, in which a number of qualitative themes were extracted.²² Given importance of women's rights and the fact that infertile women are a group at risk of IPV and in need of support, and considering that recently, no comprehensive study has been done in this field, the present systematic review and meta-analysis were conducted to investigate the prevalence of DV against infertile women.

Materials and Methods

This systematic review and meta-analysis were performed based on the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines.

Search Strategy

Data were collected from beginning of March to the end of August 2020. The data in this study were collected from searching in international scientific electronic databases including PubMed, Scopus, Web of Science, and Google Scholar, and Persian databases including Iran Medex and SID, using keywords like "Sterility, Subfertility, Infertility, Violence, Domestic Violence, Intimate Partner Violence, and Spousal Abuse" through searching in titles, abstracts, or keywords of articles. In the search process, the "AND" and "OR" operators were used between words, with no time limit. In addition, references of the obtained articles were also used to find the items needed for the study. All the searches were performed by two reviewers independently and in case of disagreement in certain cases, a third party was consulted. Data collection continued from beginning of March to the end of August 2020.

Inclusion Criteria

Inclusion criteria consisted of the English and Persian published articles that had assessed prevalence of DV in infertile women until May 5, 2020. After independent evaluation by the

authors, eligible studies were included in the study, and items containing expert opinions, newspaper, book chapters, dissertations, conference studies and review studies, editorials, brief communications, and case reports were excluded from the study (Figure. 1).

Study Selection

In the process of selecting articles, one of the researchers reviewed titles and abstracts of articles for their relevance. In the initial search of the online databases, 630 studies were extracted including 311 articles from PubMed, 129 from Scopus, 76 from Science Direct, 104 from Google Scholar, 5 from Ovid, 1 from SID, and 4 from Magiran databases. Additionally, 4 articles were obtained from searching of article references. Totally, 145 articles were excluded due to duplication and 485 articles remained. After screening the titles and abstracts, 410 articles were removed according to inclusion criteria and a total of 75 articles were obtained. After assessment of full texts of the articles for eligibility, 49 articles were excluded according to the study criteria and 26 studies were included in the review due to their eligibility, which were included in qualitative synthesis (systematic review). From those, 16 studies were presumed to be eligible for quantitative analysis and were included in the meta-analysis. Among 16 articles, 15 articles reported the overall prevalence, whereas 12 articles just psychological violence, 14 articles only physical violence, and 11 articles reported just sexual violence) (Figure. 1).

Data Extraction

Overall, 26 descriptive studies were used for systematic review. All the studies were about DV and infertility in women. Titles and abstracts were evaluated to select eligible studies and some articles were excluded due to not meeting the study criteria. At this stage, full text of the selected articles was also checked in terms of the existence of inclusion criteria. Data including article title, authors, year of publication, journal name, research location, sample size, sampling method, inclusion criteria, exclusion criteria, type of questionnaire to assess the existence of violence and its types in participants, method of scoring the questionnaire, reliability of the questionnaire, and the main results were extracted in two checklists by the first and second authors.

Quality Assessment

A checklist was designed to assess quality of the studies (Table 1). This checklist was based on the critical appraisal skills program (CASP) tool in descriptive/cross-sectional studies and was specifically used to address the question of the present study,²³ and a similar version of it has been used in the previous systematic studies.²⁴ The questionnaire consisted of 18 items and the score of each item was between 0-1. If the study met the desired criteria, a score of 1 was given, and if the desired criteria were not described, a score of zero was given. The total score of the checklist was between 0 - 18, so based on their scores, all the studies were classified into three levels: (1) "High quality studies", including the studies with 75% or more of the maximum total score (13 and higher points) (2) "Medium quality studies", including the studies with a score between 50 - 75% of the total score (9 - 12 points) ,and (3) "Low quality studies", including the studies with a score below 50% of the total score (8 points or less) .²⁴ The results of quality assessment of the articles showed that 22 studies (81.5%) were classified as high quality, 4 studies (14.8%) as medium quality , and one study (3.7%) as low quality study.

Data Synthesis and Analysis

After careful reading and examination, 16 studies were included in the meta-analysis, and the rest of the studies were used only for the systematic review. All the included studies had reported about DV in infertile women. Overall estimates were calculated using random-effects model and a test for heterogeneity was applied using Chi-Square test and the I^2 statistics ($I^2=98.68\%$, $p\text{-value}< 0.0001$). According to this test, the random-effects meta-analysis model was chosen. Data analysis was carried out by the MedCalc software version 19.4.1.

Results

Overview of the Selected Studies

Out of 634 articles reviewed, a total of 26 articles were included in the study, consisting of 24 English and 2 Persian articles. One of the reviewer, who was fluent in Persian and English languages, with a background of education in Iranian and English universities, translated the Persian articles into the English language and it was double-checked by the another reviewer.

One case study had been done in high-income countries like the United States,²⁵ and the rest of them had been conducted in the middle- and low-income countries. Table 2 presents a summary about 26 studies met the inclusion criteria. These included studies had identified violence in infertile women as a primary or secondary objective. All the studies were descriptive, and most of them were cross-sectional and surveys. In 16 studies, meta-analyses had been performed on the level of DV in infertile women.

Prevalence of Domestic Violence among Infertile Women

In the present study, percentage of violence in infertile women in different studies and countries varied from 15% to nearly 89%. Most of the studies had been conducted in Iran (8 articles),^{15, 20, 26, 27-31} and Turkey (7 articles).^{17, 25, 32-36} Other countries included Nigeria (4 articles),^{18, 37-39} Egypt (2 articles),^{40, 41} and India (2 articles),⁴²⁻⁴³ with one study on the subject for USA,²⁵ Rwanda,⁴⁴ and Pakistan⁴⁵. In the current study, the highest rate of DV (88.9%) had been reported in Iran. Despite this, frequency of DV greatly varied between 34.7-88.9%,^{15, 20, 26-31} in this country.^{15, 20, 26-31}

Table 3 presents the total estimated prevalence of violence against infertile women. Prevalence rates of 15 studies ranged between 14.987% (95% CI 12.545 to 17.699%) and 88.918% (95% CI 85.317 to 91.896%). Overall, the pooled prevalence was equal to 47.163% using random-effects model (95% CI 34.660 to 59.850%). (Table 3)

Prevalence of Types of Domestic Violence in Infertile Women

According to global sources, DV against women can include physical, psychological, and sexual forms.¹⁵

The overall prevalence of violence in infertile women had been reported in 15 studies with 4,394 participants.^{15, 17, 18, 20, 27-28, 32-35, 38, 39, 43, 45-46} Also, 12 studies with 3,872 participants had reported psychological and emotional violence,^{15, 18, 20, 27-28, 30, 32-35, 39, 46} and this type of violence was the most common type compared to the others. Fourteen studies with 4,394

participants had reported the presence or increase in physical violence,^{15, 17- 18, 20, 27-28, 30, 32-35, 39, 45-46} and 11 studies with 3,460 participants had reported sexual violence^{15, 17, 20, 27-28, 30, 32-35, 39.} It should be noted that in one article, valence of different types of violence had been stated separately, while the total score of violence had not been reported.³⁰

The results of the meta-analysis in this study showed that rates of psychological, physical, and sexual violence were equal to 36.964 (95% CI 21.385 to 54.084), 14.183 (95% CI 8.271 to 21.367), and 14.289 % (95% CI 7.206 to 23.281), respectively. (Tables 4-6)

Although, verbal violence is cited as part of psychological violence, however, its frequency had been mentioned separately in 6 studies and its range varied from 11% to 63.4%.^{17, 18, 34, 39, 45- 46}

Nevertheless, in one study, verbal violence was lower in infertile women³⁶. In some studies, several types of violence had been expressed simultaneously.^{25, 39, 42} Also, in some reports, there was an increase in economic violence.^{17, 31, 32, 36} (Table 2)

Comparison of Domestic Violence in Fertile and Infertile Women

Five studies had been conducted for comparison of DV in fertile and infertile women,^{27, 31, 36-37, 44} which in 4 studies, infertility was an effective factor in increasing spousal violence against women,^{27, 31, 36} and in the rest of the studies, no increase had been reported in this regard.⁴⁴ Also, even in one study, the rate of violence was lower in infertile women.³⁷

Determinants of Domestic Violence in Infertile Women

Infertility Factors

Whether infertility is caused by a female or male factor is an important subject regarding type of psychosocial consequences.⁴⁴ In a study, the rate of violence in women with infertility factor was equal to 78%,¹⁷ while in the others, infertility factor had not been found to be associated with violence.^{18, 32} Primary infertility was also associated with DV.^{32, 34, 38} While in the other studies, prolongation of infertility,^{29, 38} the increase in duration of marriage,^{29, 38, 41} and marriage under 19 years of age³⁴ had been introduced as predictors and were

associated with the increased violence, but in another study, marriage duration of less than 4 years was a factor responsible for the increase in violence.³⁴

An infertility period less than 2 years, and a family history of infertility and obesity in women were associated with violence.³⁴ In another study on the people with more frequency of treatment with IVF approach, prevalence of violence was lower.²⁰ Whereas, in the others, intracytoplasmic sperm injection (ICSI) was a predictive factor and was associated with the increased violence.⁴⁰⁻⁴¹ Also, in another study, no association had been found between childbirth and violence in these women.³⁷ (Table 2)

Demographic Factors

Although, sometimes no association had been found between women's age and DV,³⁸ in the other studies, old age was associated with violence.^{34,40}

Though in a study, no relationship had been found regarding age of the wife,³² in another one, the rate of violence was higher in women with young smoker husbands.²⁸ On the contrary, in some studies, no significant relationship had been found between level of education of women and their husbands, place of residence, and level of spousal violence,^{18, 28, 30, 32, 38} but in some studies, low level of education and living in village were determining factors in committing violence against women.^{32,39}

Regarding the job factor, the women's unemployment was associated with an increase in violence against them,^{32, 34, 38} and in the case of the husband's job, although in one study, it was not related to violence,²⁸ in the others, unemployment and low-level jobs were significantly associated with violence against women.^{32, 34, 38, 39} Similarly, there was a significant increase in violence in infertile families with low economic status,^{32, 38} and low social class.⁴¹

Contrary to some studies, no association was found between family type and type of marriage with violence,^{18, 33} but in the others, there was a significant relationship between family type,³³ involuntary marriage, polygamy, and remarriage.^{20, 34, 38} (Table 2)

Despite the fact that alcohol consumption and drug addiction were not associated with DV,²⁸ in some studies, couples' addiction had been reported to increase DV.^{20, 34, 38} Also, in a study conducted in Nigeria, there was no association between religion, ethnicity, and violence.³⁸ (Table 2)

Psychological Factors of Couples

DV was significantly associated with women's emotional status and husband's mental and physical diseases.^{20, 32} (Table 2). Also, Prevalence of anxiety disorders and depression was higher in the people exposed to DV,^{34, 35} and there was a significant relationship between components of violence and the general health score.²⁹ (Table 2)

Discussion

This study was done to investigate prevalence of DV against infertile women. Evidence shows that infertile women are prone to all kinds of DV, and they experience all kinds of violence. In the present study, similar to the study by Staller et al.,²¹ the most frequent type of violence committed by the husband against infertile women was psychological and emotional violence. It seems that like other problems in the societies and families, this problem might be due to progressive transition from a traditional to a modern society. Also, in a previous study, sexual violence had been reported as an important factor associated with women's infertility.⁴⁷

The results of the present study showed a significant difference in comparative results between the groups of fertile and infertile women. Similar to our findings, in most of the reviewed articles, infertility was a factor responsible for increasing spousal violence against women.^{27, 31, 36, 37} But, paradoxically, in another study, the rate of violence was lower in infertile women.³⁷

On the other hand, in a study conducted in Nigeria, the rate of violence was higher in women with two or three children than infertile women.³⁷ This difference in results can be due to different cultures of the communities under study as well as different used measurement tools.

Infertility factor (either female or male factor), type of infertility (either primary or secondary), duration of infertility and number of attempts for assisted reproductive techniques were among important issues leading to violence and its psychosocial consequences. On the other hand, duration of marriage and duration of infertility were determining factors in this regard. In a study by Hajizadeh Valaklaei et al., infertility, duration of infertility, and young age at marriage were the factors increasing violence in infertile women²². In many cultures, infertility is a social stigma that women try to avoid attributing to themselves^{48, 49}, and ascribing it to any couple can increase violence in them. Early marriage may cause men to take the power and make women weak. On the other hand, in the case of duration of infertility, since duration of infertility is related to marital life satisfaction,²⁰ this can lead to violence in marital life.

Findings of the study were contradictory regarding the relationship between demographic factors and spousal violence against infertile women. For example, regarding the relationship between age, education level of couple and occupation of wife with violence in infertile women, although in some studies, no relationship had been found,^{18, 28, 30, 32, 38} but in the others, older age,^{34, 40} women with young smoker husbands,²⁸ and low level of education,^{32, 39} couple employment and its type, and rurality^{32, 34, 38-39} were determining factors in committing violence against women. The results of the study were consistent with the study by Hajizadeh Valaklaei et al.²² Women's empowerment is increased with education, and educated men have a better view of family, gender, and infertility and these factors are effective in reducing violence against women. Also, in infertile families with low economic status,^{32, 38} and low social class,⁴¹ the increase in violence was significant, which was similar to the results of the study by Hajizadeh Valaklaei et al.²²

However, in the study by Sheikhan et al., violence was higher in men with high-income status than in the unemployed group.²⁰ Also, in some studies, there was a relationship between couples' addiction,^{20, 34, 38} family type,³⁴ unwanted marriage, polygamy, and remarriage,^{20, 34, 38} with domestic violence. It seems that in all the above cases, cultural characteristics are the most important factor effective in modulating the effect of these risk factors. In the systematic review done by Coker, spousal violence was strongly associated with sexual hazards including sexual behaviors, unwanted pregnancies and abortions, sexually transmitted infections, and polygamy.⁵⁰

Previous studies on the general female population have also shown that risk factors for spousal violence against women include lower level of education, young age, socio-economic status and low income, unemployment, alcohol abuse, gender inequality, and acceptance of violence.² All of these risk factors are the cause of the increased violence against infertile women in low- and middle-income societies.

Although, according to the results of the present study, DV had a significant relationship with the emotional and mental state of couples,^{20, 32} psychological documents have also provided strong evidence stating that DV is associated with psychological stress.⁵¹ Another important point is that preventing DV will be important not only to reduce the burden of infertility but also to reduce long-term costs for the individuals, economy, and public health issues as shown in both the present study and the study by Staller et al.²¹ On the other hand, violence against infertile women and the resulting stress influence consequences of infertility treatment.^{22, 52} The findings showed that DV in infertile women is an important issue in their health. Also, because infertile women are prone to violence by their husbands, this problem increases challenges of infertility. Therefore, it is a principal that women who are referred to reproductive clinics need to be examined and supported regarding spousal violence.

Consistent with the results of the WHO multinational studies on violence against women,⁵³ sub-findings of the present study revealed the various adverse effects of violence on personal (including physical and psychological harm), and social dimensions of infertility (including disease burden, costs, and adverse effects on children). Because, the experience of infertility is instinctively a stressful situation,⁵⁴ aggravation of physical and psychological injuries

caused by it is not unexpected. Another finding is the issue of women's blame, especially in cases where infertility has been caused by women,^{26, 55} where the important issue of men's participation should be considered in women's counseling and support programs⁵⁶. Infertility health care providers should consider the possibility of DV against women and its potential psychological consequences, as a large proportion of violence against women results from husbands, and the need for well-designed and well-executed services will continue to be vital for victims.

The strength of this study was using a large number of articles, but in the present study, although the studies included in the systematic review and meta-analysis were from different countries, most of them were related to Asian and African countries, while there were limited available studies in this field from other countries. This issue limits generalization of results to other countries, and another limitation was the use of different methods and tools in different studies.

Therefore, in the future studies, it is suggested to use comparative study methods using consonant methods and tools, extensive multicenter coordinated studies, and preferably cohort studies.

Conclusion

It is necessary to pay attention to infertile women as one of the most important groups of people who should have the desired quality of reproductive health. Because multiple factors are involved in incidence of violence against women, identifying the factors associated with violence against infertile women can be effective in planning interventions to reduce violence and treat infertility. In this regard, due to the potential risk of violence against the individuals and society, as well as future pregnancies and children, screening is required regarding IPV. Education of victims and early intervention not only help the women, but also prevent violence against the child. Policies and programs reducing men's blame for their wives' infertility, promoting monogamy, expanding access to education and employment, and empowering women may reduce spousal violence. Infertility management should be done with the help of a consulting team including psychologists, reproductive health professionals, and gynecologists, taking into account the problem of violence and its risk factors. Education of the couples, participation of planners in this field, awareness and education of the community, and taking into account culture of the community should be at the forefront of

programs. Also, counseling programs should be done in pairs and with an emphasis on men's participation. For clarifying about prevalence of DV against infertile women, more research is needed in different societies using more accurate study methods.

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Figure 1. PRISMA Flowchart of the study Selection Process

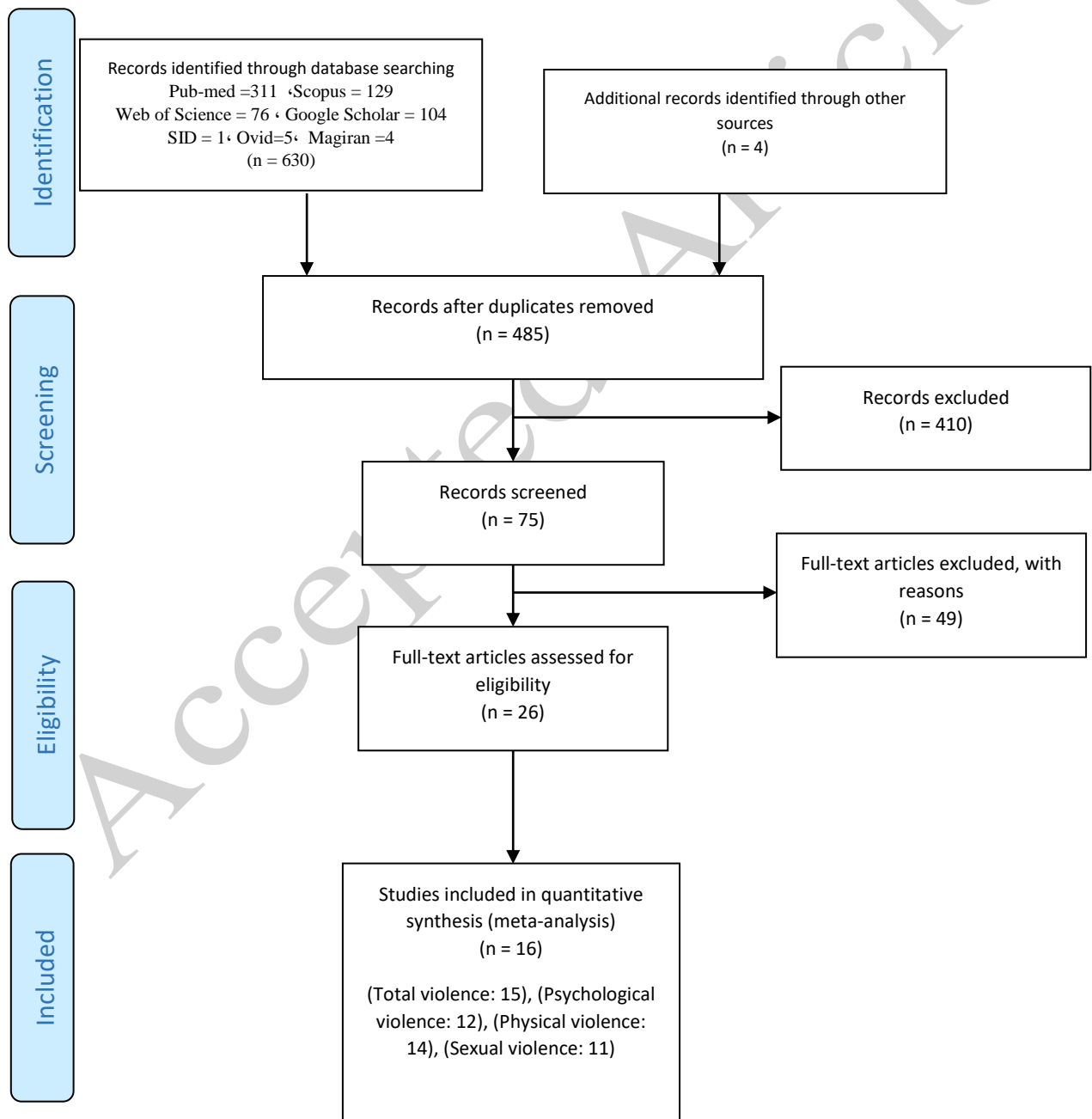


Table 1: List of Criteria for assessing the quality of articles on domestic violence (DV) and women's infertility

Value	Study participants
A	Was the sample representative of a defined population?
B	A description is included of at least two socio-demographic variables (e.g., age, sex, economical status, educational status, etc.)
C	Inclusion and/or exclusion criteria are provided
D	Participation rates (defined as the % age of eligible patients who gave their informed consent) are included and these rates exceed 70%
E	Information is given about the ratio between non-responders versus responders
	Violence assessment
F	A standard questionnaire is used
G	Are measurement tools available or described?
H	Is the method of reliability and its measures justified?
	Study design
I	Is the setting for data collection justified?
J	Is the sample size sufficient?
K	Is the method of sampling justified?
L	A primary objective of the study is to examine the DV in infertile women
M	It is clear how the data were collected (e.g., interview, questionnaire)
	Results
N	Are the results significant and meaningful (P-value)?
O	Is there a summary of the bottom-line result of the trial in one sentence (key findings)?
P	Is there an in-depth description of the analytic process?
Q	Is sufficient data presented to support the findings?
R	Are the findings explicit?

Table 2: Characteristics of twenty seven Included Studies on domestic violence (DV) and women's infertility

Author/Year /Country	study design	Sampling	Tool	N	Result of women experienced of DV	Quality using CASP
Aduloju PO. et al 2015 ³⁸ Nigeria	Cross-sectional	Convenient	semi-structured questionnaire on violence	131	- Total DV: 31.2% -Psychological DV: more than 50%, - Associated with Unemployment, polygamous marriage, husbands' social habits, primary infertility and prolonged duration of infertility. -No significant differences in the age of the women, duration of marriage and duration of infertility.	High
Akpınar, F. et al 2017 ³³ Turkey	Cross-sectional	Convenient	AAS	142	- Total DV: 47.9% - Psychological DV: 76.5% - Physical DV: 17.6% -Sexual DV: 4.4% -both physical and sexual abuse: 1.5% -Risk factors: low educational and economic level , living in a compound family	Moderate
Akyuz A. et al 2013 ³⁶ Turkey	Comparative descriptive	Convenient	SDVW	228	- The emotional, economic and sexual violence scores were higher in the infertile group. - The verbal violence score was lower	High
Alijani F. et al 2018 ²⁸ Iran	Cross-sectional	Consecutive	CTS2	379	- Total DV: 88.9% -Psychological violence: 85.8%, -Physical violence: 25.9 % , -Sexual violence: 28.2%, - No relationships between violence and women's educational status, men's jobs, place of residence, alcohol consumption, and drug addiction. - Risk factors: Men smoking and women with younger age	High
Ameh N, et al 2007 ¹⁸ Nigeria	Cross-sectional	Consecutive	Demographic and DV Questionnaire	233	Total DV: 41.6%- -Physical abuse :17.5% -Psychological torture: 51.5% -Verbal abuse: 39.2%	Moderate
Ardabilly HE. et al 2011 ¹⁵ Iran	Cross-sectional	Convenient	CTS2	400	-Total DV:61.8 Psychological DV:33.8% Physical DV :14%	High

					Sexual DV: 8%	
Bondade, S. et al 2018 ³⁵ Turkey	Cross-sectional	Convenient	HAM-A HAM-D WHO violence against women instrument	100	- Total DV: 50% , Psychological violence: 34%, Physical violence: 11%, sexual violence: 5%, - The prevalence of anxiety disorder and depressive disorder was high among IPV group.	High
Dhont N. et al 2011 ⁴⁴ Rwanda	Survey	.....	structured questionnaire	312	- DV more frequently in the survey by infertile than fertile couples. - Infertility was important determinant for the psycho-social consequences suffered.	Moderate
Etesami pour, R. et al 2011 ³¹ Iran	Comparative descriptive	Simple random method	family violence and sexual satisfaction & disorders questionnaire	100	-The rate of mental, physical and economical violence in infertile women was significantly higher than fertile ones. - Significant interaction effect between education of women and the rate of couple abuse was not observed in fertile and infertile groups.	High
Farzadi L et al 2014 ³⁰ Iran	Cross-sectional	Convenient	Modified questionnaire of violence against women	200	- experienced at least one type of physical violence: 45% - Sexual violence: About 54% -Psychological violence: 82%	High
Iliyasu Z. et al 2016 ³⁹ Nigeria	Cross-sectional	Systematic random sampling	DHS, CTS2	373	- Total DV: 35.9% Psychological violence : 94.0%- -Sexual : 82.8% -Verbal: 35.1% Physical forms: 18.7%- -Multiple forms of violence: 25.4% -Independently associated with IPV: Lack of formal education, employment in the informal sector and having an unemployed spouse or one with low level of education	High
Lotfy, M. et al 2019 ⁴⁰ Egypt	Cross-sectional	Convenient	IWEVDS	304	-The most common forms of DV: psychological violence and verbal abuse. - Predictors: wife's age, residency, previous intracytoplasmic sperm injection, divorce threatens and fear from husband.	High
Mansour F. et al 2018 ⁴¹ Egypt	Cross-sectional	Convenient	Researcher-made questionnaire and general health questionnaire	246	-Psychological violence was found to be the most common type of violence followed by sexual and physical violence. -The severity of DV had a significant correlation with the social class of the woman, chronic disease of the husband, duration of marriage and trial of ICSI treatment.	High
Ozturk, R. et al 2020 ²⁵ United State	Survey	Convenient	AAS, PSS and Social support questions, SFPS	786	- Emotionally or physically abused in infertile women: 21.8% -Emotionally abused: 30.3% -Physically abused: 21.8% - High levels of experience of stigma in Infertile women -One in five infertile women exposed to emotional or physical violence	High
Ozturk, R. et al 2017 ⁴⁶ Turkey	Cross-sectional	Convenient	Infertile Women's Exposure to Violence Determination Scale	301	-Violence throughout lives : 32.5% -Emotional DV: 21.8% -Physical violence: 31.9% -Sexual DV: 21.8% -Verbal: 38.7%	High
Pasi AL. et al 2011 ⁴² India	Survey	.....	NFHS-3	2,023	- physical and/or sexual violence in last 12 months: 77.8%	Low
Poornowrooz, N. et al 2019 ²⁷ Iran	Cross-sectional	Convenient	FSFI	147	-Total DV: 56.6% - Physical violence:34% -Sexual violence: 27.2% -Psychological violence: 52.4% - Physical violence, sexual violence and psychological violence were higher in infertile women than fertile women.	High
Sahin S. et al 2018 ⁴⁴ Turkey	Cross-sectional	.....	Questionnaires face-to-face interview method Beck Anxiety Inventory	774	- Total DV: 15.0% -Emotional DV: 56.1% -Physical violence: 11% -Sexual DV: 21.9% -verbal: 11% -Determinant: women aged 25 years and above, education level of high school and above, no job, addiction of smoking and alcohol, obesity got married more than once, whose first marriage age is 19 years and below, married for 4 years or below, with primary infertility, infertile for 2 years and below and a family history of infertility. -Anxiety levels of infertile women with a history of DV were determined to be significantly higher.	High
Sami N. et al 2012 ⁴⁵ Pakistan	Cross-sectional	Convenient	. AAS	400	- DV: 64% -physical violence: 23.1% -Verbal: 60.8%	High
Sheikhan Z L et al 2014 ²⁰ Iran	Cross-sectional	Convenient	-DV questionnaire	400	-Experienced DV: 34.7% -Physical violence:5.3% -Emotional violence: 74.3% -Sexual violence: 47.3% -DV was significantly associated with unwanted marriage, number of IVF, drug abuse, emotional status of the women, smoking and addiction or drug abuse of the spouse, mental and physical diseases of the husband	High

Sis Çelik, A. et al 2018 ³² Turkey	Cross-sectional	Simple random sampling method	Infertile Women's Exposure to Violence Determination Scale	423	-Total DV: 72%. -Physical violence: 30% -Sexual violence: 6% -emotional violence: 62% -Economic violence: 19%. -Associations between husband's low education and workers of the employment status, low level of income, live in a rural area, primary infertility and violence against women.	High
Sisira C. Satheesan. et al 2018 ⁴³ India	Cross-sectional	Simple random sampling method	MQS	30	- Total DV: 47%. - Women who experienced violence were more likely to report poor quality of marital relationship, higher levels of distress, and lower resilience than women who did not. -Experience of at least one form of intimate partner violence emerged as a significant predictor of psychological distress.	Moderate
Solanki BL. et al 2018 ³⁷ Nigeria	Survey	.....	Women's individual recode datasets of the 2008 and 2013 Nigeria Demographic and Health Survey	8646	- Lower DV among childless women in Nigeria.	High
Tabrizi FM. et al 2016 ²⁹ Iran	Cross-sectional	Random sampling method	General Health Questionnaire	384	- The violence rate was significant In families with infertile women and husband with primary education and below, and in women with lower economic status. - By lengthening the duration of marriage, and awareness of the infertile women, the rate of the violence was high. - A strong relationships between all components of the violence, and total score of public health	High
Taebi M. et al 2016 ²⁶ Iran	Cross-sectional	Convenient	PASNP, NPAPS	131	- A significant difference in the mean scores of perceived non-physical partner abuse and factor of infertility	High
Yildizhan R. et al 2009 ¹⁷ Turkey	Cross-sectional	Convenient	Structured questionnaire modified from AAS	122	- Total DV: 33.6% -physical abuse: 31.7% -Forced sexual intercourse: 7.3% - DV of female factor infertility: 78% -Verbal abuse was the most common type of DV reported :63.4% economic deprivation: 29.2%	High

N: Number of infertile women

CASP: Critical Appraisal Skills Program

AAS: Abuse Assessment Scale

PSS: Perceived Stress Scale

SFPS: Stigma of Fertility Problems Scale

IWEVDS: interview questionnaire of Infertile Women's Exposure to Violence Determination Scale

FSFI: DV inventory and female sexual function index

MQS: Marital Quality Scale

HAM-A: Hamilton Anxiety Rating Scale

HAM-D: Hamilton Depression Rating Scale

CTS2: Revised Conflict Tactics Scale

AAS: Abuse Assessment Screen

DHS: Interviewer-administered questionnaire adapted from a validated Demographic and Health Survey instrument

CTS2: Health Survey Revised Conflict Tactics Scale

PASNP: Partner Abuse Scale: Non-physical

NPAPS: Non-physical Abuse of Partner Scale

SDVW: Questionnaire and Scale for Marital Violence against Women

NFHS-3: National Family Health Survey 3

DV: Domestic Violence

ICSI: intracytoplasmic sperm injection

IVF: In vitro fertilization

IPV: Intimate partner Violence

Table 3. Total domestic violence in infertile women (n=15)

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Poornowrooz, N. et al (2019)	147	56.463	48.046 to 64.613	3.36	6.65
Sis Çelik, A. etal (2018)	423	72.340	67.813 to 76.552	9.62	6.77
Sisira C. Satheesan. Et al (2018)	30	46.667	28.342 to 65.674	0.70	6.04
Bondade, S. etal (2018)	100	50.000	39.832 to 60.168	2.29	6.57
Alijani F. etal (2018)	379	88.918	85.317 to 91.896	8.62	6.76
Sahin S. etal (2018)	774	14.987	12.545 to 17.699	17.58	6.79
Iliyasu Z. etal (2018)	373	35.925	31.051 to 41.025	8.48	6.76
Akpınar, F. etal (2017)	142	47.887	39.440 to 56.424	3.24	6.64
Ozturk R. etal (2017)	301	32.558	27.293 to 38.170	6.85	6.74
Aduloju PO. etal (2015)	170	31.176	24.304 to 38.719	3.88	6.67
Sheikhan Z L etal (2014)	400	34.750	30.087 to 39.641	9.10	6.76
Sami N. etal (2012)	400	57.000	51.987 to 61.909	9.10	6.76
Ardabily HE. etal (2011)	400	61.750	56.790 to 66.535	9.10	6.76
Yildizhan R. etal (2009)	122	33.607	25.310 to 42.720	2.79	6.61
Ameh N, etal (2007)	233	41.631	35.230 to 48.248	5.31	6.71
Total (fixed effects)	4394	45.610	44.132 to 47.094	100.00	100.00
Total (random effects)	4394	47.163	34.660 to 59.850	100.00	100.00

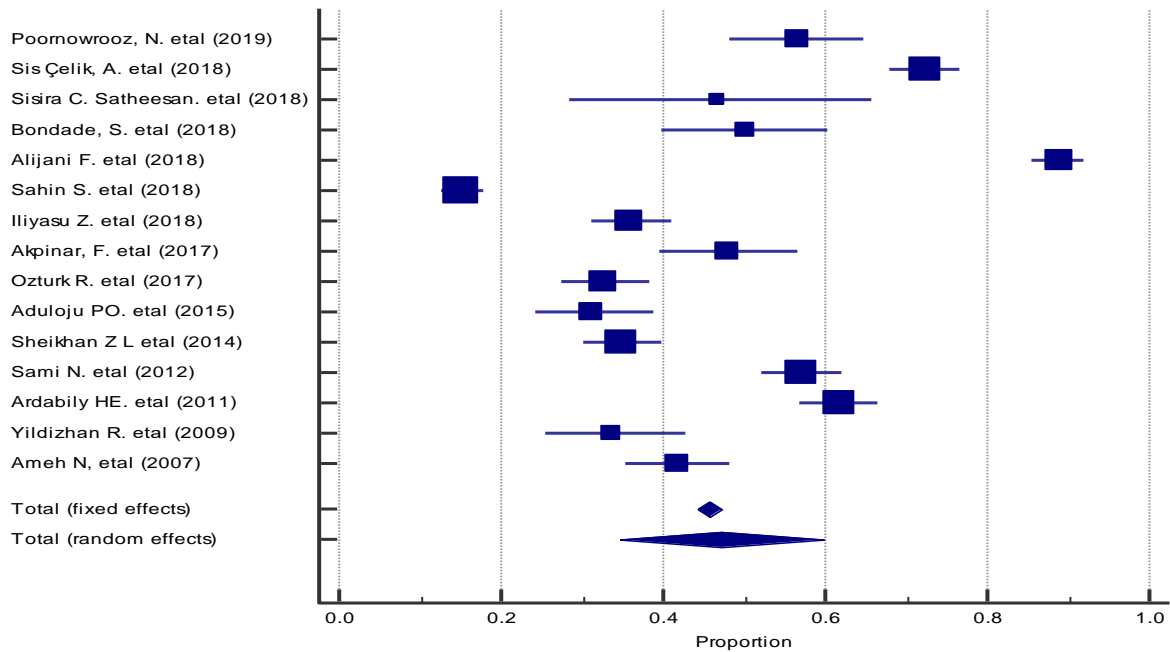


Table4. Psychological domestic violence in infertile women (n=12)

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Poornowrooz, N. etal (2019)	147	52.381	43.991 to 60.673	3.81	8.28
Sis Çelik, A. etal (2018)	423	61.939	57.123 to 66.586	10.92	8.37
Bondade, S. etal (2018)	100	34.000	24.822 to 44.153	2.60	8.21

Alijani F. etal (2018)	379	85.752	81.822 to 89.112	9.78	8.37
Sahin S. etal (2018)	774	12.532	10.282 to 15.073	19.95	8.40
Iliyasu Z. etal (2018)	373	33.780	28.992 to 38.828	9.63	8.37
Akpınar, F. etal (2017)	142	8.451	4.443 to 14.296	3.68	8.27
Ozturk R. etal (2017)	301	6.977	4.370 to 10.467	7.78	8.35
Farzadi L etal (2014)	200	82.000	75.962 to 87.063	5.18	8.32
Sheikhan Z L etal (2014)	400	25.750	21.533 to 30.330	10.32	8.37
Ardabily HE. etal (2011)	400	33.750	29.126 to 38.616	10.32	8.37
Ameh N, etal (2007)	233	21.459	16.367 to 27.293	6.02	8.33
Total (fixed effects)	3872	34.943	33.442 to 36.466	100.00	100.00
Total (random effects)	3872	36.964	21.385 to 54.084	100.00	100.00

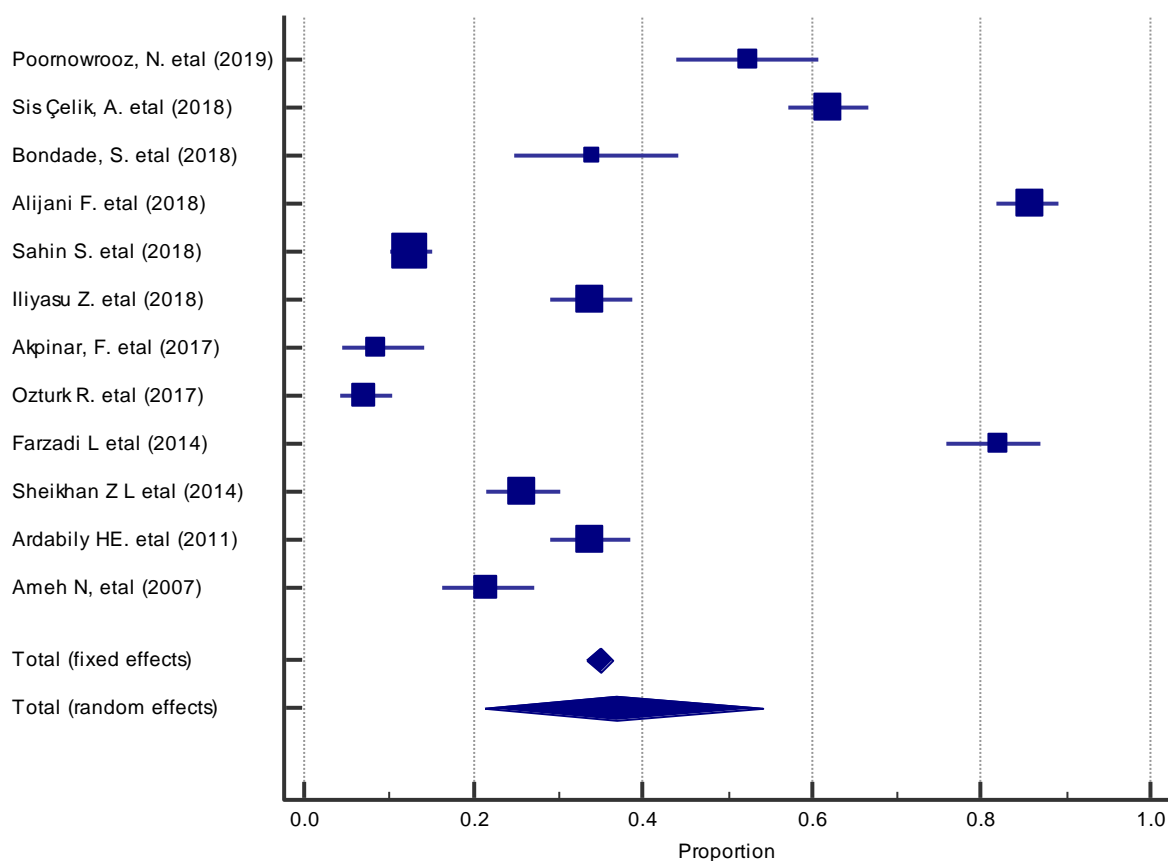


Table5. Physical domestic violence in infertile women (n=14)

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Poomowrooz, N. etal (2019)	147	34.014	26.410 to 42.276	3.36	7.01
Sis Çelik, A. etal (2018)	423	30.024	25.690 to 34.639	9.62	7.25
Bondade, S. etal (2018)	100	11.000	5.621 to 18.830	2.29	6.85
Alijani F. etal (2018)	379	25.858	21.521 to 30.576	8.62	7.24
Sahin S. etal (2018)	774	2.455	1.484 to 3.807	17.58	7.31
Iliyasu Z. etal (2018)	373	6.702	4.384 to 9.735	8.48	7.23
Akpınar, F. etal (2017)	142	8.451	4.443 to 14.296	3.24	7.00
Ozturk R. etal (2017)	301	10.299	7.106 to 14.299	6.85	7.20

Farzadi L etal (2014)	200	45.000	37.975 to 52.175	4.56	7.11
Sheikhan Z L etal (2014)	400	1.750	0.706 to 3.572	9.10	7.24
Sami N. etal (2012)	400	15.500	12.095 to 19.425	9.10	7.24
Ardabily HE. etal (2011)	400	14.000	10.752 to 17.792	9.10	7.24
Yildizhan R. etal (2009)	122	10.656	5.797 to 17.532	2.79	6.94
Ameh N, etal (2007)	233	7.296	4.307 to 11.425	5.31	7.14
Total (fixed effects)	4394	12.111	11.162 to 13.111	100.00	100.00
Total (random effects)	4394	14.183	8.271 to 21.367	100.00	100.00

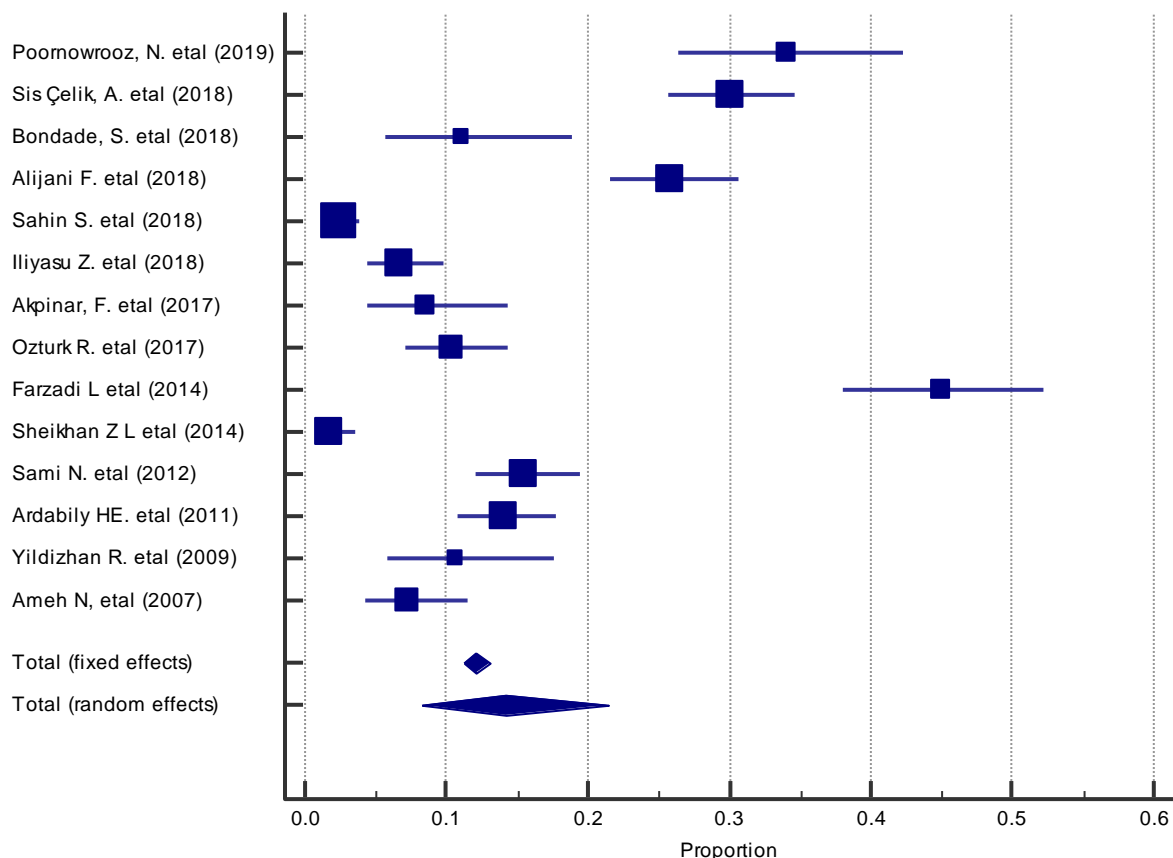
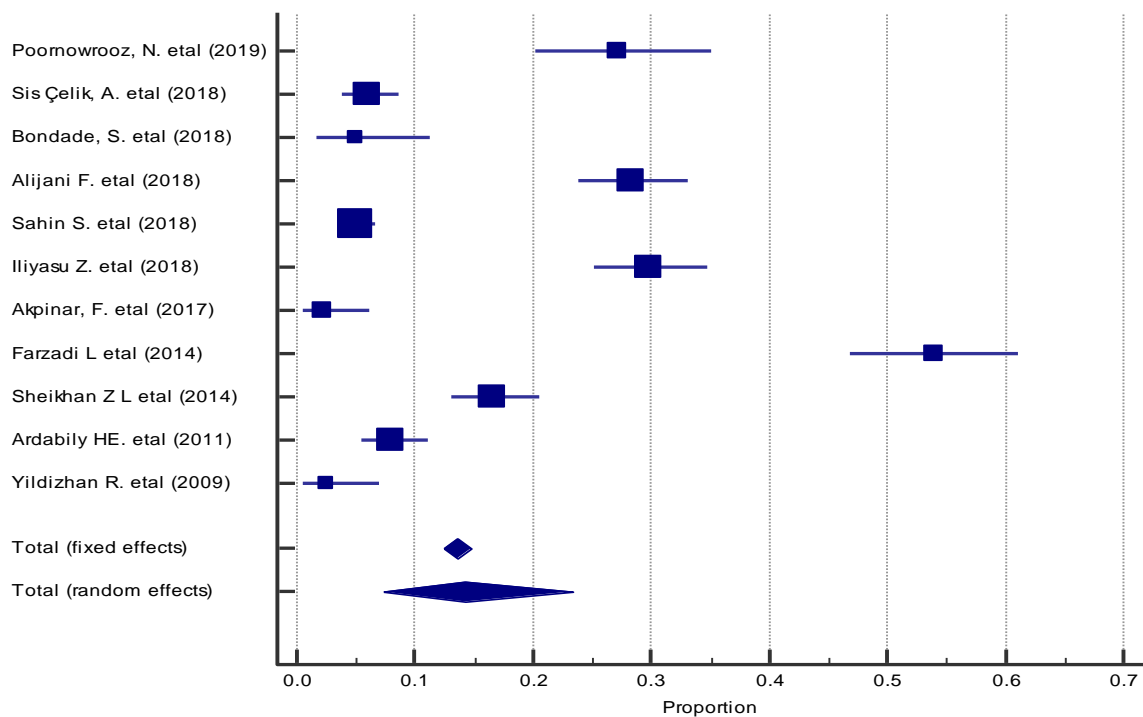


Table6. Sexual domestic violence in infertile women (n=11)

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Poomowrooz, N. etal (2019)	147	27.211	20.205 to 35.159	4.26	8.96
Sis Çelik, A. etal (2018)	423	5.910	3.861 to 8.601	12.22	9.22
Bondade, S. etal (2018)	100	5.000	1.643 to 11.283	2.91	8.79
Alijani F. etal (2018)	379	28.232	23.754 to 33.054	10.95	9.21
Sahin S. etal (2018)	774	4.910	3.497 to 6.677	22.33	9.29
Iliyasu Z. etal (2018)	373	29.759	25.162 to 34.680	10.77	9.20
Akpınar, F. etal (2017)	142	2.113	0.438 to 6.050	4.12	8.95
Farzadi L etal (2014)	200	54.000	46.828 to 61.052	5.79	9.07
Sheikhan Z L etal (2014)	400	16.500	12.997 to 20.508	11.55	9.21
Ardabily HE. etal (2011)	400	8.000	5.536 to 11.106	11.55	9.21
Yildizhan R. etal (2009)	122	2.459	0.510 to 7.018	3.54	8.88

Total (fixed effects)	3460	13.514	12.393 to 14.697	100.00	100.00
Total (random effects)	3460	14.289	7.206 to 23.281	100.00	100.00



Accepted