Original Research Article

Frequency of Infertility in men among Iranian infertile couples- A systematic Review and Meta-analysis

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Abstract

Introduction: Infertility is defined as non-occurrence of pregnancy after one year of intercourse without the use of any contraceptive method. The knowledge about the abundance of different causes of infertility in each region is of great importance for health and can be effective in determining the decision of relevant health planners.

Methods: From the beginning of databases to June 30, 2018, International {PubMed, Web of Science (WOS) and Google scholar} and National {Scientific Information Database (SID), Magiran} databases were searched for related observational studies that were conducted in Iran including only Iranian Patients and published in English and Persian languages. The quality of the articles was evaluated using the Hoy D tool.

Results: The final research was conducted on 6471 participants; with an age range of 20 and 80 years old; a cross-sectional design was used in all studies. Research was conducted in only 6 provinces out of 31 provinces of Iran. Based on the results of random effects model, the incidence of Male Infertility in 6471 infertile couples was 39.1% (95% confidence interval [CI]: 38, 40.3, $I^2 = 98.4$).

Conclusion: Considering that the infertility rate is a determining factor in the success rate of the treatment modalities and the prolongation of the course of treatment reduces the chance of treatment significantly, it seems that long delay in visiting infertility clinics is a problem that can be addressed in people's health behaviors.

Keywords: Infertility, Men, male Infertility, epidemiological study , STD

Introduction

Infertility is one of the most common problems of human societies, from which, according to WHO estimates, 33-36 million couples around the world suffer.

Infertility is defined as non-occurrence of pregnancy after one year of intercourse without the use of any contraceptive method (1-2). It is estimated that the fertility potential of a normal couple is 20-25%, signifying that 90% of couples will have one child after marriage (3). 10 to 15% of couples have difficulty becoming fertile or reaching the number of children they want; thus, they rely on fertility medical care at least once during fertilization period. (4)

Infertility has several causes, some of which are physiological and various factors, such as genetic disorders, are involved in it. But many environmental and acquired factors also affect fertility and can cause infertility. For example, infections genital diseases; sexually transmitted diseases (STDs) are one of the most important causes of fertility disorder. Because of the many differences that occur in different environmental conditions associated with fertility behaviors such as the age of marriage, sexual partners, environmental infections, alcohol and smoking, and outbreaks of infectious diseases among societies, the

etiology of infertility and the pattern of the various causes of infertility in different regions are different (5). This difference is particularly significant between developed and developing countries (6). Since the most important and logical approach to reducing infertility is to reduce the incidence and promote reproductive health in order to prevent the onset of infertility (7), the knowledge about the abundance of different causes of infertility in each region is of great importance for health and can be effective in determining the decision of relevant health planners.this study was performed aiming to evaluate Frequency of Infertility in men among Iranian infertile couples**.**

Methods

Eligibility criteria

The methods used for this systematic review were based on the "Cochrane Systematic Study Booklet" and "Appropriate Items for Systematic and Meta-Analysis Study (PRISMA)" tool. Observational studies conducted on general population have been added and studies conducted on specific population have been removed. Results are summarized as reported in the research. The minimum sample size was 25 patients in each study. The target population covers the total population of Male Infertility in Iran who entered the study. The Frequency of Infertility in men among Iranian infertile couples was calculated in this study.

Searching strategies and databases

The review of references and resources was done using the Medical Subject Headings (MeSH) and keywords related to the source of information on the incidence of Male Infertility. To find references, the international Databases (MEDLINE PubMed interface), Google Scholar, and Web of Science) and domestic databases (SIDs and Magiran) and journals were searched; unlimited searching, in terms of both setting and language, was done until June 30, 2018. PRESS standard and the Health Sciences Librarian were used for designing the strategy.

MEDLINE application was used to search other databases. In addition, PROSPERO was used to provide a systematic search that was completed recently. To search for headlines and abstracts, boolean (AND, OR, NOT), mesh, coordinate {truncation} * and related words were used; following

keywords were used to provide a comprehensive context: infertility , Men, male Infertility, STD , epidemiological study and prevalence rate and percent.

Research selection and data extraction

According to the research protocol, two researchers observed the titles and abstracts separately according to the eligibility criteria; in the next step, after the removal of repeated studies, the full text of the paper was studied based on the eligibility criteria and the required information was extracted. Consensus method was used to solve the disagreements between two researchers. The extracted data included the general information (corresponding author, year and place), characteristics of the research (research design, sample size, location, study period, and risk of bias), and characteristics of participants.

Quality control

To assess the quality of the methodology and bias risk, each observation study was evaluated using a tool developed by Hoy et al; this 10-item scale evaluated the quality of the study in two dimensions, including external credentials (items 1 to 4 target populations, sampling frame, sampling method, and minimum indirect neglect) and internal validity (items 5 up to 9 covering methods for data collection, case definition, study tools, and data collection mode and item 10 covering assessing relevant assumptions or analyzes). The risk of abuse was assessed by two researchers separately and possible disparity of ideas was resolved by consensus.

Aggregation of data

All eligible studies were included within the systematic review. The heterogeneity of primary studies was assessed by performing I^2 tests. Subgroup analysis was conducted to determine the heterogeneity based on the participants in the study, gender, and age. Meta-analysis was performed using the STAT 14 statistical software.

Results

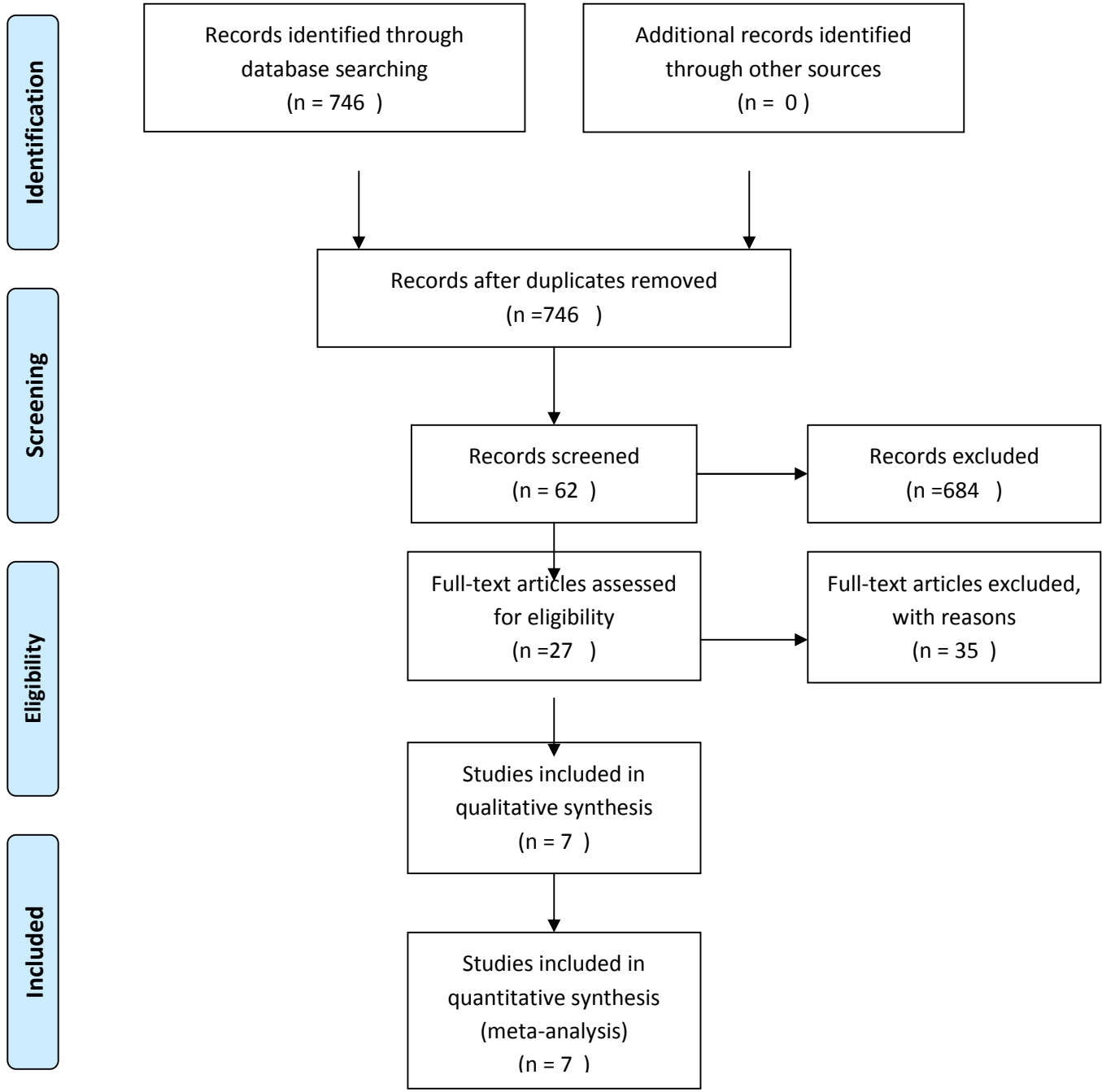## 1.   Selecting eligible papers and researches

In the initial search on various databases, a total of 746 articles were reviewed, 684 of which turned out to be repetitive during screening process of title and abstract. 35 articles were removed due to unrelated

title; out of the remaining 27 articles, 7 articles met the inclusion criteria. Of the 20 articles that were removed, 5 were reviews, 4 were letters to editors, 4 had no complete text, and 7 had low quality and could not be considered in the research. (Figure 1).

PRISMA 2009 Flow Diagram

Identification

Records identified through database searching
(n = 746)

Additional records identified through other sources
(n = 0)

Screening

Records after duplicates removed
(n =746   )

Records screened
(n = 62)

Records excluded
(n =684   )

Eligibility

Full-text articles assessed for eligibility
(n =27   )

Full-text articles excluded, with reasons
(n = 35)

Included

Studies included in qualitative synthesis
(n = 7)

Studies included in quantitative synthesis (meta-analysis)
(n = 7)

2. Characteristics of the researches and papers

The final research was conducted on 6471 participants; with an age range of 20 and 80 years old; a cross-sectional design was used in all studies. Research was conducted in only 6 provinces out of 31 provinces of Iran. Of the 7 studies, 2 were from Tehran [8-14], one from Jahrom [9], one from Yazd [10], one from Mashhad [12], and one from Ardabil [13]; the majority of papers were conducted on outpatient cases (n= 5) through random sampling (n = 5). Required data was collected through interview (n = 6) and had a low bias risk (n = 6) (Table 1).

Table 1: **Characteristics of final included studies about Frequency of Male Infertility in Iran**

ID	Author	Year	city	N	Type of study	prevalence	Bias
1	Sohrabvand [8]	2014	Tehran	430	Cross-sectional	0.37	low
2	Esfehani [9]	2010	Jahrom	169	Cross-sectional	0.09	Moderate
3	Aflatoonian [10]	2009	Yazd	277	Cross-sectional	0.25	Low
4	Karimpour [11]	2005	Saari	657	Cross-sectional	0.48	Low
5	Yousefi [12]	2001	Mashhad	1846	Cross-sectional	0.35	Low
6	Rahimi [13]	2017	Ardabil	600	Cross-sectional	0.35/5	Low
7	Kamali [14]	2006	Tehran	2492	Cross-sectional	0.50/5	low

Meta‑analysis Frequency of Infertility in men among Iranian infertile couples

Based on the results of random effects model, the incidence of Male Infertility in 6471 Iranian infertile couples was 39.1% (95% confidence interval [CI]: 38, 40.3, I^2 = 98.4).

Table2: Frequency of Infertility in men among Iranian infertile couples

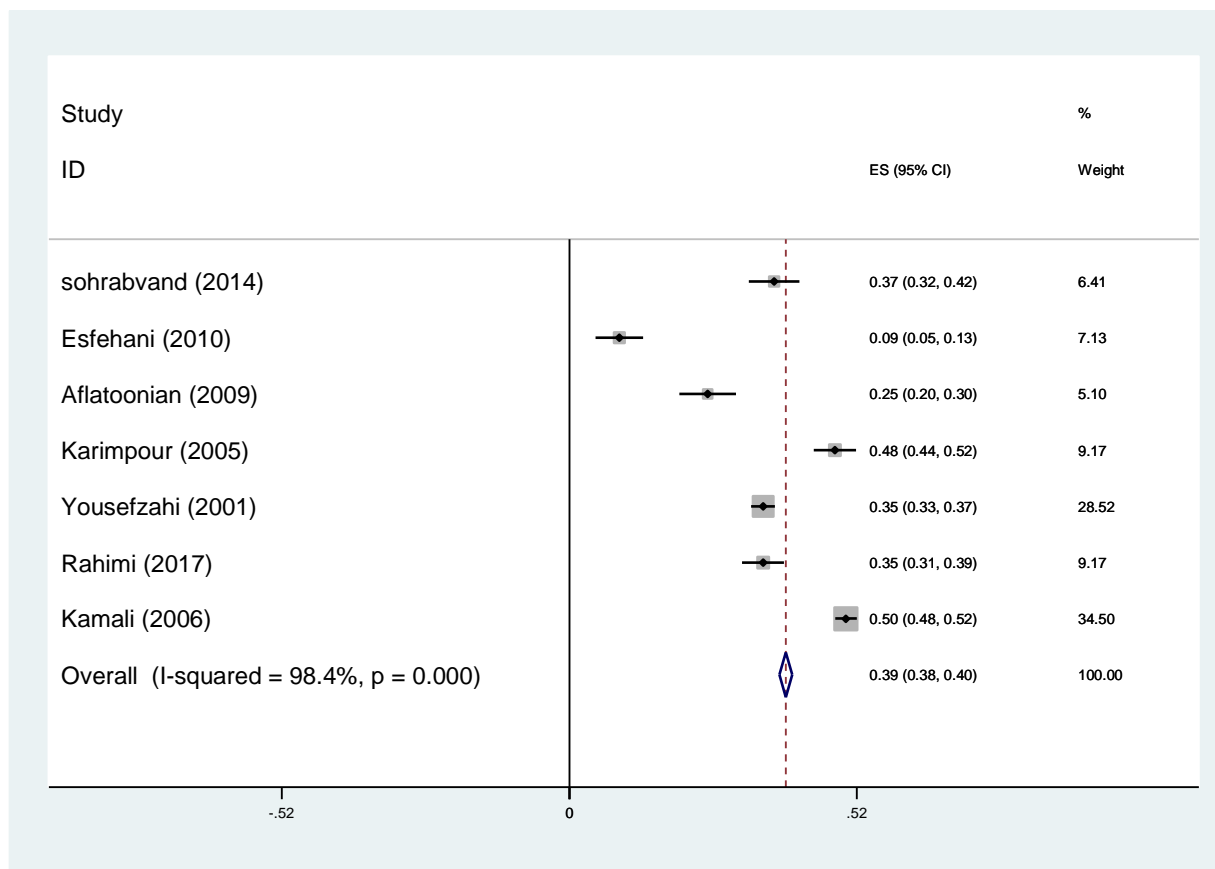| Study	year	ES	95% conf Interval		weight
			Low	up	
Sohrbavand	2014	0.370	0.325	0.415	6.41
Esfehani	2010	0.090	0.047	0.133	7.13
Aflatooniyan	2009	0.250	0.199	0.301	5.10
Karimpour	2005	0.480	0.442	0.518	9.17
Yousefi	2001	0.350	0.328	0.372	28.52
Rahimi	2017	0.350	0.312	0.388	9.17
Kamali	2006	0.500	0.480	0.520	34.50
Pooled ES	-------	0.391	0.380	0.403	100

Fig.2 . The incidence of Infertility in men among Iranian infertile couples and its 95% interval for the studied cases according to the year and the city where the study was conducted based on the model of the random effects model. The midpoint of each section of the line estimates the% value and the length of the lines showing the 95% confidence interval in each study.

Discussion and Conclusion

Although progress has been made in detecting, treating and preventing infertility in recent decades, progress in the treatment of male infertility has not been significant (15). The incidence of infertility has been reported differently in foreign countries. For example, the rate of infertility in the United States was 8.5% and 8%in Iran (16-17).

There are many differences in the incidence of infertility in various studies. This relatively large difference may be due to differences in various conditions that contribute to infertility. The incidence of genital tract infection, especially STI and PID, depends on different health and cultural conditions of different regions (18). These diseases are one of the causes of fertility which can be prevented; however, it is not logical to expect these conditions to be the same in different regions. Environmental contaminants such as heavy metal contamination can affect fertility (19). These conditions are not the same in different situations. Socio-cultural factors, such as sexual behaviors, age of marriage, number of sexual partners, etc., can also affect the fertility rate by influencing the risk of genital infection (20). Also, the use of tobacco, alcohol, and caffeine and affects fertility (21). The conditions can also be different in different societies.

The results of the analysis of 5 studies conducted on 1391 subjects is presented in this research. The overall prevalence of Infertility in men among Iranian infertile couples turned out to be 39.1 %in Iran, which was the result of a comprehensive review of existing evidence (Iran is a country in the Middle East with a population of more than 80 million people).

Conclusion

Considering that the infertility rate is a determining factor in the success rate of the treatment modalities and the prolongation of the course of treatment reduces the chance of treatment significantly, it seems that long delay in visiting infertility clinics is a problem that can be addressed in people's health behaviors.

Based on the findings of the present, it is recommended to survey a larger number of men of different age groups in order to obtain more precise findings in the domain of infertility. The use of findings in the domain of infertility is the best way to assess the effect of health care in the field of infertility. Since the absence of a child and the overall problem of fertility are not socially and culturally sensible, the true incidence of infertility in men may be overwhelming. It is also recommended that health authorities make more efforts to improve health information in regard with the issue of fertility and how to deal with the problem of infertility.

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