**Supplementary**

**Supplementary Table S1.** Prisma checklist

| **Section and Topic** | **Item #** | **Checklist item** | **Location where item is reported** |
| --- | --- | --- | --- |
| **TITLE** | | |  |
| Title | 1 | Identify the report as a systematic review. | Page 1 |
| **ABSTRACT** | | |  |
| Abstract | 2 | See the PRISMA 2020 for Abstracts checklist. | Page 2 |
| **INTRODUCTION** | | |  |
| Rationale | 3 | Describe the rationale for the review in the context of existing knowledge. | Page 4 |
| Objectives | 4 | Provide an explicit statement of the objective(s) or question(s) the review addresses. | Page 5 |
| **METHODS** | | |  |
| Eligibility criteria | 5 | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. | Page 6 |
| Information sources | 6 | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | Page 6 |
| Search strategy | 7 | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | Page 6 |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | Page 6 |
| Data collection process | 9 | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | Page 7 |
| Data items | 10a | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | Page 7，Figure 1 |
| 10b | List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information. | Figure 1 |
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | Page 7, supplementary list |
| Effect measures | 12 | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | Page 7-8, Table 2 |
| Synthesis methods | 13a | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | Page 7-8 |
| 13b | Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions. | Page 7-8 |
| 13c | Describe any methods used to tabulate or visually display results of individual studies and syntheses. | Page 7-8 |
| 13d | Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used. | Page 7-8 |
| 13e | Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression). | Page 7 |
| 13f | Describe any sensitivity analyses conducted to assess robustness of the synthesized results. | Page 7 |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | Page 7 |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | Page 7 |
| **RESULTS** | | |  |
| Study selection | 16a | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram. | Figure 1 |
| 16b | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | Table 1 |
| Study characteristics | 17 | Cite each included study and present its characteristics. | Supplementary file |
| Risk of bias in studies | 18 | Present assessments of risk of bias for each included study. | Supplementary file |
| Results of individual studies | 19 | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | Page 8 |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | Page 8-9 |
| 20b | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | Page 8-10，Table 2 |
| 20c | Present results of all investigations of possible causes of heterogeneity among study results. | NA |
| 20d | Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results. | Page 8-10，Table 2 |
| Reporting biases | 21 | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | NA |
| Certainty of evidence | 22 | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | Page 8-10，Table 2 |
| **DISCUSSION** | | |  |
| Discussion | 23a | Provide a general interpretation of the results in the context of other evidence. | Page 12 |
| 23b | Discuss any limitations of the evidence included in the review. | Page 14 |
| 23c | Discuss any limitations of the review processes used. | Page 14 |
| 23d | Discuss implications of the results for practice, policy, and future research. | Page 14 |
| **OTHER INFORMATION** | | |  |
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | Page 6 |
| 24b | Indicate where the review protocol can be accessed, or state that a protocol was not prepared. | NA |
| 24c | Describe and explain any amendments to information provided at registration or in the protocol. | NA |
| Support | 25 | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | Page 15 |
| Competing interests | 26 | Declare any competing interests of review authors. | Page 15 |
| Availability of data, code and other materials | 27 | Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review. | Supplementary file |

*From:*  Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: <http://www.prisma-statement.org/>

**Supplementary Table S2.** Pubmed search.

|  |  |  |
| --- | --- | --- |
| PubMed | | |
| Published by December 31,2022 | | |
| Step | Search strategy | Numbers |
| #1 | ("Gonadotropin-Releasing Hormone"[Mesh]) OR (Gonadotropin Releasing Hormone) OR (Gn-RH) OR (Gonadoliberin) OR (LHFSH Releasing Hormone) OR (Releasing Hormone, LHFSH) OR (LH-RH) OR (LFRH) OR (LH-Releasing Hormone) OR (LH Releasing Hormone) OR (LH-FSH Releasing Hormone) OR (LH FSH Releasing Hormone) OR (LHFSHRH) OR (LHRH) OR (Luliberin) OR (Gonadorelin) OR (Luteinizing Hormone-Releasing Hormone) OR (Luteinizing Hormone Releasing Hormone) OR (FSH-Releasing Hormone) OR (FSH Releasing Hormone) OR (GnRH) OR (Factrel) OR (Cystorelin) OR (Gonadorelin Hydrochloride) OR (Kryptocur) OR (Dirigestran) OR (Gonadorelin Acetate) | 51794 |
| #2 | (Gonadotropin Releasing Hormone agonist) OR (GnRH-a) OR (gonadorelin agonist) OR (gnrh agonist) OR (lhrh agonist) OR (luteinising releasing hormone agonist) OR (luteinizing releasing hormone agonist) OR GnRH-a | 41632 |
| #3 | (gonadorelin antagonist) OR (gnrh antagonist) OR (gonadorelin, anti) OR (gonadotropin releasing factor antagonist) OR (gonadotropin releasing hormone antagonist\*) OR (lhrh antagonist) OR (lrf antagonist) OR (luliberin antagonist) OR (luteinising releasing hormone antagonist) OR GnRH-ant | 12903 |
| #4 | ("Buserelin"[Mesh]) OR (Buserelin Acetate) OR (Acetate, Buserelin) OR (Suprefact) OR (Profact) OR (Receptal) OR (Tiloryth) OR (Suprecur) OR (Bigonist) OR (HOE-766) OR (HOE 766) OR (HOE766) OR (Buserelin) | 2533 |
| #5 | ("Triptorelin Pamoate"[Mesh]) OR (Pamoate, Triptorelin) OR (Triptorelin Embonate) OR (Embonate, Triptorelin) OR (CL-118532) OR (CL 118532) OR (CL118532) OR (Trelstar) OR (Triptorelin) OR (LHRH, Trp(6)-) OR (GnRH, Trp(6)-) OR (LHRH, Tryptophyl(6)-) OR (Wy-42462) OR (Wy 42462) OR (Wy42462) OR (AY-25650) OR (AY 25650) OR (AY25650) OR (Decapeptyl) OR (Decapeptyl Trimestral) OR (Trimestral, Decapeptyl) OR (Decapeptyl LP) OR (Decapeptyl Depot) | 2310 |
| #6 | ("Goserelin"[Mesh]) OR (ICI-118630) OR (ICI 118630) OR (ICI118630) OR (Zoladex) OR (Goserelin Acetate) OR (Acetate, Goserelin) OR (Goserelin) | 2018 |
| #7 | ("Leuprolide"[Mesh]) OR (Leuprorelin) OR (Enantone) OR (Leuprolide Acetate) OR (Acetate, Leuprolide) OR (Leuprolide Monoacetate) OR (Monoacetate, Leuprolide) OR (Leuprolide, (L-Leu)-Isomer) OR (Lupron) OR (TAP-144) OR (TAP 144) OR (TAP144) OR (A-43818) OR (A 43818) OR (A43818) OR (Leuprolide, (DL-Leu)-Isomer) | 3834 |
| #8 | ("Nafarelin"[Mesh]) OR (Synarel) OR (RS-94991-298) OR (RS 94991 298) OR (RS94991298) OR (Nafarelin Acetate) OR (Nafarelin Acetate, Hydrate) OR (Nafarelin Monoacetate) | 368 |
| #9 | ("cetrorelix" [Supplementary Concept]) OR (SB 75) OR (SB-75) OR (Cetrotide) OR (cetrorelix acetate) OR (cetrorelix pamoate) OR (cetrorelix) | 766 |
| #10 | ("ganirelix" [Supplementary Concept]) OR (ganirelix acetate) OR (ganirelix diacetate) OR (RS-26306-298) OR (RS 26306) OR (RS-26306) OR (Antagon) OR (orgalutran) OR (ganirelix) | 291 |
| #11 | ("antarelix" [Supplementary Concept]) OR (teverelix acetate) OR (teverelix) OR (EP 24332) OR (EP-24332) OR (antarelix) | 59 |
| #12 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 | 53304 |
| #13 | ("Reproductive Techniques, Assisted"[Mesh]) OR (Assisted Reproductive Techniques) OR (Reproductive Techniques, Assisted) OR (Techniques, Assisted Reproductive) OR ART | 263176 |
| #14 | ("Fertilization in Vitro"[Mesh]) OR (In Vitro Fertilization) OR (Test-Tube Fertilization) OR (Fertilization, Test-Tube) OR (Test Tube Fertilization) OR (Fertilizations in Vitro) OR (Test-Tube Babies) OR (Babies, Test-Tube) OR (Test Tube Babies) OR IVF | 61144 |
| #15 | ("Sperm Injections, Intracytoplasmic"[Mesh]) OR (Injection, Intracytoplasmic Sperm) OR (Intracytoplasmic Sperm Injection) OR (Sperm Injection, Intracytoplasmic) OR (ICSI) OR (Injections, Sperm, Intracytoplasmic) | 14331 |
| #16 | #13 OR #14 OR #15 | 279287 |
| #17 | ("Randomized Controlled Trials as Topic"[Mesh]) OR (Clinical Trials, Randomized) OR (Trials, Randomized Clinical) OR (Controlled Clinical Trials, Randomized) OR RCT | 741802 |
| #18 | #12 AND #16 AND #17 | 1248 |

**Supplementary Table S3.** Embase search

|  |  |  |
| --- | --- | --- |
| Embase | | |
| Published by December 31,2022 | | |
| Step | Searches | Results |
| #1 | ‘Gonadotropin-Releasing Hormone’ OR ‘Gonadotropin Releasing Hormone’ OR ‘Gn-RH’ OR ‘Gonadoliberin’ OR ‘LHFSH Releasing Hormone’ OR ‘Releasing Hormone, LHFSH’ OR ‘LH-RH’ OR ‘LFRH’ OR ‘LH-Releasing Hormone’ OR ‘LH Releasing Hormone’ OR ‘LH-FSH Releasing Hormone’ OR ‘LH FSH Releasing Hormone’ OR ‘LHFSHRH’ OR ‘LHRH’ OR ‘Luliberin’ OR ‘Gonadorelin’ OR ‘Luteinizing Hormone-Releasing Hormone’ OR ‘Luteinizing Hormone Releasing Hormone’ OR ‘FSH-Releasing Hormone’ OR ‘FSH Releasing Hormone’ OR ‘GnRH’ OR ‘Factrel’ OR ‘Cystorelin’ OR ‘Gonadorelin Hydrochloride’ OR ‘Kryptocur’ OR ‘Dirigestran’ OR ‘Gonadorelin Acetate’ | 77173 |
| #2 | 'gonadorelin agonist'/exp OR 'gnrh agonist' OR 'gonadotropin releasing hormone agonist' OR 'lhrh agonist' OR 'luteinising releasing hormone agonist' OR 'luteinizing releasing hormone agonist' OR gnrh OR 'gnrh a' | 43747 |
| #3 | 'gonadorelin antagonist'/exp OR antigonadorelin OR ‘gnrh antagonist’ OR ‘gonadorelin, anti’ OR ‘gonadotropin releasing factor antagonist’ OR ‘gonadotropin releasing hormone antagonist\*’ OR ‘lhrh antagonist’ OR ‘lrf antagonist’ OR ‘luliberin antagonist’ OR ‘luteinising releasing hormone antagonist’ OR ‘GnRH-ant’ | 10240 |
| #4 | 'buserelin'/exp OR ‘buserelin acetate’ OR ‘acetate, buserelin’ OR suprefact OR profact OR receptal OR tiloryth OR suprecur OR bigonist OR 'hoe 766' OR ‘hoe 766’ OR hoe766 OR buserelin | 5569 |
| #5 | 'triptorelin'/exp OR ‘pamoate, triptorelin’ OR ‘triptorelin embonate’ OR ‘embonate, triptorelin’ OR 'cl 118532' OR ‘cl 118532’ OR cl118532 OR trelstar OR 'd trp 6 lh rh' OR 'wy 42462' OR wy42462 OR 'ay 25650' OR ay25650 OR decapeptyl OR ‘decapeptyl trimestral’ OR ‘trimestral, decapeptyl’ OR ‘decapeptyl lp’ OR ‘decapeptyl depot’ | 6281 |
| #6 | 'goserelin'/exp OR 'ici 118630' OR ici118630 OR zoladex OR ‘goserelin acetate’ OR ‘acetate, goserelin’ OR goserelin | 7828 |
| #7 | 'leuprorelin'/exp OR leuprorelin OR enantone OR ‘leuprolide acetate’ OR ‘acetate, leuprolide’ OR ‘leuprolide monoacetate’ OR ‘monoacetate, leuprolide’ OR lupron OR ‘tap 144’ OR tap144 OR 'a 43818' OR a43818 | 12738 |
| #8 | 'nafarelin'/exp OR synarel OR 'rs 94991 298' OR rs94991298 OR ‘nafarelin acetate’ OR ‘nafarelin acetate, hydrate’ OR ‘nafarelin monoacetate’ | 1494 |
| #9 | 'cetrorelix'/exp OR cetrotide OR ‘cetrorelix acetate’ OR ‘cetrorelix pamoate’ OR cetrorelix | 2792 |
| #10 | 'ganirelix'/exp OR ‘ganirelix acetate’ OR ‘ganirelix diacetate’ OR 'rs 26306 298' OR ‘rs 26306’ OR antagon OR orgalutran OR ganirelix | 1562 |
| #11 | 'teverelix'/exp OR antarelix OR ‘teverelix acetate’ OR teverelix OR 'ep 24332' | 116 |
| #12 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 | 90991 |
| #13 | 'in vitro fertilization'/exp OR ‘in vitro fertilization\*’ OR ‘test tube fertilization\*’ OR ‘fertilization\*, test tube’ OR ‘fertilizations in vitro’ OR ‘test tube babies’ OR ‘bab\*, test tube’ OR ‘test tube bab\*’ OR IVF | 125546 |
| #14 | 'intracytoplasmic sperm injection'/exp OR ‘injection\*, intracytoplasmic sperm’ OR ‘intracytoplasmic sperm injection\*’ OR ‘sperm injection, intracytoplasmic’ OR ICSI OR ‘injections, sperm, intracytoplasmic’ | 29683 |
| #15 | 'infertility therapy'/exp OR ‘Assisted Reproductive Techn\*’ OR ‘Reproductive Techn\*, Assisted’ OR ‘Techn\*, Assisted Reproductive’ OR ART | 438840 |
| #16 | #13 OR #14 OR #15 | 452905 |
| #17 | 'randomized controlled trial'/exp OR ‘controlled trial, randomized’ OR ‘randomised controlled study’ OR ‘randomised controlled trial’ OR ‘randomized controlled study’ OR ‘trial, randomized controlled’ OR RCT\* | 815475 |
| #18 | #12 AND #16 AND #17 | 2115 |

**Supplementary Table S4.** Cochrane Library search

|  |  |  |
| --- | --- | --- |
| Cochrane | | |
| Published by December 31,2022 | | |
| Step | Searches | Results |
| #1 | MeSH descriptor: [Gonadotropin-Releasing Hormone] explode all trees | 2764 |
| #2 | (Gonadotropin Releasing Hormone) OR (Gn-RH) OR (Gonadoliberin) OR (LHFSH Releasing Hormone) OR (Releasing Hormone, LHFSH) OR (LH-RH) OR (LFRH) OR (LH-Releasing Hormone) OR (LH Releasing Hormone) OR (LH-FSH Releasing Hormone) OR (LH FSH Releasing Hormone) OR (LHFSHRH) OR (LHRH) OR (Luliberin) OR (Gonadorelin) OR (Luteinizing Hormone-Releasing Hormone) OR (Luteinizing Hormone Releasing Hormone) OR (FSH-Releasing Hormone) OR (FSH Releasing Hormone) OR (GnRH) OR (Factrel) OR (Cystorelin) OR (Gonadorelin Hydrochloride) OR (Kryptocur) OR (Dirigestran) OR (Gonadorelin Acetate) | 6475 |
| #3 | (Gonadotropin Releasing Hormone agonist) OR (GnRH-a) OR (gonadorelin agonist) OR (gnrh agonist) OR (lhrh agonist) OR (luteinising releasing hormone agonist) OR (luteinizing releasing hormone agonist) OR GnRH-a | 2978 |
| #4 | (gonadorelin antagonist) OR (gnrh antagonist) OR (gonadorelin, anti) OR (gonadotropin releasing factor antagonist) OR (gonadotropin releasing hormone antagonist\*) OR (lhrh antagonist) OR (lrf antagonist) OR (luliberin antagonist) OR (luteinising releasing hormone antagonist) OR GnRH-ant | 2225 |
| #5 | MeSH descriptor: [Buserelin] explode all trees | 293 |
| #6 | (Buserelin Acetate) OR (Acetate, Buserelin) OR (Suprefact) OR (Profact) OR (Receptal) OR (Tiloryth) OR (Suprecur) OR (Bigonist) OR (HOE-766) OR (HOE 766) OR (HOE766) OR (Buserelin) | 598 |
| #7 | MeSH descriptor: [Triptorelin Pamoate] explode all trees | 476 |
| #8 | (Pamoate, Triptorelin) OR (Triptorelin Embonate) OR (Embonate, Triptorelin) OR (CL-118532) OR (CL 118532) OR (CL118532) OR (Trelstar) OR (Triptorelin) OR (Wy-42462) OR (Wy 42462) OR (Wy42462) OR (AY-25650) OR (AY 25650) OR (AY25650) OR (Decapeptyl) OR (Decapeptyl Trimestral) OR (Trimestral, Decapeptyl) OR (Decapeptyl LP) OR (Decapeptyl Depot) | 1001 |
| #9 | MeSH descriptor: [Goserelin] explode all trees | 592 |
| #10 | (ICI-118630) OR (ICI 118630) OR (ICI118630) OR (Zoladex) OR (Goserelin Acetate) OR (Acetate, Goserelin) OR (Goserelin) | 1245 |
| #11 | MeSH descriptor: [Leuprolide] explode all trees | 716 |
| #12 | (Leuprorelin) OR (Enantone) OR (Leuprolide Acetate) OR (Acetate, Leuprolide) OR (Leuprolide Monoacetate) OR (Monoacetate, Leuprolide) OR (Lupron) OR (TAP-144) OR (TAP 144) OR (TAP144) OR (A-43818) OR (A 43818) OR (A43818) | 1142 |
| #13 | MeSH descriptor: [Nafarelin] explode all trees | 79 |
| #14 | synarel OR 'rs 94991 298' OR (rs AND 94991 AND 298) OR rs94991298 OR (nafarelin AND acetate) OR (nafarelin AND acetate, AND hydrate) OR (nafarelin AND monoacetate) | 101 |
| #15 | cetrotide OR (cetrorelix AND acetate) OR (cetrorelix AND pamoate) OR cetrorelix | 430 |
| #16 | (ganirelix AND acetate) OR (ganirelix AND diacetate) OR 'rs 26306 298' OR (rs AND 26306) OR 'rs 26306' OR antagon OR orgalutran OR ganirelix | 303 |
| #17 | antarelix OR (teverelix AND acetate) OR teverelix OR (ep 24332) | 4 |
| #18 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 | 8318 |
| #19 | MeSH descriptor: [Fertilization in Vitro] explode all trees | 2300 |
| #20 | (In Vitro Fertilization\*) OR (Test-Tube Fertilization\*) OR (Fertilization\*, Test-Tube) OR (Test Tube Fertilization) OR (Fertilizations in Vitro) OR (Test-Tube Bab\*) OR (Bab\*, Test-Tube) OR (Test Tube Babies) OR IVF | 8758 |
| #21 | MeSH descriptor: [Sperm Injections, Intracytoplasmic] explode all trees | 635 |
| #22 | (Injection\*, Intracytoplasmic Sperm) OR (Intracytoplasmic Sperm Injection\*) OR (Sperm Injection, Intracytoplasmic) OR (ICSI) OR (Injections, Sperm, Intracytoplasmic) | 4024 |
| #23 | MeSH descriptor: [Reproductive Techniques, Assisted] explode all trees | 3552 |
| #24 | (Assisted Reproductive Techn\*) OR (Reproductive Techn\*, Assisted) OR (Techn\*, Assisted Reproductive) OR ART OR ARTs | 20006 |
| #25 | #17 OR #18 OR #19 OR #20 OR #21 OR #22 | 29225 |
| #26 | #16 AND #23 in Trials | 2765 |

**Supplementary Table S5.** Web of Science search

|  |  |  |
| --- | --- | --- |
| Web of Science | | |
| Published by December 31,2022 | | |
| Step | Searches | Results |
| #1 | TS=((Gonadotropin-Releasing Hormone) OR (Gonadotropin Releasing Hormone) OR (Gn-RH) OR (Gonadoliberin) OR (LHFSH Releasing Hormone) OR (Releasing Hormone, LHFSH) OR (LH-RH) OR (LFRH) OR (LH-Releasing Hormone) OR (LH Releasing Hormone) OR (LH-FSH Releasing Hormone) OR (LH FSH Releasing Hormone) OR (LHFSHRH) OR (LHRH) OR (Luliberin) OR (Gonadorelin) OR (Luteinizing Hormone-Releasing Hormone) OR (Luteinizing Hormone Releasing Hormone) OR (FSH-Releasing Hormone) OR (FSH Releasing Hormone) OR (GnRH) OR (Factrel) OR (Cystorelin) OR (Gonadorelin Hydrochloride) OR (Kryptocur) OR (Dirigestran) OR (Gonadorelin Acetate)) | 82744 |
| #2 | TS=((Gonadotropin Releasing Hormone agonist) OR ( GnRH-a) OR (gonadorelin agonist) OR (gnrh agonist) OR (lhrh agonist) OR (luteinising releasing hormone agonist) OR (luteinizing releasing hormone agonist) OR GnRH-a) | 18996 |
| #3 | TS=((gonadorelin antagonist) OR (gnrh antagonist) OR (gonadorelin, anti) OR (gonadotropin releasing factor antagonist) OR (gonadotropin releasing hormone antagonist\*) OR (lhrh antagonist) OR (lrf antagonist) OR (luliberin antagonist) OR (luteinising releasing hormone antagonist) OR GnRH-ant) | 15398 |
| #4 | TS=((Buserelin) OR (Buserelin Acetate) OR (Acetate, Buserelin) OR (Suprefact) OR (Profact) OR (Receptal) OR (Tiloryth) OR (Suprecur) OR (Bigonist) OR (HOE-766) OR (HOE 766) OR (HOE766)) | 3545 |
| #5 | TS=((Triptorelin Pamoate) OR (Pamoate, Triptorelin) OR (Triptorelin Embonate) OR (Embonate, Triptorelin) OR (CL-118532) OR (CL 118532) OR (CL118532) OR (Trelstar) OR (Triptorelin) OR (LHRH, Trp(6)-) OR (GnRH, Trp(6)-) OR (LHRH, Tryptophyl(6)-) OR (Wy-42462) OR (Wy 42462) OR (Wy42462) OR (AY-25650) OR (AY 25650) OR (AY25650) OR (Decapeptyl) OR (Decapeptyl Trimestral) OR (Trimestral, Decapeptyl) OR (Decapeptyl LP) OR (Decapeptyl Depot) ) | 3647 |
| #6 | TS=((Goserelin) OR (ICI-118630) OR (ICI 118630) OR (ICI118630) OR (Zoladex) OR (Goserelin Acetate) OR (Acetate, Goserelin)) | 3391 |
| #7 | TS=((Leuprorelin) OR (Enantone) OR (Leuprolide Acetate) OR (Acetate, Leuprolide) OR (Leuprolide Monoacetate) OR (Monoacetate, Leuprolide) OR (Leuprolide, (L-Leu)-Isomer) OR (Lupron) OR (TAP-144) OR (TAP 144) OR (TAP144) OR (A-43818) OR (A 43818) OR (A43818) OR (Leuprolide, (DL-Leu)-Isomer)) | 4694 |
| #8 | TS=((Nafarelin) OR (Synarel) OR (RS-94991-298) OR (RS 94991 298) OR (RS94991298) OR (Nafarelin Acetate) OR (Nafarelin Acetate, Hydrate) OR (Nafarelin Monoacetate)) | 695 |
| #9 | TS=((cetrorelix) OR (SB 75) OR (SB-75) OR (Cetrotide) OR (cetrorelix acetate) OR (cetrorelix pamoate)) | 6142 |
| #10 | TS=((ganirelix) OR (ganirelix acetate) OR (ganirelix diacetate) OR (RS-26306-298) OR (RS 26306) OR (RS-26306) OR (Antagon) OR (orgalutran)) | 712 |
| #11 | TS=((antarelix) OR (teverelix acetate) OR (teverelix) OR (EP 24332) OR (EP-24332)) | 94 |
| #12 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 | 92760 |
| #13 | TS=((Reproductive Techn\*, Assisted) OR (Assisted Reproductive Techn\*) OR (Techn\*, Assisted Reproductive) OR ART) | 1096695 |
| #14 | TS=((Fertilization\* in Vitro) OR (In Vitro Fertilization\*) OR (Test-Tube Fertilization\*) OR (Fertilization\*, Test-Tube) OR (Test Tube Fertilization\*) OR (Test-Tube Bab\*) OR (Bab\*, Test-Tube) OR (Test Tube Bab\*) OR IVF) | 96222 |
| #15 | TS=((Sperm Injections, Intracytoplasmic) OR (Injection\*, Intracytoplasmic Sperm) OR (Intracytoplasmic Sperm Injection\*) OR (ICSI) OR (Injections, Sperm, Intracytoplasmic)) | 25684 |
| #16 | #13 OR #14 OR #15 | 1180650 |
| #17 | TS=((Randomized Controlled Trial) OR (Randomized Controlled Trials as Topic) OR (Clinical Trials, Randomized) OR (Trials, Randomized Clinical) OR (Controlled Clinical Trials, Randomized) OR RCT OR RCTS) | 855420 |
| #18 | #12 AND #16 AND #17 | 1074 |

**Supplementary Table S6.** ROB 2.0 quality assessment for RCT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Random sequence generation** | **Allocation concealment** | **Blinding** | **Incomplete outcome data** | **slective reporting** | **other bias** |
| Albano et al. (2000) | unclear | low risk | high risk | low risk | low risk | unclear |
| Aydin（2014） | low risk | unclear | unclear | low risk | unclear | low risk |
| Badrawi et al. (2005) | unclear | low risk | high risk | low risk | low risk | low risk |
| Bahceci et al. (2005) | low risk | unclear | high risk | low risk | low risk | low risk |
| Barmat et al. (2005) | low risk | low risk | high risk | low risk | low risk | low risk |
| Borm Eur org (2000) | low risk | low risk | high risk | low risk | unclear | low risk |
| Check et al. (2004) | unclear | unclear | high risk | high risk | low risk | unclear |
| Cheung et al. (2005) | low risk | low risk | low risk | unclear | low risk | low risk |
| Cota et al. (2012) | low risk | low risk | unclear | low risk | unclear | low risk |
| Dakhly(2016) | low risk | low risk | unclear | low risk | unclear | low risk |
| Depalo et al. (2009) | low risk | unclear | low risk | low risk | low risk | low risk |
| Devjak (2012） | unclear | low risk | unclear | low risk | unclear | low risk |
| Eur. M. East study (2001) | low risk | low risk | high risk | low risk | low risk | unclear |
| Ferrari et al. (2006) | low risk | unclear | unclear | low risk | unclear | low risk |
| Firouzabadi et al. (2010) | low risk | low risk | high risk | low risk | low risk | low risk |
| Fluker et al. (2001) | low risk | low risk | high risk | low risk | low risk | low risk |
| Friedler et al. (2006) | unclear | unclear | high risk | low risk | low risk | low risk |
| Fusi(2020) | low risk | unclear | high risk | low risk | unclear | low risk |
| Garcia-Velasco et al. (2011) | low risk | low risk | high risk | low risk | low risk | low risk |
| Gizzo(2014) | unclear | Unclear | unclear | unclear | unclear | low risk |
| Haydardedeoglu et al. (2012) | low risk | low risk | unclear | low risk | unclear | low risk |
| Hershko-Klement et al. (2015) | unclear | low risk | unclear | unclear | unclear | low risk |
| Hohmann et al. (2003) | low risk | low risk | high risk | low risk | low risk | low risk |
| Hosseini et al. (2010) | unclear | unclear | unclear | low risk | unclear | high risk |
| Hsieh et al. (2008) | unclear | unclear | unclear | low risk | low risk | unclear |
| Huirne et al. (2006) | low risk | low risk？Unclear | unclear | low risk | low risk | low risk |
| Kaya(2012) | unclear | unclear | unclear | low risk | low risk | low risk |
| Kim et al. (2011) | low risk | unclear | unclear | low risk | low risk | low risk |
| Kim et al. (2012) | low risk | unclear | unclear | low risk | low risk | low risk |
| Koichi et al. (2006) | low risk | low risk | unclear | unclear | unclear | low risk |
| Lainas et al. (2007) | low risk | low risk | high risk | unclear | low risk | low risk |
| Lainas et al. (2010) | low risk | low risk | high risk | low risk | low risk | low risk |
| Lee et al. (2005) | unclear | Unclear | unclear | unclear | low risk | low risk |
| Loutradis et al. (2004) | low risk | Unclear | high risk | unclear | low risk | low risk |
| Moraloglu et al. (2008) | low risk | low risk | unclear | unclear | low risk | low risk |
| Pabuccu et al. (2007) | low risk | unclear | unclear | low risk | low risk | low risk |
| Papanikolaou et al. (2012) | low risk | low risk | unclear | low risk | low risk | low risk |
| Prapas et al. (2013) | unclear | low risk | unclear | unclear | unclear | low risk |
| Qiao et al. (2012) | unclear | unclear | unclear | low risk | unclear | low risk |
| Rabati and Zeidi (2012) | unclear | unclear | unclear | low risk | low risk | low risk |
| Rombauts et al. (2006) | unclear | low risk | high risk | unclear | low risk | low risk |
| Serafini et al. (2006) | low risk | low risk | unclear | unclear | high risk | low risk |
| Shin（2018） | low risk | low risk | high risk | low risk | unclear | low risk |
| Sunkara et al. (2014) | unclear | low risk | unclear | low risk | high risk | low risk |
| Tazegül et al. (2008) | low risk | unclear | high risk | unclear | unclear | low risk |
| Tehraninejad et al. (2010) | low risk | low risk | unclear | unclear | low risk | low risk |
| Tehraninejad et al. (2011) | low risk | unclear | unclear | low risk | unclear | unclear |
| Toftager et al. (2016) | unclear | unclear | unclear | unclear | low risk | low risk |
| Trenkic（2016） | low risk | Unclear | high risk | low risk | low risk | low risk |
| Xavier et al. (2005) | low risk | low risk | high risk | unclear | low risk | low risk |
| Xu（2020） | low risk | low risk | high risk | low risk | low risk | low risk |
| Ye et al. (2009) | low risk | unclear | high risk | low risk | low risk | low risk |

**Supplementary Figure 1.** Bias estimation of live birth rate.

