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SYSTEMATIC REVIEW AND META-ANALYSIS

Mental health outcomes in infertility and fertility treatment: a systematic review of prevalence, correlates, and psychosocial interventions

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ABSTRACT

Background. Infertility and fertility treatments are associated with substantial mental health burdens, yet systematic evidence on prevalence, correlates, and interventions across global contexts remains fragmented.

Objectives. To systematically review mental health outcomes, including prevalence of depression, anxiety, stress, and quality of life impairments, alongside correlates and effects of psychosocial interventions in individuals undergoing infertility evaluation and fertility treatments.

Methods. Systematic extraction from 38 diverse studies (cross-sectional n = 17, prospective cohorts n = 6, RCTs n = 4, others), spanning low/middle-income (*e.g.*, Iran n = 6, India n = 3) and

high-income countries, assessing standardized outcomes via DASS, FertiQoL, GHQ-28, MINI, and others in clinic-based samples (N = total > 30,000).

Results. Clinically significant depression (40-60%) and anxiety (40-75%) prevailed, with infertility-specific stress in 80-92%; women exceeded men (39% *vs* 15% MDD). Emotional/relational QoL domains scored lowest. Correlates included female gender, childlessness, low SES, stigma, and poor sleep (OR = 9-16). RCTs showed hope therapy reduced depression (AMD = -3.1, $p < 0.001$) and ACT improved FertiQoL (AMD = 14.8, $p < 0.001$). Pre-treatment depression lowered treatment initiation (OR = 0.55) and live birth odds (AOR = 0.83); emotional QoL predicted pregnancy (+2.4%/unit).

Conclusions. High mental health morbidity underscores need for routine screening and scalable interventions like ACT/hope therapy to enhance both psychological well-being and reproductive success, particularly in high-burden LMIC settings.

Key words

Infertility; mental health; depression; anxiety; fertility treatment; psychosocial interventions; quality of life.

1. Introduction

Infertility is a major global public health concern with profound psychological and social consequences. Epidemiological estimates suggest that around 10–15% of reproductive-age couples worldwide experience infertility, with rates often higher in low- and middle-income countries where infectious, environmental, and health-system factors compound reproductive risk (1, 2). Beyond biomedical implications, infertility threatens core social roles related to parenthood, marriage, and family continuity, particularly in pronatalist cultures where childbearing is strongly linked to social status, marital stability, and economic security. A literature review synthesizes data from 32 low-bias studies involving 124,556 women, reporting a pooled prevalence of infertility at 46.25% (95% CI 37.73%–54.77%) and primary infertility at 51.5% (95% CI 32.74%–70.26%), though these figures reflect clinic-based samples rather than population-level lifetime rates (1). The cited WHO foundation aligns with broader global assessments, such as lifetime prevalence near 17.5% (1 in 6 people), with comparable rates across income levels but elevated burdens in low-resource settings due to untreated STIs and poor care access (3).

Infertility and its treatment are closely associated with elevated rates of common mental disorders, especially depression, anxiety, and stress-related conditions. Clinic-based studies consistently report that approximately 40–60% of women undergoing infertility evaluation or assisted reproductive technologies (ART) meet criteria for clinically significant depressive or anxiety symptoms, substantially exceeding rates in the general population or fertile controls (4). Infertility-specific stress, encompassing personal, marital, and social domains, is even more pervasive, affecting 80–90% of patients in several cohorts, with personal and marital distress typically exceeding social stress (5). Men are also affected, though prevalence estimates are generally lower; in mixed-gender samples, major depressive disorder is observed in roughly 15–30% of male partners during treatment episodes (6).

Multiple, interacting mechanisms contribute to this heightened mental health burden. At the individual level, the chronic uncertainty of not conceiving, repeated treatment failures, and invasive procedures contribute to sustained emotional strain, fear, and hopelessness. Biological and iatrogenic factors such as hormonal stimulation, physical side effects of treatment, and sleep disruption—may further exacerbate vulnerability to mood and anxiety disorders. Relationally, infertility can strain couple dynamics, diminishing partner support and increasing conflict over finances, sexual intimacy, and treatment decisions; in some settings, women report neglect, emotional abuse, or violence from partners and in-laws in the context of childlessness (7). Socially, stigma, blame (often directed at women even when male factor infertility is present), and community scrutiny intensify shame and isolation, particularly in societies where motherhood is central to female identity and social value (8).

Socioeconomic and structural determinants play a critical role in shaping mental health outcomes in this population. Low income, unemployment, rural residence, and lower educational attainment are repeatedly associated with higher levels of depression, anxiety, and poorer quality of life among infertile individuals. In many countries, high out-of-pocket costs for fertility treatment create additional financial stress, with couples sometimes incurring substantial debt or sacrificing other basic needs to pursue ART (9). Conversely, some studies indicate that higher education and better economic resources are not uniformly protective, as more educated women in resource-intense ART settings may experience heightened performance pressure, perfectionism, and awareness of prognostic uncertainty, which can drive anxiety. For instance, a study analyzed 1,420 Spanish university students and found that academic perfectionism positively correlates with better grades but negatively affects well-being dimensions (e.g., personal growth, life satisfaction), with women showing compromised well-being across all areas. In resource-intense,

high-demand settings like medicine (β = −0.461 for degree demand mediating perfectionism-well-being link), perfectionism exacerbates mental health risks, including higher suicidal thoughts in women (M = 29.99 vs. non-suicidal, t = −7.66, p < 0.001) (10).

Importantly, mental health is not only a consequence but may also influence treatment engagement and reproductive outcomes. Depressive symptoms have been associated with lower likelihood of initiating or continuing recommended fertility treatment, potentially due to reduced motivation, pessimistic expectations, or difficulties in navigating complex care pathways (11). Pre-existing depression and anxiety, as well as the use of certain psychotropic medications, have been linked in some studies to modestly reduced odds of pregnancy and live birth and to higher miscarriage risk, although findings differ by drug class and clinical context (12). At the same time, better emotional quality of life prior to embryo transfer and higher resilience appear to predict more favorable pregnancy outcomes, suggesting bidirectional relationships between psychological well-being and fertility treatment success.

In response to this substantial burden, a range of psychosocial interventions has been developed and evaluated for people with infertility. Group-based hope-oriented counseling, mindfulness-based cognitive approaches, and acceptance and commitment therapy have shown clinically meaningful reductions in depression and stress and improvements in fertility-related quality of life among women and couples undergoing or recovering from fertility treatment. However, despite high levels of distress, mental health service utilization remains low; only a minority of highly distressed patients report receiving information about, or engaging with, specialized psychological support in fertility settings. This gap underscores the need for integrated models of care that incorporate routine psychological assessment, early identification of high-risk individuals, and accessible, evidence-based psychosocial interventions alongside medical treatment for infertility.

2. Methods

2.1. Study Design and Reporting Standards

This study was designed as a systematic review of observational and interventional studies examining mental health outcomes among individuals and couples who experienced infertility and/or underwent fertility treatment. The review followed the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines and was conducted according to a protocol defined a priority (13, 14). The protocol specified the review question, eligibility criteria, search strategy, methods for study selection, data extraction, risk of bias assessment, and data synthesis.

2.2. Eligibility Criteria

Eligibility criteria were structured using the PICOS framework (15, 16). The population included women, men, or couples with primary or secondary infertility, or those who underwent any fertility treatment, including medical management, ovulation induction, intrauterine insemination, IVF, or ICSI, as well as relevant comparison groups such as fertile controls or general population samples where available. The exposures and interventions of interest encompassed Infertility or fertility treatment as exposures in observational studies and psychosocial or psychological interventions (e.g. cognitive-behavioural therapy, mindfulness-based interventions, acceptance and commitment therapy, hope-oriented or group counseling, infertility-focused psychoeducation) in interventional studies.

2.3. Information Sources and Search Strategy

A comprehensive search strategy was implemented across major electronic databases, including PubMed, Google Scholar, Web of Science, Scopus, and Cochrane, from database inception from 2015 to 2025. The search used a combination of controlled vocabulary (e.g. MeSH, Emtree) and free-text terms related to infertility and mental health.

Core concepts included “infertility”, “subfertility”, “assisted reproductive technology”, “IVF”, and “IUI”, combined with terms such as “mental health”, “depression”, “anxiety”, “stress”, “psychiatric”, “common mental disorders”, “distress”, “quality of life”, “FertiQoL”, and “psychological intervention” using Boolean operators (“AND”/“OR”) as appropriate. Search strategies were tailored to each database’s indexing system and were refined iteratively. Reference lists of all included articles and relevant systematic reviews were hand-searched to identify additional studies. Where applicable, grey literature sources (e.g. trial registries) were also explored, and all search dates and strategies were documented in detail.

2.4. Study Selection

The study selection process was conducted in two stages by two independent reviewers to reduce selection bias. First, titles and abstracts retrieved from the searches were screened against the predefined eligibility criteria to identify potentially relevant records. Second, full-text articles of all potentially eligible studies were obtained and assessed independently by the same reviewers for final inclusion. Reasons for exclusion at the full-text stage (e.g. ineligible population, design, or outcomes) were systematically recorded. The overall selection process was summarized in a

PRISMA flow diagram, showing the number of records identified, screened, excluded, and included.

2.5. Data Extraction and Management

Data extraction was carried out independently by two reviewers using a standardized, piloted data extraction form. Extracted variables included study identifiers (authors, year, country), study design, setting, sample size, sampling method, participant characteristics (e.g. age, sex, type and duration of infertility, treatment type, socio-economic indicators), details of comparison groups where relevant, mental health and quality-of-life instruments.

2.6. Quality Assessment

Methodological quality of the included studies was evaluated independently by two reviewers. The Joanna Briggs Institute (JBI) Critical Appraisal Checklis to examined the quality assessment [16]. Representativeness, sampling methods, measurement validity, response rates, and data analysis were used in evaluating the studies. The studies were classified into these three levels of risk; low, moderate and high bias using these criteria. A score was assigned on the low risk of bias, moderate risk of bias, and high risk of bias and the papers were scored and categorised into these levels: low risk of bias when the score was 7 or higher, moderate risk of bias when the score was 4 to 6, and high risk of bias when the score was lower than 4. Some studies when they pointed out to the existence of bias, the meta-analysis did not incorporate them.

2.7. Data Synthesis

Given the anticipated heterogeneity in study design, populations, and measurement instruments, a narrative synthesis approach was applied. Findings were organized according to mental health outcomes (e.g., depression, anxiety, stress, quality of life). Correlates were synthesized across studies to highlight consistent associations and gaps. Where available, effect sizes, prevalence estimates, and mean scores were summarized. Subgroup analyses (e.g., fertility treatment type, cultural context, sociodemographic factors) were highlighted to provide contextual interpretation.

3. Results

3.1. Study Characteristics

Studies spanned diverse global regions, with heavy representation from low- and middle-income countries including Pakistan (n=3), India (n=3), Iran (n=6), Bangladesh (n=2), and Ethiopia (n=2), alongside higher-income settings in Canada (n=2), USA (n=4), Sweden (n=2), and others. Most

employed cross-sectional designs (n=17), capturing point-in-time mental health snapshots in infertility clinics, while prospective cohorts (n=6) tracked changes over treatment periods up to 18 months, and register-based cohorts (n=2) leveraged national data for long-term outcomes spanning 10 years. Randomized controlled trials (n=4) evaluated interventions like hope therapy and mindfulness-based cognitive therapy, with sample sizes ranging from 54 to 60 participants. Table 1 shows the characteristics of populations included in this study.

3.2. Population Demographics

Participants were predominantly women (85-95% in most studies), with mean ages typically 29-35 years across clinic samples; older cohorts (mean 35-41 years) appeared in IVF-specific studies. Infertility durations averaged 4-7 years, with primary infertility more common (60-80%); many were nulliparous or childless (50-78%), married (85-95%), and from urban settings, though rural participants featured prominently in South Asian and African studies. Socioeconomic profiles varied: high unemployment among women (55-96%), low household incomes (<$5000/year equivalents), and lower education (high school or less in 40-70%), particularly in LMIC contexts; higher-income, college-educated samples prevailed in US/European studies. Table 1 provided the detailed of these populations.

3.3. Fertility Treatment Types

Treatments encompassed a spectrum from non-IVF options like ovulation induction (OI), timed intercourse, and intrauterine insemination (IUI) to advanced ART including IVF, ICSI, and frozen embryo transfer (FET). IVF/ICSI dominated ART-focused studies (n=12), often first-cycle or with prior failures; non-IVF treatments appeared in ovulation drug/surgery cohorts and general clinic attendees. Some studies compared infertile groups to fertile controls without specifying treatments, while others examined pre-ART histories or post-treatment follow-up (e.g., 20-23 years post-IVF).

3.4. Mental Health Outcomes Assessed

Core outcomes included depression (n=29 studies), anxiety (n=26), and stress (general, n=14; infertility-specific, n=8), with prevalence rates often 40-60% for depression/anxiety and 70-90% for stress. Quality of life measures (n=15) targeted fertility-specific (FertiQoL), general (SF-12/36, WHOQOL-BREF), or multidimensional domains (emotional, relational, physical); broader psychiatric screening (n=5) covered 18+ disorders via MINI or SCL-90. Less common variables were parenting morale, hopelessness, suicidality, sleep quality, resilience, stigma, coping styles,

marital satisfaction, and antidepressant prescriptions as proxies for incident mental health needs. Table 2 represents the main finding of studies included in this work.

3.5. Measurement Instruments

Validated scales dominated: Depression via EPDS, CES-D, PHQ-9, BDI, HAM-D; anxiety via STAI, HAM-A, BAI, GAD-7; stress via DASS-21/42, PSS, COMPI-FPSS. QoL used FertiQoL (core/treatment subscales), SF-12/36 (MCS/PCS), WHOQOL-BREF; general health via GHQ-28 (somatic, anxiety/depression subscales), MINI, SRQ-20. Fertility-specific tools included FPI (stress), Fertility-QoL, ICQ (illness cognitions); others like Ryff PWB, PHQ-15 (somatic), PSQI (sleep), and study-specific stigma/support measures supplemented core assessments.

3.6. Key Findings on Prevalence and Patterns

High prevalence characterized findings: 30-60% met psychiatric disorder criteria; infertility-specific stress affected 80-92%, with personal > marital/social domains; QoL lowest in emotional/relational areas. Infertile groups showed 2-5x higher mean depression/anxiety/stress scores vs. controls; women > men in distress; childless/unsuccessful outcomes linked to persistent elevations even decades post-treatment. Paradoxes emerged: some fertile comparisons showed higher social QoL; high parity/childbirth in non-infertile cohorts worsened later-life mental health.

3.7. Correlates and Predictors

Demographic: Female gender, older age (>35), childlessness, primary infertility, longer infertility/marriage duration (4-7+ years), low SES (income, education, rural), unemployment/homemaking. Clinical: Female/mixed infertility factors, prior failures/abortions, somatic symptoms, poor sleep, non-SSRI antidepressants, PCOS/unexplained diagnoses. Psychosocial: Insecure attachment, low support/stigma/violence, maladaptive coping (avoidance, wishful thinking), high personal/marital stress, low resilience/acceptance, hopelessness. Protective: Higher education/income (mixed), employment (contextual), secure attachment, partner support, interventions.

3.8. Intervention Effects

RCTs (n=4) reported significant post-intervention reductions: hope therapy lowered depression (AMD=-3.1, $p<0.001$), stress (-1.7, $p=0.018$); MBCT improved GHQ mental health ($p=0.002$),

marital satisfaction (p=0.043); ACT counseling boosted FertiQoL (AMD=14.8, p<0.001), GHQ (-8.4, p<0.001). Effects held for couples, with baseline distress predicting greater gains; anxiety changes were smaller/non-significant in some trials. Service utilization remained low (11-21%), with untargeted info provision despite 40-75% clinical distress rates.

3.9. Reproductive Outcome Links

Pre-treatment depression/anxiety slightly reduced pregnancy/live birth odds (AOR=0.83-0.86); non-SSRI use raised miscarriage risk (RR=1.87). Higher emotional QoL pre-transfer boosted ongoing pregnancy/live birth probabilities (2.4-2.6% per unit); depression screens halved treatment initiation odds (OR=0.55). Male partner depression lowered conception (RR=0.44); infertility stress predicted later antidepressants (OR=1.80-2.85).

3.10. Risk of Bias

The risk of bias across the included studies was generally low to moderate, with several studies employing validated assessment tools and standardized protocols enhancing internal validity. However, heterogeneity was notable due to variability in study designs, populations, psychological outcome measures (e.g., DASS-21, MINI, HAM-D), and follow-up durations. Some studies were limited by smaller sample sizes, lack of blinding, and potential selection biases, particularly in non-randomized or cross-sectional designs. Reporting bias may have arisen from underreporting of negative findings or inconsistent use of cut-off thresholds for psychiatric diagnoses. These factors should be carefully considered when interpreting pooled prevalence estimates and intervention effects, as they may contribute to variability and limit generalizability. Future research adopting rigorous randomized controlled trial methodologies with standardized mental health assessments is needed to reduce bias and strengthen evidence quality.

4. Discussion

Current prevalence estimates of depression (40-60%), anxiety (40-75%), and stress (80-92%) align with prior systematic reviews reporting pooled rates of 26-33% for depression and 23-38% for anxiety among infertile women undergoing IVF, though point estimates here reach 60% in LMIC clinic samples using clinical thresholds like HAM-D or MINI.(58) Elevated stress levels mirror Gameiro et al's 2015 review of psychosocial adjustment during fertility treatment, where 50-80% experience clinically significant infertility-related distress, particularly personal and marital subtypes on COMPI-FPSS.(59) Unlike earlier Western-focused syntheses, this review highlights

higher rates in South Asian and Middle Eastern cohorts (e.g., 79% depression in Pakistani case-controls), consistent with cultural pronatalism amplifying stigma as noted in Latifnejad Roudsari et al's 2014 qualitative synthesis (60).

Longitudinal data showing 40% of women and 15-30% of men meeting MDD criteria during treatment replicate Holley et al's 2015 prospective findings and extend them to non-Western settings, where DASS-21 scores exceed fertile controls by 2-5-fold (61). Postpartum and long-term outcomes (e.g., elevated depression 20 years post-IVF in childless women) converge with Vikström et al 2015 and registry studies like Cesta 2016, affirming persistent vulnerability absent parenthood (62). Modest adverse associations between pre-treatment depression/anxiety and live birth (AOR 0.83) align with Klonoff-Cohen et al's 2001 meta-analysis, though non-SSRI miscarriage risks (RR 1.87) exceed SSRI-neutral findings in US cohorts (63).

Sociodemographic predictors female gender, older age, primary infertility, low SES replicate meta-analyses like Luk and Loke 2015 linking unemployment and rurality to doubled odds of distress in Asian samples (64). Psychosocial factors like insecure attachment, stigma, and low support predict higher DASS scores, paralleling Gameiro and Finnigan's 2017 model where relational strain mediates 30-50% of infertility distress variance (65). RCT effects—depression reductions (AMD -3.1) and QoL gains (AMD 14.8) match meta-analytic effect sizes (g 0.46-0.72) from van Dongen et al 2021 for CBT/mindfulness in infertility (66). Low utilization (11-21%) despite 50-75% clinical need echoes Pasch 2016 and Boivin et al's 2011 survey, where only 20% of distressed patients receive targeted support (67).

This review's geographic diversity strengthens generalizability beyond Eurocentric syntheses by incorporating LMIC data absent in many prior overviews (68). Heterogeneity in designs, measures (e.g., DASS vs. MINI), and thresholds limits pooled estimates, mirroring critiques of earlier reviews where variable cutoffs inflate prevalence by 10-20% (69). Findings underscore routine screening (e.g., PROMIS Depression, FertiQoL) and targeted interventions in high-burden settings, prioritizing couples with relational strain or childlessness to optimize mental health and reproductive success (70). Future research should standardize outcomes and test scalability of brief therapies like ACT in resource-limited clinics.

5. Conclusion

This systematic review confirms high prevalence of mental health disturbances—including depression (40-60%), anxiety (40-75%), and infertility-specific stress (80-92%)—among individuals with infertility and during fertility treatments, with women showing greater vulnerability

than men across global contexts. Emotional and relational quality-of-life domains are most impaired, driven by sociodemographic (childlessness, low SES, older age) and psychosocial correlates (stigma, poor support, sleep disturbance; OR=9-16), while pre-treatment depression reduces treatment initiation (OR=0.55) and live birth odds (AOR=0.83). Psychosocial interventions such as hope therapy (depression AMD=-3.1, $p<0.001$) and ACT counseling (FertiQoL AMD=14.8, $p<0.001$) offer significant, scalable benefits, yet service utilization remains low (11-21%) despite widespread need. Routine screening with validated tools (DASS-21, FertiQoL) and targeted interventions are essential in fertility clinics to mitigate distress, curb dropout, and enhance reproductive success, particularly in LMICs where cultural factors amplify burden. Future efforts should prioritize standardized measures, paternal pathways, and policy integration of multidisciplinary care to address this bidirectional mental health-fertility challenge.

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Table 1: Basic Characteristics of included studies (n=40)

Reference	Author(s)/Year	Country	Study Design	Sample Size	Population Characteristics	Aims/Objectives
[17]	Raguz et al., 2014	Canada	Prospective cohort	1296	Mothers postpartum, primiparous and multiparous, diverse backgrounds	To assess mental health outcomes of mothers who conceived using fertility treatment
[18]	Saleem S et al./2019	Pakistan	Cross-Sectional	169	Women with primary infertility, aged 19-45, married ≥1 year	To examine attachment styles, social support, and mental health in infertile women

[19]	Prasad et al. (2017)	India	Cross-sectional	186	Infertile women undergoing first IVF cycle; Mean age: 31.35 yrs; Mean infertility duration: 7.38 yrs; Majority had family income <Rs. 500,000/year.	To assess psychological distress, quality of life, and mental health in women undergoing ART.
[20]	Yusuf L. (2016)	Pakistan	Case-Control Study	200	Females with female-factor infertility (cases) vs. fertile females accompanying patients (controls). Mean age ~20-30 years. Excluded those with pre-existing mental health issues and male-factor infertility.	To find the prevalence of depression, anxiety, and stress among females suffering from infertility.
[21]	Rahimi et al. (2021)	Iran	Randomized Controlled Trial	60	Women with failed IVF cycles, minimum education of junior high school, living in Tabriz. Excluded those with psychiatric problems, chronic physical diseases, or recent severe	To determine the effects of hope-oriented group counseling on mental health (primary) and quality of life (secondary) in infertile women with failed IVF cycles.

					psychological crises.	
[22]	Holley et al. (2015)	United States	Prospective cohort study	174	Heterosexual couples; Mean age W=36.4, M=37.8; 70% White; 67% college graduates; Mean infertility=2.4 years	Examine prevalence and predictors of MDD during fertility treatment
[23]	Cesta et al. (2016)	Sweden	Nationwide register-based cohort study	23,557	Nulliparous women undergoing first fresh IVF cycle; mean age ~33; Swedish national sample	Investigate associations between depression, anxiety, antidepressants before IVF and cycle outcomes (pregnancy, live birth, miscarriage)
[24]	Patel A. et al. (2016)	India	Cross-sectional Study	300	Women diagnosed with primary infertility. Age range 20-49 yrs (median 29). 62% rural, 55% joint families, 64% unemployed. Excluded secondary infertility.	To estimate the prevalence of infertility-specific stress and identify its predictors in women with primary infertility.

[25]	Bakhtiyar K. et al. (2019)	Iran	Matched Case-Control Study	720	Infertile women and fertile controls matched for age, education, and duration of marriage. Excluded those with psychological problems, recent stressful events, or substance use.	To investigate the impact of infertility on women's quality of life.
[26]	Pasch et al. (2016)	USA	Prospective longitudinal cohort study	352	Heterosexual couples; first fertility clinic visit; no previous IVF; average age mid-30s; predominantly white, highly educated, high income.	To Determine extent of clinical distress. 2. Mental health service (MHS) use and clinic information provision. 3. Assess if MHS was targeted to the most distressed.
[27]	Wu et al. (2020)	Taiwan	Prospective longitudinal cohort study	686	Infertile women undergoing IVF; mean age 35.7; excluded those with mental disorders or recent major trauma.	To investigate the association between QoL (measured before embryo transfer) and IVF pregnancy outcomes.
[28]	Alam et al. (2018)	Bangladesh	Cross-sectional study	112 married infertile women	Women attending infertility outpatient clinic;	To investigate the psychological impacts

					mean age 28.5 years; mean infertility duration 4.46 years.	(depression, anxiety) of infertility among married women.
[29]	Alosaimi et al. (2015)	Saudi Arabia	Cross-sectional observational study	406	Infertile men and women attending clinics; mean age women 31.5, men 35.4; high unemployment in women (68%).	To measure the rate of psychiatric disorders in infertile men and women seeking treatment.
[30]	Crawford et al. (2017)	USA	Prospective observational study	416	New female infertility patients; mean age 35.1; predominantly Caucasian (80%), highly educated (86% college degree+).	To determine if screening positive for depression is correlated with pursuing infertility treatment.
[31]	Pedro et al. (2019)	Denmark	10-year longitudinal register-based cohort study	1009 women	Women initiating ART treatment; mean age 31.8; mean infertility duration 3.45 years.	To explore if infertility-related stress predicts a first redeemed prescription of antidepressants after ART.
[32]	Gordon & Balsom (2020)	Canada & USA	Cross-sectional online survey	92	Women (20-45 yrs) whose fertility treatments were suspended due to COVID-19; mean age 34.2; mean TTC 36 months	To examine the psychological impact of treatment suspensions and identify psychosocial predictors

[33]	Patel et al. (2018)	India	Cross-sectional dyadic study	81	Distressed infertile couples undergoing IUI; mean infertility duration 4 years	To compare illness cognitions (helplessness, acceptance, benefits), anxiety, and depression between men and women in infertile couples
[34]	Khan et al. (2019)	Pakistan	Case-control study	60	Married women (20-40 yrs); infertile group from hospital gynae departments, fertile group from community	To compare levels of depression, anxiety, and stress between infertile and fertile women
[35]	Catalao et al. (2020)	Ethiopia	Population-based cohort study	1026	Rural women in 3rd trimester; followed for 6.5 years; high fertility, low contraceptive use setting	To examine impact of poor mental health on unmet need for contraception and fertility rate
[36]	Shargh et al. (2016)	Iran	Randomized controlled trial	60 women (30 intervention, 30 control)	Infertile women (20-45 yrs); mean infertility duration 4-7 years; low education level (53.33% elementary)	To determine effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) on marital satisfaction and general health

[37]	Jiang & Yang (2022)	China	Cross-sectional survey (CLDS 2018)	4,245	Women of childbearing age (15-49 yrs, mean 41.1); 94.4% married; 79.3% rural Hukou; mean births: 1.79	To examine the impact of fertility (number of births) on the physical and mental health of Chinese women of childbearing age and confirm the "motherhood health penalty".
[38]	Keenan & Grundy (2019)	10 European Countries (e.g., Sweden, France, Italy)	Longitudinal (SHARE waves 1-2)	19,928	Adults aged 50-79 years; 11% childless; 11% men & 15% women had early first birth (<23/<20 yrs)	To investigate associations between fertility history (timing, parity) and changes in a range of physical and mental health indicators in older adults.
[39]	Namdar et al. (2017)	Iran	Cross-sectional	146	Mean age: 29.4 ± 5.2 yrs; Mean marriage duration: 6.6 ± 0.5 yrs; 39.7% with academic education; 15.8% from rural areas	To determine the general health and QOL of infertile women and identify affecting socio-demographic conditions.
[40]	Sezgin et al. (2016)	Turkey	Cross-sectional	100	Urban; Mean age ~30 yrs; 74% employed; Mean marriage duration	To compare psychiatric symptoms, disability, and QOL between

					infertile: 9.3 yrs, fertile: 6.4 yrs	infertile and fertile urban women in Turkey.
[41]	Zivaridelavar et al. (2016)	Iran	Prospective Cohort	63	Fertile women undergoing ART due to male factor infertility; Mean age: 29.17 yrs; Mean infertility duration: 5.84 yrs	To evaluate the effect of the ART process on the mental health of fertile women (with male factor infertility) before and after ovarian stimulation/oocyte retrieval.
[42]	Hosseinpanahi et al. (2020)	Iran	Randomized Controlled Trial	54	Infertile couples; Mean age (women): 30.9 yrs; Mean infertility duration: 2.7 yrs	To determine the effect of ACT-based counseling on mental health and quality of life in infertile couples.
[43]	Roberts et al. (2020)	India	Mixed-Method Cross-Sectional	74	Low-income women from Mumbai slums with infertility; Mean age: 26.7 yrs; Mean marriage duration: 7.7 yrs	To assess mental health and stigma among low-income women with infertility in a pronatalist culture.
[44]	Vikström et al. (2015)	Sweden	Cross-Sectional	470	Women 20–23 years post-IVF treatment; Mean age at follow-up: >45 yrs for majority	To assess long-term mental health in women post-IVF and compare outcomes based

						on parenthood status.
[45]	Hasan et al. (2023)	Bangladesh	Cross-Sectional	300	Infertile women receiving treatment in Dhaka; Mean age: >30 yrs for majority; 69.3% primary infertility	To assess mental health and quality of life among infertile women in Bangladesh and identify influencing factors.
[46]	Sohbati et al. (2021)	Iran	Cross-sectional	300	Infertile women (female factor); Mean age: 29.16 ± 5.81 yrs; Majority had high school education (52%); 65% had relatively favorable economic status	To determine psychological well-being (PWB) and its relationship with demographic factors and fertility history in infertile women.
[47]	Teklemicheal et al. (2022)	Ethiopia	Cross-sectional	96	Infertile women (non-IVF treatment); Mean age: 31.5 ± 5.9 yrs; 78.1% childless; 68.8% housewives; 53.1% secondary infertility	To determine the prevalence of infertility-related psychological stress and its demographic-clinical correlates in Ethiopian women.
[48]	Wang et al. (2023)	China	Cross-sectional	1712	Infertile women undergoing ART; Mean age: 32.1 ± 4.59 yrs; 65.3% with junior college	To investigate the incidence and risk factors of anxiety and depression in infertile women

					degree or above; 48.8% aged 30–35 yrs	undergoing fertility treatment.
[49]	Li et al. (2019)	China	Cross-sectional	498	Infertile women undergoing IVF-ET; Mean age: 32.19 yrs; All from Northeast China	To evaluate fertility quality of life (QoL) and examine whether resilience moderates the relationship between infertility-related stress and fertility QoL.
[50]	Setswe & Roomaney (2025)	South Africa	Cross-sectional	210	Patients seeking fertility treatment in Cape Town; Predominantly female (79.5%), married/cohabiting (96.2%), higher-income, well-educated; Mean age not reported.	To investigate the predictors (demographic, clinical, psychosocial) of psychosocial well-being among fertility patients.
[51]	Moutzouroulia et al. (2025)	Greece	Cross-sectional	128	Women undergoing first IVF/ICSI/IUI treatment; Mean age: 41.5 yrs; Majority married (88.3%), employed (81.3%),	To explore the impact of infertility and IVF on women's mental health and quality of life.

					university-educated (53.9%).	
[52]	Kamışlı et al. (2021)	Turkey	Cross-sectional	70	Women diagnosed with infertility applying for IVF; Mean age: ~31-33 yrs; Mean infertility duration: 6.1 yrs; 60% unemployed; 41.4% high school graduates	To determine the levels of hopelessness, anxiety, and depression and their relationship with socio-demographic characteristics in women applying for infertility treatment.
[53]	Evans-Hoeker et al. (2018)	USA	Prospective Cohort (Secondary Analysis of RCTs)	1,650	Infertile couples (female partners with PCOS or unexplained infertility); Mean female age: ~30.7 yrs; Mean male age: ~33.0 yrs; 5.96% of women and 2.28% of men had active major depression (MD); 5.72% of women used antidepressants.	To determine if maternal major depression (MD), antidepressant use, or paternal MD are associated with pregnancy outcomes after non-IVF fertility treatments.
[54]	Huang et al. (2019)	Taiwan	Cross-sectional	97 women	Women with primary infertility undergoing IVF;	To investigate the status of emotional

					Mean age: 35.7 yrs; Mean infertility duration: 51.5 mos; 63.5% had received repeated IVF treatment.	distress (anxiety, depression) and sleep quality, and examine factors predicting sleep disturbances in women during the hormonal stimulation phase of IVF.
[55]	Marom Haham et al. (2021)	Canada	Cross-sectional	181	Women whose fertility treatments (IVF, FET, IUI, ovulation induction) were suspended due to COVID-19; Mean age: 37.7 yrs; 70% had no children; 93% had a partner; 61% reported above-average income.	To investigate patients' views and emotional reactions to the suspension of fertility treatments during the COVID-19 pandemic and identify factors affecting psychological distress.
[56]	Yokota et al. (2022)	Japan	Cross-sectional	254	Japanese women undergoing infertility treatment; mean age 35.9 yrs; married; no children; primary infertility only	To examine the association between infertility stigma and anxiety, depression, and psychological distress using a validated scale.

Table 2: Main findings of included studies (n=40)

Reference	Author(s)/Year	Fertility Treatment Type	Mental Health Outcomes Assessed	Measurement Instruments	Main Findings / Results	Correlates / Predictors
[17]	Raguz et al., 2014	Assisted reproductive techniques (ART), general fertility treatment	Postpartum depression, anxiety, perceived stress, parenting morale	Edinburgh Postnatal Depression Scale, Spielberger State Anxiety Inventory, Perceived Stress Scale, Parenting Morale Index	No significant difference in depression, anxiety, or stress; lower parenting morale in spontaneous conception group; fertility treatment group had higher parenting morale	Age, parity, mental health history, mode of conception, postpartum mental health, parenting morale
[18]	Saleem S et al./2019	Medical treatment for primary infertility	Depression, Anxiety, Stress (DASS)	Adult Attachment Questionnaire, MSPSS, DASS	Women with secure attachment perceive more social support and have fewer mental health problems. Insecure attachment correlates with higher stress and depression. Education and social support are strong predictors.	Attachment style, social support, education, age, duration of marriage

[19]	Prasad et al. (2017)	IVF/ICSI	Depression, Anxiety, General Life Stress, Quality of Life (QoL)	HAM-D, ADI, HAM-A, SCAT, PSLES, FertiQoL, CMI	Depression: 60.11–64.86% had clinically significant depression. Anxiety: 27–37% had moderate to severe anxiety. Stress: 80% reported high general life stress. QoL: Lowest scores in relational (mean=46.4) and emotional (mean=49.07) domains. Core FertiQoL scores were significantly lower than treatment scores.	Education: Positively correlated with better QoL and treatment tolerability. Age: Negatively correlated with treatment tolerability. Key Stressors: Marital conflict, in-law conflicts, financial problems, sexual problems.
[20]	Yusuf L. (2016)	Not specified (patients attending an infertility clinic)	Depression, Anxiety, Stress	Validated Urdu version of the 42-item Depression, Anxiety, Stress Scale (DASS)	Significantly higher mean scores for depression (16.14 vs. 3.90), anxiety (14.63 vs. 3.69), and stress (19.72 vs. 5.87) in the infertile group compared to controls (p=0.00). 79% of infertile women had some depression, 70% had anxiety, and 69% had stress.	Infertility status was a major predictor of poor mental health outcomes. Level of education and occupation did not significantly affect the scores (i.e., they were not found to be protective factors in this population).

[21]	Rahimi et al. (2021)	Hope-Oriented Group Counseling (six 45-60 min weekly sessions) vs. routine care	Depression, Anxiety, Stress, Quality of Life	Depression Anxiety Stress Scale-21 (DASS-21), SF-12 Quality of Life Scale	Hope-oriented counseling significantly reduced stress (AMD=-1.7, p=0.018) and depression (AMD=-3.1, p<0.001) scores, and improved QoL (AMD=6.9, p<0.001) compared to the control group one-month post-intervention. The reduction in anxiety was not statistically significant (AMD=-1.1, p=0.153).	The intervention (hope therapy) was the primary predictor of improved outcomes. Higher baseline scores likely predicted greater improvement. Other potential predictors (e.g., duration of infertility) were not reported as significant moderators in this analysis.
[22]	Holley et al. (2015)	IVF, IUI, medication (unsuccessful outcomes only)	MDD, depressive symptoms, anxiety symptoms	CIDI (diagnosis), CES-D (symptoms), STAI (anxiety)	39.1% of women and 15.3% of men met MDD criteria during 18-month treatment period	Past MDD history (strongest predictor), baseline depression, baseline anxiety, low partner support (women only)
[23]	Cesta et al. (2016)	IVF (first fresh cycle with embryo transfer)	Depression/Anxiety diagnoses, Antidepressant use	National Patient Register (diagnoses), Prescribed Drug Register (medications)	4.4% had depression/anxiety/antidepressant use. Associated with slightly decreased odds of pregnancy (AOR=0.86) and live birth (AOR=0.83). No significant association for SSRIs alone. Non-SSRI antidepressants and	Diagnosis of depression/anxiety (without antidepressants), use of non-SSRI antidepressants. SSRIs alone were not a significant predictor of negative outcomes.

					diagnosis-only showed reduced odds.	
[24]	Patel A. et al. (2016)	Various (OI with timed intercourse, IUI, IVF; 97% were advised but had not taken IVF due to financial constraints)	Infertility-specific stress, Psychiatric morbidity	Semi-structured questionnaire, ICD-10 Clinical Descriptions and Diagnostic Guidelines, Psychological Evaluation Test for Infertility (clinician-rated)	The prevalence of infertility-specific stress was 80%.	Predictors from Multivariate Analysis: Female factor infertility (vs. male factor), Significant coping difficulties. Other associated factors from Univariate Analysis: >5 years marital life, >5 years infertility duration, history of gynecological surgery, cycles of OI/IUI, present/past psychiatric morbidity, gynecological diagnosis (uterine/ovarian factors), premenstrual dysphoria.

[25]	Bakhtiyar K. et al. (2019)	N/A (Comparison of infertile vs. fertile women, not an intervention)	Quality of Life (Physical, Mental, Social, Environmental Health)	WHOQOL-BREF questionnaire	Infertile women had significantly lower scores in physical health (AMD=-3.6, p<0.001) and mental health (AMD=-16.0, p<0.001) dimensions. They had a significantly higher score in social health (AMD=+20.0, p<0.001). The total QoL score was higher in infertile women (AMD=+21.6, p<0.001), driven by the large increase in the social domain.	Main Predictor/Correlate: Infertility status. Other Correlates: Lower physical/mental QoL was associated with lower education, unemployment, not owning a home, and having underlying diseases. Higher social QoL was associated with longer marriage duration, lower education, being a housewife, and undergoing costly treatments like IVF.
[26]	Pasch et al. (2016)	Any fertility treatment (58% female factor, 7% male, 31% mixed)	Depression, Anxiety, MHS information provision and use	CES-D (depression), STAI-State (anxiety), Study-specific questions on MHS	1. 56.5% of women and 32.1% of men had clinical depression at ≥1 point; 16.5% of women and 5.8% of men had prolonged depression. 2. 75.9% of women and 60.6% of men had clinical anxiety at ≥1 point. 3. 21% of women and 11.3% of men used MHS. 4. 26.7% of women and 24.1% of men received MHS	Predictors of Higher Distress: Unsuccessful treatment outcome (remaining childless). Predictors of MHS Use: Being in the "at-risk" or "high-risk" distress group. Not a Predictor of MHS Info: Distress level did not predict receiving information from the clinic.

					information from their clinic. 5. MHS use was higher in distressed patients, but information provision was not targeted to them.	
[27]	Wu et al. (2020)	IVF	Quality of Life (QoL) specific to infertility	FertiQoL (Taiwanese version)	1. Lowest QoL scores were in the emotional (62.0) and treatment tolerability (59.4) domains. 2. A one-unit increase in the emotional QoL score significantly increased the probabilities of ongoing pregnancy by 2.4% and live birth by 2.6% ($p<0.05$). 3. Other QoL domains were not significantly associated with outcomes.	Predictors of Positive Pregnancy Outcome: Higher emotional QoL score before transfer. Other Predictors (from univariate analysis): Younger maternal age, higher AMH, shorter infertility duration, higher number of oocytes retrieved, higher number of embryos transferred, blastocyst-stage (Day 4-5) transfer, use of frozen-thawed embryos.

[28]	Alam et al. (2018)	Not specified (patients seeking treatment)	Depression, Anxiety	Goldberg Depression Questionnaire (GDQ), Beck Anxiety Inventory (BAI)	1. 62.5% of women showed depression (10.7% minor-moderate, 32.1% moderate-severe). 2. 37.5% had anxiety disorders (12.5% moderate, 25% potentially concerning levels). 3. Prevalence of disorders increased with age and duration of infertility.	Predictors of Depression: Older age, not having a living child, negligence by husband. Predictors of Anxiety: Lower monthly income, negligence by husband, violence by in-laws. Not Predictors: Type of family, education level, employment status.
[29]	Alosaimi et al. (2015)	Not specified (patients at infertility clinics)	18 common psychiatric illnesses (e.g., depression, anxiety, bipolar, substance-related)	Mini International Neuropsychiatric Interview (MINI) - Arabic version	1. Self-reported psychiatric disorders were low (4.5% men, 10.2% women), but MINI identified 30% of men and 36.9% of women had a disorder. 2. Most common disorders were depression (21.7%) and anxiety (21.2%). 3. Women had significantly higher rates of suicidality and depression. Men had higher rates of bipolar and substance-related disorders.	Predictors of Psychiatric Disorders: Lower monthly income (for both genders), polygamy (for women). Gender Differences: Female gender predicted higher depression/suicidality; male gender predicted bipolar/substance disorders.

[30]	Crawford et al. (2017)	Any recommended treatment (oral meds, IUI, IVF, surgery)	Depression	NIH PROMIS Depression 4-item short form	1. 41% of women screened positive for depression. 2. Women with a positive screen had 0.55 times the odds of initiating any treatment (95% CI: 0.31–0.95) and were less likely to pursue oral medications or IVF. 3. Only 62% of all women initiated recommended treatment.	Predictors of Not Initiating Treatment: Positive depression screen, older age, non-Caucasian race, unmarried, higher BMI, nulliparity, diagnosis of DOR. Not Associated: Income (though education was used as a proxy).
[31]	Pedro et al. (2019)	ART (IVF, ICSI)	First-time redeemed prescription of antidepressants	COMPI Fertility Problem Stress Scales (COMPI-FPSS), Stress Profile Questionnaire	1. 13.7% of women redeemed a first-time antidepressant prescription during the 10-year follow-up. 2. High personal stress (adj OR=2.14) and high marital stress (adj OR=1.80) significantly predicted antidepressant prescription. 3. High general physical stress was the strongest predictor (adj OR=2.85). Social stress was not a significant predictor.	Predictors of Antidepressant Use: High personal infertility-related stress, high marital infertility-related stress, high general physical stress. Stratified by Outcome: The risk was significantly higher for women who did not achieve childbirth during follow-up.

[32]	Gordon & Balsom (2020)	IVF (54%), IUI (35%), FET (5%), Other (6%)	Depressive symptoms, perceived mental health impact, change in quality of life	PHQ-9, study-specific QoL and mental health impact measures, IUS-12, LOT-R, DPQ-R, ICQ, Infertility Coping Questionnaire	1. 52% had clinical depressive symptoms (PHQ-9 ≥10). 2. Significant decline in QoL (M=-1.3/7, p<.0001) and mental health (M=-2.1/±5, p<.001). 3. 86% reported negative mental health impact from suspensions.	Lower defensive pessimism, greater infertility acceptance, better quality social support, more social support seeking, less avoidance. Longer time TTC predicted worse outcomes.
[33]	Patel et al. (2018)	IUI	Infertility-specific stress, anxiety, depression, helplessness, acceptance, perceived benefits	FPI, MINI, HAM-A, HAM-D, Illness Cognition Questionnaire (ICQ)	Women reported significantly higher infertility-specific stress (p=0.002), anxiety (p<0.001), depression (p<0.001), and helplessness (p=0.01) than men. Women had lower acceptance (p=0.01). No gender difference in perceived benefits; neither partner found infertility beneficial.	Higher distress in women, higher helplessness and lower acceptance in women, no perceived benefits from infertility for either gender.
[34]	Khan et al. (2019)	Not specified (comparison based on fertility status)	Depression, Anxiety, Stress	Depression Anxiety and Stress Scale (DASS)	Infertile women had significantly higher depression (10.83 vs 4.17, p=0.000), anxiety (11.60 vs 5.50, p=0.001), and stress (19.67 vs 12.10, p=0.000) scores than fertile women.	Infertility status (primary correlate). Majority of infertile women were housewives (96.7%) and had low income (46.7%).

[35]	Catalao et al. (2020)	Not a treatment study; observational of family planning behaviors	Common Mental Disorders (CMD: depression, anxiety)	Self-Reporting Questionnaire-20 (SRQ-20)	Higher CMD symptoms at 1 year postnatal were associated with unmet need for contraception at 2.5 years (aOR 1.06; 95% CI 1.01–1.12). No association found between CMD and number of pregnancies. Unmet need was high (50.4%-64.0%).	Lower socioeconomic status (SES) was also a significant predictor of unmet need (aOR 1.79). CMD symptoms were higher at 1 year postnatal.
[36]	Shargh et al. (2016)	Not specified (psychological intervention study)	Marital satisfaction, General mental health (somatic, anxiety, depression, social function)	Enrich Marital Satisfaction Questionnaire, General Health Questionnaire (GHQ-28)	MBCT group showed significant improvement in marital satisfaction (Mean=115.4 vs 107.0, p=0.043) and general mental health (Mean=55.09 vs 45.31, p=0.002) compared to control group post-intervention.	MBCT intervention was the primary factor. Majority had low education and long infertility duration (70% for 4-7 years).
[37]	Jiang & Yang (2022)	N/A (Observational study of fertility history)	Self-rated physical health, Depression (Mental health)	Self-rated health (5-point Likert), Center for Epidemiological Studies Depression (CES-D) Scale	A higher number of births had significant adverse impacts on both physical and mental health, confirming the motherhood health penalty. Rural women's health was more negatively affected than urban women's. Mechanisms included reduced income and the	Worse Health Outcomes: Higher number of births, rural Hukou. Mediating Factors: Lower income, occupying multiple roles. Protective Factors: Higher income, urban Hukou.

					strain of multiple roles (worker, homemaker, caregiver).	
[38]	Keenan & Grundy (2019)	N/A (Observational study of fertility history)	Depression, Cognition	Euro-D Depression Scale, Cognition Index (verbal fluency, recall, numeracy)	High parity (4+ children) was associated with worse baseline physical health, depression, cognition, and a higher risk of developing circulatory disease. Early parenthood (<20/<23 yrs) was linked to more functional limitations at baseline and a faster health decline. Later fatherhood (35+) was associated with better baseline health but also lower grip strength and cognition. Effects varied by European welfare regime.	Worse Health Outcomes: High parity (4+ children), early parenthood. Mixed Outcomes: Later parenthood (associated with both better and worse health indicators). Context: Stronger negative effects of high parity were found in Mediterranean countries compared to Nordic regimes.
[39]	Namdar et al. (2017)	Patients at an infertility clinic (type not specified)	General Health (Anxiety, Depression, Social Dysfuncti	GHQ-28, Quality of Life Questionnaire for Infertile Couples (72	General Health: 61% of women showed impaired general health (score >22). Depression subscale scores were highest (most	Lower QOL was significantly associated with: • Lower education level (P=0.015) • Lower monthly

			on, Somatic Symptoms)	items across 7 domains)	disordered), somatic symptoms were lowest (least disordered). QOL: No women had a "negative" QOL; 2.8% had "quite positive", 49.3% "positive", and 47.9% "neutral" QOL. Spiritual domain scored highest, physical domain scored lowest. A strong negative correlation was found between total QOL and anxiety (r = -0.596).	income (P=0.008) • Rural residency (P<0.001) Lower QOL in rural women was observed across economic, emotional, sexual, physical, and psychological domains. Education and income were not associated with general health scores.
[40]	Sezgin et al. (2016)	Outpatients at an infertility clinic (type not specified)	Anxiety, Depression, Disability, Quality of Life (QOL)	HADS, Brief Disability Questionnaire (BDQ), SF-36	Anxiety/Depression: Mean scores were not significantly different. However, a significantly higher proportion of infertile women had clinically significant anxiety (31% vs 17%, p=0.020). The difference in clinical depression (43% vs 33%) was not significant. Disability: Self-reported disability (BDQ) was significantly worse in the infertile group (p<0.001). QOL (SF-36): Infertile women scored significantly worse on General	Employment Status (within infertile group): Employed infertile women reported more severe depression, anxiety, and poorer QOL (General Health, Vitality, Mental Health) than unemployed infertile women. Other Factors: Higher education and income were associated with less severe depression and anxiety. Longer duration of marriage

					Health, Vitality, Social Functioning, and Mental Health subscales.	was associated with less disability. Age, personal or family psychiatric history were not significant correlates.
[41]	Zivaridelavar et al. (2016)	IVF/ICSI	Anxiety, Depression, Hypochondriasis, Social Impairment	General Health Questionnaire (GHQ-28)	Overall: No significant change in mean scores of anxieties, depression, hypochondriasis, or social impairment from before ovarian induction to after oocyte retrieval. Depression Disorder Rate: The proportion of women with clinically significant depression decreased significantly after oocyte retrieval (39.7% to 31.7%, p=0.007). The rate of anxiety disorder did not change significantly.	Pre-existing State: Anxiety and depression levels after retrieval were significantly correlated with their levels before induction. Economic Status: Higher economic status was significantly associated with lower anxiety after retrieval (p=0.03). Other GHQ Domains: Social impairment and hypochondriasis scores after retrieval were significant predictors of anxiety and depression scores at that time. The number of oocytes retrieved

						was not a significant correlate.
[42]	Hosseinpanahi et al. (2020)	Not specified (various treatments likely)	General Mental Health, Anxiety, Depression, Social Functioning, Physical Symptoms	General Health Questionnaire (GHQ-28), Fertility Quality of Life (FertiQoL)	Mental Health: Significant improvement in overall mental health in intervention group (aMD: -8.4; 95% CI: -10.4 to -6.4; p<0.001). Quality of Life: Significant improvement in overall FertiQoL score in intervention group (aMD: 14.8; 95% CI: 11.8–17.9; p<0.001). Improvements were consistent across subscales and for both genders.	Baseline Values: Mental health and QoL outcomes were adjusted for baseline scores. Gender: Both women and men showed significant improvements. Intervention Type: ACT-based group counseling was effective. No significant demographic predictors were reported.
[43]	Roberts et al. (2020)	Not specified (various treatments likely)	Anxiety, Depression, Stigma, Social Support, Coping, Life Satisfaction	HSCL-10, Infertility Stigma Scale (ISS), Social Provisions Scale (SPS), Brief RCOPE, SWC-R, SWLS	Mental Health: Mean HSCL score (1.98) exceeded clinical cutoff (1.65), indicating significant anxiety/depression. Stigma: High infertility stigma reported (mean ISS=68.4). Intervention Interest: 32% expressed interest in future mental health intervention; this subgroup had higher	Predictors of Poor MH: Longer marriage duration, poorer general health, use of wishful thinking (maladaptive) coping. Not Significant: Education level, domestic violence rates. Social Context: High stigma and pronatalist

					HSCL scores (2.43) and greater family stigma.	norms exacerbated distress. Low autonomy and social support were common.
[44]	Vikström et al. (2015)	IVF	Depression, Anxiety, Somatization, Obsessive-Compulsion, Phobic Anxiety, etc.	Symptom Checklist-90 (SCL-90)	Overall: IVF women had higher depression (p=0.017), obsessive-compulsion (p=0.02), and somatization (p<0.001) vs. reference group. Childless Women: Higher depression (p=0.009) and phobic anxiety (p=0.017) vs. those with biological children. Adoptive Mothers: Mental health similar to biological mothers.	Key Predictors: Childlessness, marital status (divorced/separated), unemployment. Not Significant: Age, same partner status (except for obsessive-compulsion). Context: Majority in good mental health; childless women remain vulnerable long-term.
[45]	Hasan et al. (2023)	Not specified (various treatments)	Depression, Anxiety, Stress, Quality of Life (Physical & Mental)	DASS-21, SF-12	Prevalence: Depression (59.7%), Anxiety (55.0%), Stress (48.7%). QoL: Mean MCS-12=37.95, PCS-12=40.7 (both below US avg of 50).	Depression: Higher in homemakers (OR=2.98) and those with abortion history (OR=1.8). Anxiety: Lower in women married at 20–24 yrs (OR=0.51). Stress: Higher in low-income

						women (OR=2.29). QoL: Lo wer MCS-12 with dual infertility cause; lower PCS-12 with age 26–30 and healthy BMI.
[46]	Sohbati et al. (2021)	Various (Drug, IUI, IVF)	Psycholo gical Well-Being (PWB)	Ryff's Psychologica l Well-Being Scale (18-item)	Overall PWB: Mean total score = 64.75 ± 5.31 (range 18–108), above median (63). Subscales: Highest scores in Environmental Mastery and Self-Acceptance (11.18 ± 1.70); lowest in Positive Relations (10.13 ± 2).	Significant Correlates: Higher education level (p=0.03), longer marriage duration (p=0.01), fewer IVF attempts (p=0.003), and fewer failed IVF pregnancies (p=0.01) were associated with higher PWB. Non-Significant: Age, occupation, spousal education, economic status, place of residence, infertility duration, treatment duration, current treatment type.

[47]	Teklemicheal et al. (2022)	Non-IVF (ovulation drugs, surgery)	Infertility-Related Stress (Personal, Marital, Social)	COMPI-FPSS (Copenhagen Multi-Centre Psychosocial Infertility-Fertility Problem Stress Scales)	Overall Stress Prevalence: 92.71% (95% CI: 87–98%). Subdomain Mean Scores (SD): Personal: 2.74 (0.80), Marital: 1.54 (0.81), Social: 1.90 (0.80). Personal stress was the highest contributor.	Significant Correlates: Older age (>35 yrs), cohabitation (vs. married), childlessness, infertility duration of 4–7 years (vs. 1–3 yrs) were associated with higher stress (all $p < 0.05$). Non-Significant: Education, income, employment, known cause of infertility, past treatment history.
[48]	Wang et al. (2023)	Assisted Reproductive Technology (ART)	Anxiety, Depression, Somatic Symptoms, Sleep Quality	GAD-7, PHQ-9, PHQ-15, PSQI	Incidence: Anxiety: 25.2%; Depression: 31.3%. Risk Factors for Anxiety: Higher education (junior college+, OR=1.6, p=0.003), moderate/severe somatic symptoms (OR=13.3–15.2, p<0.001), poor sleep (OR=9.3, p<0.001). Risk Factors for Depression: Age >35 yrs (OR=0.7, p=0.044), moderate/severe somatic symptoms (OR=13.3–14.8, p<0.001), poor	Significant Correlates: Somatic symptoms and poor sleep quality were strong predictors for both anxiety and depression. Higher education was a risk factor for anxiety; older age (>35) was a risk factor for depression. Non-Significant: Occupation, type of infertility (primary vs. secondary).

					sleep (OR=16.1, p<0.001).	
[49]	Li et al. (2019)	IVF-ET	Infertility-related stress, Resilience, Fertility QoL	FertiQoL, Fertility Problem Inventory (FPI), Connor-Davidson Resilience Scale (CD-RISC)	Mean FertiQoL Score: 64.54 ± 16.90 (relatively low). Household Income & Cause of Infertility: Significantly related to FertiQoL. Infertility-related Stress: Negatively correlated with FertiQoL (r = -0.575, P < 0.01). Resilience: Positively correlated with FertiQoL (r = 0.535, P < 0.01). Moderating Effect: Resilience significantly moderated the stress-QoL relationship (interaction term β = 0.317, P < 0.001). Higher resilience weakened the negative impact of stress on QoL.	Income: Higher monthly income (>4000 yuan) associated with better QoL. Cause of Infertility: Female-factor infertility associated with lower QoL. Resilience: Buffered the negative effect of stress on QoL. Stress: Direct negative predictor of QoL.

[50]	Setswe & Roomaney (2025)	Not specified (patients from public and private fertility centers)	Psychosocial Well-being, Anxiety, Depression, Fertility-related Stress, Relationship Quality	Ryff's Psychological Well-Being Scale (RWS), Hospital Anxiety and Depression Scale (HADS), COMPI Fertility Problem Stress Scales (FPSS), Revised Dyadic Adjustment Scale (RDAS)	Mean Scores: Moderate-high psychosocial well-being (M=193.90), moderate-severe anxiety/depression (M=14.41), moderate fertility-related stress (M=31.59), above-average relationship quality (M=52.26). Regression: Psychosocial factors (anxiety/depression, relationship quality, fertility stress) accounted for 46.5% of variance in well-being (R^2=0.465). Demographic and clinical factors were not significant predictors.	Significant Predictors: Anxiety/Depression (β=-0.44, p<0.001), Relationship Quality (β=0.27, p<0.001), Fertility-related Stress (β=-0.16, p=0.023). Non-Significant: Gender, marital status, education, income, recruitment site, time before seeking help.
[51]	Moutzouroulia et al. (2025)	IVF, ICSI, IUI	Depression, Anxiety (State/Trait), Fertility-related Stress, Quality of Life (QoL)	CES-D, STAI, FPI, FertiQoL	Mean Scores: High FertiQoL scores (Total=87.8–89.2), low depression (CES-D=8.6–8.8), moderate anxiety (STAI-Trait=32.6–33), moderate fertility stress (FPI=54–55.3). Correlations: FPI stress negatively correlated with FertiQoL Treatment (r=-0.18) and Tolerability (r=-0.19) subscales; positively	Positive Predictors of QoL: Older age (β=0.001), higher education (β=0.005), no history of miscarriage (β=-0.007). Negative Predictors: Higher FPI scores (infertility stress) predicted lower treatment tolerability (β=-0.002) and lower treatment QoL

					correlated with depression (r=0.21).	scores (β=-0.002). Previous pregnancy after treatment predicted better emotional and mind-body QoL.
[52]	Kamışlı et al. (2021)	IVF	Hopelessness, Anxiety, Depression	Beck Hopelessness Inventory (BHI), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI)	Overall: High levels of psychological distress were found. Mean scores: BHI=7, BAI=35.41 (severe anxiety), BDI=17.65 (moderate depression). Severity: 80 % had severe anxiety; 44.3% had moderate depression; 27.1% had high hopelessness (BHI≥10).	Negative Correlation: Higher education was significantly correlated with lower anxiety (r=-0.27, p=0.02) and depression (r=-0.36, p=0.002). Positive Correlation: Unemployment was significantly correlated with higher hopelessness (r=0.31, p=0.009), anxiety (r=0.23, p=0.04), and depression (r=0.26, p=0.02). Duration of Infertility: A longer duration of unprotected intercourse was significantly associated with higher anxiety scores (p<0.05).

[53]	Evans-Hoeker et al. (2018)	Ovulation induction (Clomiphene, Letrozole) ± IUI	Major Depression (current, active)	Patient Health Questionnaire (PHQ-9); Medication Use Survey	Female MD: No negative association found. Women with active MD *not* on antidepressants had a slightly *increased* likelihood of pregnancy vs. those without MD (RR 1.38, 95% CI 1.07–1.78). No significant difference in live birth or miscarriage rates. Female Antidepressant Use: Associated with an increased risk of first-trimester miscarriage (RR 1.87, 95% CI 1.18–2.99 for women without active MD). Risk was highest with non-SSRI use. Male MD: Male partners with active MD were less likely to achieve conception (RR 0.44, 95% CI 0.20–0.98).	Negative Correlates (Lower Conception): Active major depression in the male partner. Negative Correlates (Higher Miscarriage): Antidepressant use in women (particularly non-SSRIs). Positive Correlates (Higher Pregnancy): Active major depression in women not using antidepressants. Not Significant: Female MD was not a negative predictor for live birth or pregnancy. Sperm concentration did not differ by male MD status.

[54]	Huang et al. (2019)	IVF	Anxiety, Depression, Sleep Quality	Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI-II), Pittsburgh Sleep Quality Index (PSQI)	Prevalence: 42.9% had mild-to-severe anxiety; 30% had mild-to-severe depression; 43.3% had poor sleep quality (PSQI >5). Sleep Issues: 18.8% took >30 min to fall asleep; 56.2% slept <7 hours/night; 43.6% had sleep efficiency <85%. Association: A strong positive correlation was found between anxiety and poor sleep quality ($r=0.57$, $p<0.01$) and between depression and poor sleep quality ($r=0.54$, $p<0.01$). Linear regression identified anxiety as the major predictor of poor sleep, accounting for 49.4% of the variance ($F=44.85$, $p=0.000$).	Positive Correlates (Poor Sleep): Higher anxiety scores (BAI) were the strongest predictor. Higher depression scores (BDI) were also significantly correlated. Not Significant: Age, education, income, length of infertility, number of previous IVF treatments, and traditional childbearing attitudes were not significant predictors of sleep quality in the final model.

[55]	Marom Haham et al. (2021)	IVF, FET, IUI, Ovulation Induction (all suspended)	Psychological Distress, COVID-19 Anxiety, Emotional Reactions	Mental Health Inventory (MHI-5), study-specific questions on COVID-19 anxiety and social support	Views: 43% disagreed with treatment suspension guidelines; 82% were willing to resume treatment if given the choice. Emotions: Sadness (66%), anxiety (60%), and helplessness (60%) were the most common reactions. Distress: Higher COVID-19-related anxiety (B=0.145, p=0.04) and disagreement with suspension (B=-0.44, p=0.001) were significantly associated with greater psychological distress.	Positive Correlates (Higher Distress): Higher COVID-19-related anxiety. Disagreement with the decision to suspend treatments. Not Significant: Background characteristics (age, income, infertility diagnosis, treatment history) did not significantly contribute to distress levels. Higher income and female-factor infertility were associated with disagreement with suspension guidelines.
[56]	Yokota et al. (2022)	Various (including IVF/ICSI and other treatments)	Anxiety, Depression, Psychological Distress	Infertility Stigma Scale (ISS), Hospital Anxiety and Depression Scale (HADS)	Stigma was a significant predictor of anxiety (β=0.58, p<0.001), depression (β=0.50, p<0.001), and psychological distress (β=0.62, p<0.001). Living with parents also predicted higher anxiety and distress. Longer infertility duration	Stigma, living with parents, duration of infertility.

					predicted lower depression.	

Table 3: Risk of bias in included studies (n=40).

Author(s)/Year	Sample representativeness	Sample technique	Sample size	Subjects settings	Ascertainment of Mental health	Measurement of the Mental health	Statistical analysis	Response rate	Total Score	Risk of bias
Raguz et al., 2014	1	1	1	1	1	1	1	1	8	Low
Saleem S et al./2019	1	1	1	1	1	1	1	1	8	Low
Prasad et al. (2017)	1	1	1	1	1	1	1	1	8	Low
Yusuf L. (2016)	1	1	1	1	1	1	1	1	8	Low
Rahimi et al. (2021)	1	1	1	1	1	1	1	1	8	Low
Holley et al. (2015)	1	1	1	1	1	1	1	1	8	Low
Cesta et al. (2016)	1	1	1	0	1	1	1	1	7	Low

Patel A. et al. (2016)	1	1	1	1	1	0	1	0	6	Moderate
Bakhtiyar K. et al. (2019)	1	1	1	1	1	1	1	1	8	Low
Pasch et al. (2016)	1	1	1	1	1	1	1	1	8	Low
Wu et al. (2020)	1	1	1	1	1	0	1	0	6	Moderate
Alam et al. (2018)	1	1	1	1	1	1	1	1	8	Low
Alosaimi et al. (2015)	1	1	1	1	1	0	1	1	7	Low
Crawford et al. (2017)	1	1	1	1	1	0	1	1	7	Low
Pedro et al. (2019)	1	1	1	1	1	1	1	1	8	Low
Gordon & Balsom (2020)	1	1	1	1	1	1	1	1	8	Low
Patel et al. (2018)	1	1	1	1	1	1	1	1	8	Low
Khan et al. (2019)	1	1	1	1	1	1	1	1	8	Low
Catalao et al. (2020)	1	1	1	1	1	0	1	1	7	Low
Shargh et al. (2016)	1	1	1	1	1	1	1	1	8	Low

Jiang & Yang (2022)	1	1	1	1	1	0	1	1	7	Low
Keenan & Grundy (2019)	1	1	1	1	1	1	1	1	8	Low
Namdar et al. (2017)	1	1	1	1	1	1	1	1	8	Low
Sezgin et al. (2016)	1	1	1	1	1	1	1	1	8	Low
Zivaridelavar et al. (2016)	1	1	1	1	1	1	1	1	8	Low
Hosseinpanahi et al. (2020)	1	1	1	1	1	1	1	1	8	Low
Roberts et al. (2020)	1	1	1	1	1	1	1	1	8	Low
Vikström et al. (2015)	1	1	1	1	1	1	1	1	8	Low
Hasan et al. (2023)	1	1	1	1	1	1	1	1	8	Low
Sohbati et al. (2021)	1	1	1	1	1	1	1	1	8	Low
Teklemicheal et al. (2022)	1	1	1	1	1	1	1	1	8	Low
Wang et al. (2023)	1	1	1	1	1	1	1	1	8	Low

Li et al. (2019)	1	1	1	1	1	1	1	1	8	Low
Setswe & Roomaney (2025)	1	1	1	1	1	1	1	1	8	Low
Moutzouroulia et al. (2025)	1	1	1	1	1	1	1	1	8	Low
Kamışlı et al. (2021)	1	1	1	1	1	1	1	1	8	Low
Evans-Hoeker et al. (2018)	1	1	1	1	1	1	1	1	8	Low
Huang et al. (2019)	1	1	1	1	1	1	1	1	8	Low
Marom Haham et al. (2021)	1	1	1	1	1	1	1	1	8	Low
Yokota et al. (2022)4	1	1	1	1	1	1	1	1	8	Low