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Infertility and Grief: The Psychological Toll on Women's Mental Health

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Abstract

Infertility poses a significant psychological burden on women, yet its mental health impacts are often overlooked, necessitating a comprehensive review to consolidate existing evidence and inform care strategies. The emotional toll of infertility, compounded by societal stigma and treatment-related stress, underscores the urgent need to address gaps in support and intervention. This review highlights the critical intersection of infertility, grief, and mental health, calling for greater awareness and tailored approaches to mitigate long-term distress. The review reveals elevated rates of depression (31 to 60%) and anxiety (25 to 75%) among infertile women, with grief often manifesting as disenfranchised and persistent. Key risk factors include treatment failures, lack of spousal support, and socioeconomic disparities, while protective factors such as resilience and mindfulness show promise in alleviating distress. Psychological interventions, including cognitive behavioral therapy and couples counseling, demonstrate efficacy but remain underutilized. The cyclical nature of infertility-related grief exacerbates emotional suffering, particularly in cultures where motherhood is central to identity. Quality of life is significantly impaired across emotional, social, and physical domains, with long-term effects persisting even after resolution. Future research should prioritize cross-cultural studies to examine societal influences on grief expression and recovery. Longitudinal investigations are needed to assess the durability of interventions and the neurobiological impacts of chronic infertility-related stress. Policymakers and clinicians must integrate mental health care into fertility treatment protocols, ensuring accessible, culturally sensitive support for this vulnerable population.

Keywords: Anxiety, Depression, Grief, Infertility, Mental health, Psychological distress, Quality of life, Resilience

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Introduction

Infertility affects approximately 1 in 6 couples globally and represents a significant reproductive health challenge with profound psychological consequences [1-4]. The relationship between infertility and mental health is complex and bidirectional, with psychological distress both resulting from and potentially contributing to fertility challenges [5-9]. This analysis examines the comprehensive psychological impact of infertility on women's mental health, drawing from recent research to understand prevalence, mechanisms, risk factors, interventions, and long-term outcomes [10-12].

The psychological toll of infertility on women's mental health has garnered increasing attention in recent literature, highlighting a complex interplay of emotional distress, grief, and societal pressures (Figure 1) [13-17]. Several studies underscore that infertility is associated with significant psychological challenges, including depression, anxiety, and grief, which can adversely affect women's overall well-being [18]. Research by de Castro et al. [19] systematically reviews the psychosocial aspects of gestational grief among women undergoing infertility treatment, revealing that women often experience profound negative psychosocial responses, including feelings of loss and mourning related to their inability to conceive. Similarly, Bose et al. [20] explore gender differences in psychological factors among infertile couples, emphasizing that women tend to experience higher levels of fertility-related stress, which impacts their quality of life.

The broader mental health implications of infertility are further supported by Hazlina et al. [18], who highlight an increasing prevalence of mental disorders among women with infertility, suggesting that these issues are often overlooked despite their severity. Longitudinal data from Bagade et al. [21] also demonstrate a steady rise in infertility reports over 18 years, correlating with increased psychological distress among women, emphasizing the persistent and escalating mental health burden. The COVID-19 pandemic has intensified these psychological challenges, with studies indicating heightened anxiety, depression, and grief among women facing fertility disruptions. Gordon et al. [22] discussed the psychological impact of fertility treatment suspensions during the pandemic, noting that such disruptions exacerbate feelings of loss and uncertainty. Similarly, Kinser et al. [23] report elevated levels of depression and anxiety among pregnant and postpartum women during the early pandemic phase, reflecting the broader mental

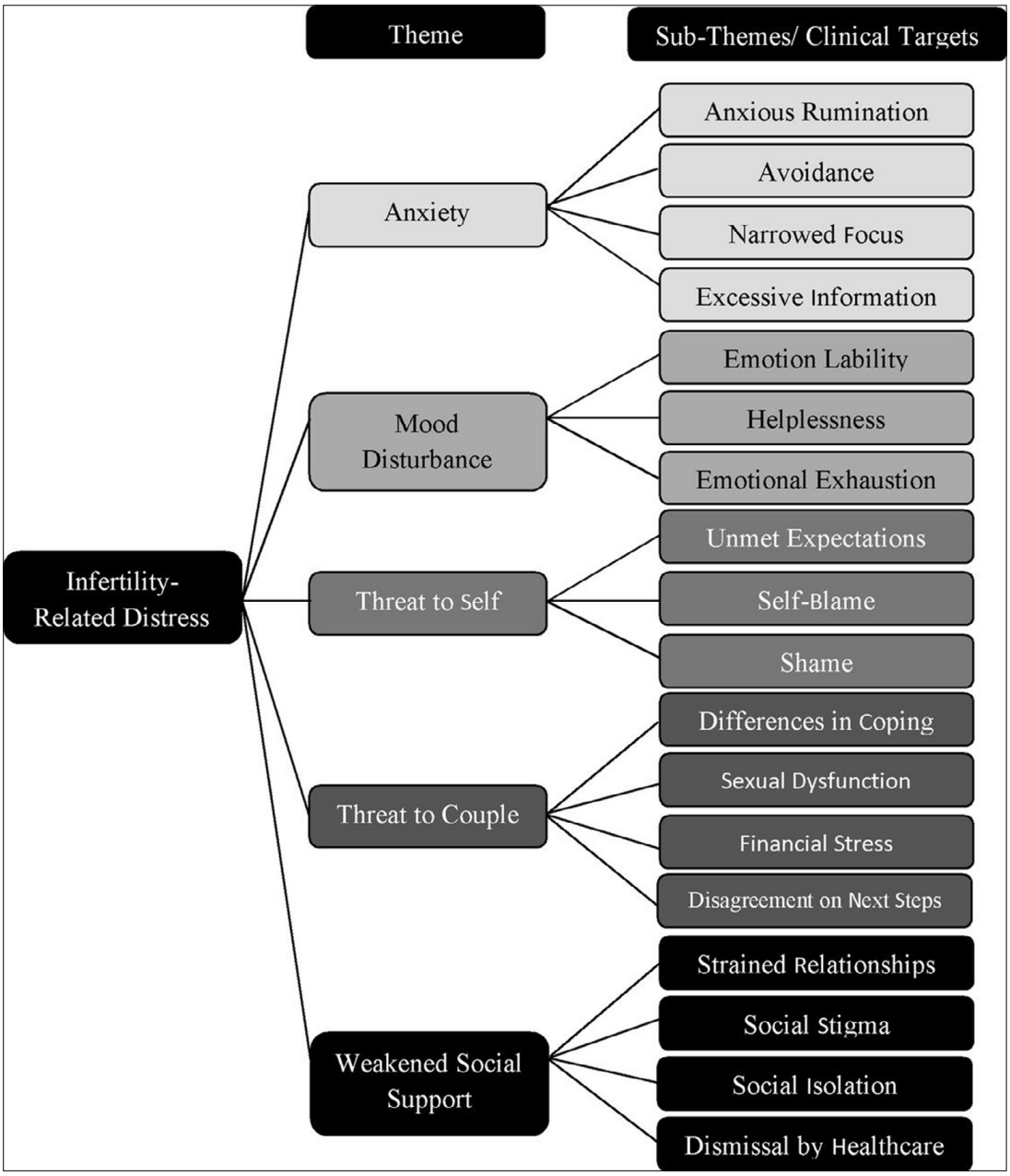

Figure 1: Infertility-related distress in women [13].

health vulnerabilities experienced by women during this period.

Qualitative insights from Diallo et al. [24] provide a nuanced understanding of the psychosocial burden faced by infertile women, emphasizing feelings of social isolation, stigma, and emotional distress rooted in cultural contexts. These findings collectively underscore that infertility-related grief is not only a personal emotional experience but also deeply embedded in social and cultural frameworks, which can intensify psychological suffering. Overall, the literature consistently indicates that infertility is associated with significant psychological distress, including grief, depression, and anxiety, which profoundly impact women's mental health. The COVID-19 pandemic has further amplified these issues, highlighting the need for targeted psychological support and interventions to address the complex emotional landscape faced by women experiencing infertility [25-27].

Types of Mental Health Issues

Infertility affects millions of women globally and represents a significant public health concern with profound psychological implications [28-30]. Research consistently demonstrates that women experiencing infertility face substantially higher rates of mental health disorders compared to their fertile counterparts [9]. The psychological burden encompasses various conditions including depression, anxiety, stress-related disorders, and grief reactions, with prevalence rates varying across different populations and study methodologies.

Depression and anxiety rates

Research consistently demonstrates elevated rates of mental health disorders among infertile women compared to fertile controls

(Table 1). A large-scale Chinese study of 1,712 women undergoing assisted reproductive technology found anxiety prevalence of 25.2% and depression prevalence of 31.3% [43]. Another comprehensive review reported that 60% of patients suffer from depression, with 75% experiencing anxiety disorders [44]. Case-control studies reveal significant differences between infertile and fertile women. One study of 100 infertile women compared to 100 fertile controls found significantly higher levels of anxiety, depression, and stress in the infertile group across all measured domains [9]. Similarly, a study of 112 infertile women found that 62.5% showed different levels of depression, with 32.1% experiencing moderate to severe depression, while 37.5% suffered from anxiety disorders [45].

Studies utilized standardized assessment tools including the depression anxiety and stress scale (DASS-21), patient health questionnaire-9 (PHQ-9), beck depression inventory, and Goldberg depression questionnaire to measure depressive symptoms in infertile women [9, 43, 45]. Depression prevalence among infertile women shows considerable variation across studies: (i) 31.3% of infertile women in a Chinese study of 1,712 participants experienced depression [43], (ii) 62.5% of infertile women showed different levels of depression in a Bangladeshi study, with 10.7% having minor to moderate depression and 32.1% experiencing moderate to severe depression [45], and (iii) 60% of patients with prolonged infertility, particularly after unsuccessful *in-vitro* fertilization (IVF) cycles, suffer from depression [44]. Comparative studies demonstrate significantly higher depression rates in infertile versus fertile women. One study found that infertile women had 'significantly higher number of women with anxiety, depression, and stress' compared to fertile controls [9].

Anxiety assessment employed instruments such as the generalized anxiety disorder-7 (GAD-7), Beck anxiety inventory, and Hamilton anxiety rating scale across multiple populations [43, 45]. Anxiety prevalence rates among infertile women include: (i) 25.2% in a large Chinese cohort study [43], (ii) 37.5% in a Bangladeshi population, with 12.5% having moderate anxiety and 25.0% experiencing potentially concerning levels [45], and (iii) 75% experiencing anxiety disorders alongside sexual dysfunction in women with multiple failed IVF attempts [44]. Studies consistently show that 'infertile women experienced higher levels of anxiety' compared to fertile women, with anxiety being particularly pronounced during treatment phases [9].

Quality of life impairment

Infertility substantially impacts quality of life across multiple domains. Research using the WHOQOL-BREF scale demonstrated that fertile women had significantly better quality of life compared to infertile women across physical, psychological, social, and environmental domains ($p < 0.001$) [9]. A tertiary care study found poor quality of life with a mean FertiQOL score of 45.42, alongside severe emotional distress with a mean DASS score of 78 [46].

A study by Wotango et al. [47] conducted a comparative cross-sectional analysis to assess health-related quality of life (HRQoL) between infertile and fertile women, revealing significant differences and identifying factors associated with HRQoL among infertile women. Infertile women had a significantly lower mean total HRQoL score (66.54 ± 10.18) compared to fertile women (72.68 ± 7.57). This difference was statistically significant between the two groups. All HRQoL domains, with the exception of the physical domain, showed significant differences between infertile and fertile women. This indicates that infertility primarily impacts emotional well-being, social functioning, and psychological health, rather than just physical health. Multiple linear regression analysis identified several factors significantly associated with the quality of life of infertile women, explaining 72.5% of the variance ($R^2 = 0.725$). These factors, listed in decreasing order of their effect, include: (i) duration of marriage had the strongest negative association with HRQoL ($\beta = -0.529$), (ii) number of previous sexual partners also showed a negative association ($\beta = -0.410$), (iii) total number of working hours per day negatively associated with HRQoL ($\beta = -0.345$), (iv) types of infertility demonstrated an association ($\beta = -0.34$), and (v) history of sexually transmitted disease also had a negative association ($\beta = -0.277$). These findings underscore the profound impact of infertility on various aspects of a woman's life beyond the physical, emphasizing the need for healthcare providers to address the psychological and social dimensions of infertility.

Specific psychological manifestations

Infertility poses a threat to self-esteem, identity, and purpose, as women often associate their self-worth with their ability to conceive [13]. This can lead to feelings of inferiority and social withdrawal, as evidenced by 66.8% of women feeling inferior and 46.3% experiencing social withdrawal in a Nigerian study [48]. Infertility can strain marital relationships, leading to reduced intimacy, frequent quarrels, and even threats of divorce. In a study, 57.7% of women reported reduced closeness with their partners, and 79.3% experienced frequent misunderstandings [48]. Social support networks may weaken, as infertile women often feel isolated and stigmatized. This isolation is exacerbated by societal expectations and the perceived failure to fulfill traditional roles [13].

Comprehensive psychological assessment utilized tools including the Australian Longitudinal Study on Women's Health

Table 1: Prevalence of depression in infertile women.

Country/Income level	No. of people	Avg. years of infertility (mean ± SD)	Age (Y) (mean ± SD)	Assessment tool	Depression prevalence (%)	Quality of assessment (out of 5)	Ref.
Malaysia (low and middle)	123	-	-	DASS	31.7	4	[31]
China (low and middle)	460	5.60±3.20	29.12 ± 4.36	ZDS	14.8	3	[32]
United States (high)	104	-	35.87 ± 0.4	BDI	63	3	[33]
Turkey (low and middle)	160	5.23±3.42	25.23 ± 3.25	BDI	65	3	[34]
Tunisia (low and middle)	100	5.19 ± 4.62	32.69 ± 4.91	HADS	33	3	[35]
India (low and middle)	140	-	28.70 ± 5.94	HADS	56.4	3	[36]
Vietnam (low and middle)	401	3.10 ± 2.20	30.41 ± 4.47	PHQ-9	12.2	4	[37]
Norway (high)	1413	-	-	HADS	6.4	3	[38]
Pakistan (low and middle)	100	-	24.60 ± 5.40	DASS	79	3	[39]
Sweden (high)	468	1.8 ± 002	30.1 ± 4.8	HADS	15.7	5	[40]
Hungary (high)	134	3.61 ± 3.08	33.30 ± 4.85	BDI	44.8	3	[41]
Iraq (low and middle)	251	-	24.26 ± 8.5	ICD-10	68.9	4	[42]

data, WHOQOL-BREF questionnaire, and various fertility-specific distress measures. A large-scale Australian longitudinal study of 6,582 women found that approximately 50% of women reporting primary or secondary infertility experienced psychological distress. The study found that approximately half of women reporting primary or secondary infertility experienced psychological distress [21]. The study revealed increased odds of psychological distress in women with primary infertility (odds ratios (OR) 1.24, 95% confidence interval (CI): 1.06 to 1.45), secondary infertility (OR 1.27, 95% CI: 1.10 to 1.46), and even resolved infertility (OR 1.15, 95% CI: 1.05 to 1.26) [21].

While the psychological impact of infertility is profound, it is essential to consider the broader context of these findings. Cultural, social, and individual factors play a significant role in shaping the psychological experiences of infertile women. For instance, societal expectations regarding motherhood can exacerbate feelings of inadequacy and stress. Conversely, supportive environments and effective psychological interventions can mitigate some of these negative effects. Understanding these dynamics is crucial for developing comprehensive care strategies that address both the physical and psychological needs of infertile women.

Infertility-related Grief and Psychological Distress

Nature of grief experience

Infertility-related grief is a profound and often overlooked emotional response that stems from the loss of the envisioned future of parenthood. Unlike traditional grief associated with death, this form of grief is frequently 'disenfranchised,' meaning it lacks societal recognition or validation [4]. Women experiencing infertility may feel isolated in their sorrow, as their loss is intangible and not openly acknowledged by others. This disenfranchisement can exacerbate feelings of loneliness and shame, as societal norms often fail to provide the same support systems available for other types of loss. The grief is further compounded by the cyclical nature of infertility treatments, where hope and disappointment alternate, creating a relentless emotional rollercoaster.

The experience of infertility-related grief is multifaceted, encompassing not only the loss of biological parenthood but also the erosion of self-identity and societal roles [49-51]. Many women internalize their inability to conceive as a personal failure, leading to diminished self-worth and existential distress [52, 53]. The absence of rituals or formal avenues to mourn this loss leaves women grappling with unresolved emotions, which can manifest as anxiety, depression, or prolonged psychological distress. Qualitative studies highlight that this grief is often intertwined with feelings of envy, guilt, and anger, particularly in social settings where pregnancy and motherhood are celebrated. Understanding the unique nature of this grief is crucial for developing empathetic and effective support systems that address both the emotional and psychological needs of affected women [54-56]. A qualitative study identified five core themes of infertility-related distress: anxiety, mood disturbance, threat to self-esteem and identity, deterioration of couple relationships, and weakened support networks [13].

Relationship between grief and mental health

An estimated 30 to 40% of women attending infertility tertiary care facilities experience clinically significant depression and anxiety [13]. The psychological burden includes stress, grief, inability to focus, insomnia, anxiety, withdrawal from others, hopelessness, guilt, and shame [4]. Research indicates that infertility-specific distress is experienced more intensely by women with existing anxiety and depression, though a substantial proportion of those without mental health conditions also report high distress levels [57].

The psychological burden of infertility-related grief is closely linked to heightened levels of depression and anxiety, creating a cyclical relationship where grief exacerbates mental health struggles and vice versa [58-60]. Studies indicate that women experiencing infertility often exhibit symptoms of clinical depression, including hopelessness, guilt, and withdrawal, which are intensified by the unresolved nature of their grief. The lack of social recognition for their loss can lead to internalized distress, making it difficult for women to seek help or process their emotions healthily. This emotional turmoil is further compounded by the stress of medical treatments, financial pressures, and societal expectations, all of which contribute to a deteriorating mental state.

Moreover, grief in infertility is not static but evolves with each failed treatment or pregnancy loss, deepening psychological distress over time. Women with pre-existing mental health conditions are particularly vulnerable, as infertility-related grief can trigger or worsen symptoms. However, even those without prior mental health issues report significant distress, underscoring the pervasive impact of infertility. Research suggests that grief-specific interventions, such as counseling and support groups, can mitigate these effects by providing validation and coping strategies [61-63]. Addressing the intersection of grief and mental health is essential for holistic care, as untreated emotional suffering can hinder both psychological well-being and treatment outcomes.

Persistent nature of distress

Importantly, the psychological impact persists even after infertility resolution. The Australian longitudinal study demonstrated that women with resolved infertility continued to have elevated odds of psychological distress (OR 1.15), indicating lasting mental health effects [21]. The psychological distress associated with infertility often extends far beyond the resolution of fertility challenges, leaving lasting emotional scars even for women who eventually conceive or choose alternative paths to parenthood. Longitudinal studies reveal that many women continue to experience symptoms of anxiety, depression, and unresolved grief long after their infertility journey concludes. This persistence can be attributed to the profound identity shift and trauma associated with prolonged fertility struggles, which may resurface during milestones such as child-rearing, menopause, or interactions with peers who conceived effortlessly. The enduring nature of this distress highlights the need for long-term mental health support, as the emotional impact of infertility does not simply vanish with pregnancy or adoption [64-66].

Furthermore, societal narratives that equate resolution with 'closure' often overlook the complex, lingering emotions that infertile women carry. Even after achieving parenthood, some women report feelings of inadequacy, fear of loss, or resentment toward their past struggles, which can affect their parenting experiences and overall well-being [67-70]. The Australian longitudinal study underscores this phenomenon, showing elevated psychological distress in women with resolved infertility, suggesting that the trauma of infertility leaves an indelible mark [21]. Recognizing the persistent nature of this distress is critical for healthcare providers, as it calls for ongoing therapeutic interventions and support networks tailored to address the long-term psychological consequences of infertility.

While the profound psychological toll of infertility-related grief, demonstrating its disenfranchised nature, strong links to depression and anxiety, and persistent effects that often endure beyond resolution. Future prospects include integrating grief-specific counseling into fertility care, developing long-term mental health support for women post-treatment, and fostering societal awareness to validate this unique form of loss. Research should further explore resilience-building interventions and the longitudinal impacts of infertility grief to improve holistic care models.

Prevalence of Psychological Distress Among Infertile Women

Infertility is a significant stressor for women, often leading to heightened levels of anxiety and depression. The prevalence of these mental health issues among infertile women is notably higher compared to their fertile counterparts. Various studies have explored this phenomenon, revealing a complex interplay of factors that contribute to the psychological distress experienced by these women. The following sections delve into the prevalence rates, associated factors, and the need for psychological support for women facing infertility

A study by Alosaimi et al. [71] provides insights into the prevalence and correlates of psychiatric disorders among infertile women in Riyadh, Saudi Arabia. While only 10.2% of women self-reported having a psychiatric disorder, a significantly higher percentage, 36.9%, were found to have psychiatric illnesses when assessed using the Mini International Neuropsychiatric Interview scale. This disparity suggests that women may minimize their psychological distress or receive inadequate psychological care. Among all participants, depression (21.7%) and anxiety (21.2%) were the most common psychiatric disorders. Specifically, for women, depression was observed in 26.2% and anxiety in 21.8%. Women exhibited significantly higher rates of suicidality (15.5%) and depression (26.2%) compared to men (1.0% and 17.0% respectively). There was no significant difference in the frequency of anxiety or psychotic disorders between women and men. For infertile women, a lower monthly income was significantly associated with the presence of psychiatric disorders. Among women with psychiatric disorders, 28.9% had a monthly income of less than 5000 Saudi Riyals, and an additional 40.8% had an income between 5000 and 10000 Saudi Riyals. A longer duration of desiring to have children was significantly correlated with anxiety disorders in women. The number of years desiring to have children was significantly higher among female patients who had psychiatric disorders (6.21 years) compared to those without (4.84 years). A long duration of delayed childbirth was also significantly correlated with anxiety disorders in women. Anxiety disorders in women were significantly correlated with their place of residence. Suicidality was also significantly correlated with the place of residence. The mean age of female patients with a psychiatric disorder was 32.0 years, which was not significantly different from those without psychiatric disorders (31.3 years). However, female patients with psychiatric disorders were significantly older than their male counterparts. The mean marriage duration for women was 8.2 years, which was significantly longer than for men (6.8 years). No significant difference in the duration of marriage was observed between women with and without psychiatric disorders. Nearly two-thirds (70.4%) of the females had secondary or university level education. The level of education was positively correlated with the frequency of psychiatric disorders in both genders. A high percentage of female participants (68.0%) were unemployed. In conclusion, infertile women in Saudi Arabia experience a high prevalence of psychiatric disorders, particularly depression and anxiety, often underreported. These conditions are notably influenced by socioeconomic factors such as lower income and polygamy, as well as the duration of their desire for children.

A study by Hasan et al. [72] found high prevalence rates of mental health issues among infertile women receiving fertility treatment in Bangladesh: depression: 59.7%, anxiety: 55.0%, and stress: 48.7%. Infertile homemakers had significantly higher odds of depression compared to government service holders, specifically 2.98 times the odds (95% CI: 1.30 to 6.80). Infertile women who had experienced an abortion were 1.8 times more likely to experience depression (95% CI: 1.10 to 3.26). Women who married between 20 and 24 years old were found to be 49% less anxious than those who married earlier (95% CI: 0.27 to 0.98). Low-income infertile women (earning less than 30,000 BDT) were 2.29 times more likely to experience stress compared to those with higher incomes (more than 60,000 BDT) (95% CI: 1.02 to 5.14). Education level and the status of infertility diagnosis significantly influenced the mental component summary-12 scores of the short form-12. Age, occupation, and body mass index were identified as significant predictors for the physical component summary-12 scores. These findings highlight the substantial mental health burden faced by infertile women in Bangladesh and identify several demographic and socioeconomic factors that contribute to depression, anxiety, and stress, as well as impact their quality of life. The study suggests that policymakers could use these insights to develop targeted interventions, such as counseling, awareness campaigns, and media involvement, to mitigate the psychological impact of infertility.

A study by Upkong and Orji [73] investigated the prevalence of psychiatric morbidity and associated factors in infertile women in Nigeria. A significant prevalence of psychiatric morbidity was observed among infertile women, with 46.4% identified as cases based on the general health questionnaire (GHQ-30). Specifically, 37.5% of infertile women were identified as cases of anxiety, and 42.9% were cases of depression. Women suffering from infertility scored significantly higher on all outcome measures of psychopathology compared to the control group. The sociodemographic variables of infertile women contributed to the prediction of psychiatric morbidity (GHQ-30 score). Age was identified as a contributing factor. Not having at least one child was a significant predictor. Poor support from the spouse was a significant predictor. These variables collectively accounted for a notable portion of the variance in psychiatric morbidity ($R^2 = 0.26$, Adjusted $R^2 = 0.19$, $F(10,101) = 3.57$, $p = 0.001$). Lack of support from the husband specifically predicted both depression and anxiety. Several factors were found not to be predictors of mental ill health in this study: (i) low level of education, (ii) polygamous marriage, (iii) unemployment, (iv) lack of support from in-laws, and (v) duration of illness. In conclusion, the study highlights that infertility is strongly associated with high levels of psychiatric morbidity, particularly anxiety and depression. Factors such as age, not having children, and lack of spousal support are significant predictors of poor mental health in infertile women in Nigeria.

A study by Omani-Samani et al. [74] investigated the prevalence of GAD and its associated factors among infertile patients in Tehran, Iran. The findings indicate a significant presence of GAD within this population, with certain demographic and fertility-related variables playing a key role. The mean total GAD-7 score among the participants was 6.61 (standard deviation (SD) = 5.32). Using a cut-off value of 10 on the GAD-7 scale, the prevalence of GAD was determined to be 28.3% (n = 324). The distribution of GAD-7 scores by severity was as follows: (i) no anxiety: 43.1%, (ii) mild anxiety: 28.6%, (iii) moderate anxiety: 19.1%, and (iv) severe anxiety: 9.2%. Factors associated with

GAD. Female patients were found to be 2.54 times more likely to have GAD compared to men (OR = 2.54, 95% CI: 1.88 to 3.42, p < 0.001). This finding is consistent with general population studies where GAD is more common in women. Individuals with primary or secondary education were 1.45 times more likely to have GAD than those with a university education (OR = 1.45, 95% CI: 1.08 to 1.94, p = 0.012). This suggests that higher education may provide more information and awareness, potentially mitigating anxiety. Each one-year increase in the duration of infertility was associated with 5% increased odds of being anxious (OR = 1.05, 95% CI: 1.01 to 1.09, p = 0.013). Patients who had experienced at least one failure in previous infertility treatments were 1.52 times more likely to have GAD (OR = 1.52, 95% CI: 1.13 to 2.04, p = 0.006). Participants with a partner-related cause of infertility were less likely to have GAD compared to those with self-cause infertility, though this difference was not statistically significant (OR = 0.76, 95% CI: 0.53 to 1.09, p = 0.134). In conclusion, the study highlights that GAD is a significant concern among infertile patients, particularly women, those with lower educational attainment, longer infertility duration, and a history of treatment failure. The findings underscore the importance of screening and treating GAD symptoms in this patient group.

A study by Mulondo et al. [75] included 100 infertile women who completed questionnaires, revealed significant findings regarding the prevalence and severity of depression and anxiety among this population attending an academic hospital in central South Africa. 42.0% of the patients were over 35 years old. 58.0% of the participants were married, with 8.6% of these being in a polygamous marriage. 53.0% of the women had never been pregnant before. The prevalence of depression was found to be 53.0%. Among those with depression, 45.0% exhibited moderate to moderately severe levels of depression. A statistically significant association was observed between the level of education and depression (p < 0.025). Half of the participants (50.0%) screened positive for anxiety. Of those with anxiety, 24.0% experienced severe anxiety. 40.0% of the participants screened positive for both anxiety and depression. No statistically significant association was found between depression or anxiety and age, duration of infertility, marital status, or employment status. In summary, the study highlights that depression and anxiety are highly prevalent among infertile women, with a substantial portion experiencing moderate to severe forms of these conditions. While education level showed an association with depression, other sociodemographic factors like age, duration of infertility, marital status, and employment status did not show significant associations with either depression or anxiety.

A study by Regmi et al. [76] conducted among infertile and non-infertile women in Gandaki province, Nepal, revealed several significant differences and determinants related to infertility and quality of life. The prevalence of infertility was found to be 9.1% among the study participants. Of these, 43.5% experienced primary infertility, while 56.5% had secondary infertility. Infertile women had a significantly higher mean age of marriage compared to non-infertile women (p < 0.001). The average body mass index score was significantly higher in infertile women than in non-infertile women (p < 0.001). Infertile women reported significantly higher average perceived stress scores (28.9 ± 4.61) compared to non-infertile women (25.27 ± 3.36). Anxiety scores were also significantly higher among infertile women (8.71 ± 3.0) than non-infertile women (7.78 ± 2.89). Similarly, infertile women had significantly higher average depression scores (8.14 ± 2.67) compared to non-infertile women (6.86 ± 2.49). The total and subscale-wise perceived social support score of infertile women was significantly lower than that of non-infertile women (p < 0.001). The overall and inter-domain quality of life score of infertile women was significantly lower than that of non-infertile women (p < 0.001). Factors significantly associated with infertility at 95% CI included family planning methods used before the first child (adjusted odds ratio (AOR)-16.59, p = 0.025), occupation (AOR-16.88, p = 0.023), and induced abortion (AOR-0.086, p = 0.047). For infertile women, perceived stress (AOR-10.13, 95% CI: 3.52 to 29.18) and perceived social support (AOR-3.412, 95% CI: 1.15 to 10.101) were identified as important determinants of their quality of life. Among non-infertile women, moderate to severe depression (AOR-14.61, 95% CI: 2.37 to 89.96), mild depression (AOR-3.42, 95% CI: 1.08 to 10.86), perceived social support (AOR-4.94, 95% CI: 1.51 to 16.14), and reproductive health problems (AOR-3.539, 95% CI: 1.01 to 12.46) were found to be determinants of quality of life. In summary, the study highlights that infertile women experience poorer quality of life, higher psychological distress, and lower social support compared to non-infertile women, with specific factors influencing both infertility status and quality of life outcomes in both groups.

While the prevalence of anxiety and depression is notably high among infertile women, it is important to consider that not all women with infertility experience these mental health issues. Some women may have strong support systems or effective coping strategies that mitigate the psychological impact of infertility. Additionally, achieving a successful pregnancy can alleviate some of the mental health burdens associated with infertility, although the psychological effects may persist for some women even after conception.

Risk Factors for Mental Health Impact

Infertility is a significant stressor for women, often leading to various mental health challenges. The psychological impact of infertility is profound, with many women experiencing anxiety, depression, and stress. Several factors increase vulnerability to psychological distress among infertile women (Table 2) [77-80]. Understanding these risk factors is crucial for providing comprehensive care to infertile women.

Table 2: Risk factors for mental health impact in women with infertility.

Category	Risk factors	Associated outcomes	Protective factors	Intervention strategies
Demographic and clinical	• Age ≥35 years • Longer infertility duration • Lower SES/education	• Higher depression/anxiety • Reduced quality of life	• Higher income stability • Social support networks	• Financial counseling • Community support programs
Treatment-related	• Female-factor infertility • Failed IVF cycles • Treatment disruptions	• Guilt, sexual dysfunction • Chronic stress	• Clear communication from clinicians • Realistic goal setting	• Psychoeducation • Coping skills training
Social and relational	• Spousal neglect • Social stigma • Polygamous marriage	• Suicidality, marital conflict • Social withdrawal	• Strong partner support • Cultural competency in care	• Couples therapy • Anti-stigma campaigns
Psychological	• Preexisting mental illness • Low resilience • Poor sleep/somatic symptoms	• Persistent distress • Treatment non-adherence	• Mindfulness practice • High self-efficacy	• Cognitive behavioral/dialectical behavior therapies • Sleep hygiene programs

Demographic and clinical factors

- Age and duration: Women over 35 years are more prone to depression, while longer infertility duration correlates with increased psychological symptoms [43, 81]. The Chinese study found that individuals experiencing adverse life events had a 2.42-fold increased risk of developing depressive symptoms (Figure 2) [81].

- Educational and socioeconomic factors: Higher education levels (junior college degree or above) were associated with increased anxiety risk (OR 1.6, 95% CI: 1.2 to 2.1) [43]. Conversely, women in paid employment had significantly lower odds of psychological distress [21].

- Physical health factors: Somatic symptoms and poor sleep quality emerged as significant risk factors for both anxiety and depression. Severe somatic symptoms increased anxiety risk 15.2-fold (OR 15.2, 95% CI: 5.6 to 41.3), while poor sleep quality increased anxiety risk 9.3-fold [43].

Lifestyle and health-related risk factors

- Lifestyle factors such as smoking, high-risk alcohol use, and body weight (either underweight or higher body mass index) are associated with higher odds of psychological distress in infertile women [21].

- Poor sleep quality and severe somatic symptoms are significant risk factors for both anxiety and depression in infertile women [43].

- Chronic physical illnesses, including diabetes, high blood pressure, and asthma, are independently associated with higher odds of psychological distress in women with infertility [21].

Variable	N	Odds ratio	p
Age(years)			
20~25	7	Reference	
26~30	82	2.58 (0.46, 16.11)	0.28
31~40	196	2.86 (0.52, 17.61)	0.23
>40	34	2.90 (0.45, 20.86)	0.27
Residence			
City	278	Reference	
Countryside	41	1.31 (0.58, 3.17)	0.53
Pregnancy history			
No	190	Reference	
Yes	129	1.07 (0.63, 1.82)	0.81
Monthly household income(￥)			
<30000	33	Reference	
30000～80000	112	1.12 (0.43, 2.81)	0.81
80000～150000	106	0.84 (0.31, 2.13)	0.71
150000～300000	53	0.39 (0.13, 1.08)	0.08
>300000	15	1.30 (0.31, 5.87)	0.72
Highest education level attained			
Junior high school	52	Reference	
Senior high school	91	1.43 (0.60, 3.38)	0.41
Bachelor	156	0.77 (0.33, 1.72)	0.52
Master	20	0.58 (0.17, 2.01)	0.39
Major mental trauma in the past year			
Yes	40	Reference	
No	279	0.41 (0.17, 0.92)	0.04
Infertility time(years)			
≤1 year	61	Reference	
2-3 years	80	1.77 (0.81, 3.88)	0.15
3-4 years	53	0.84 (0.36, 1.96)	0.69
4-5 years	33	0.70 (0.26, 1.93)	0.49
≥5 years	92	1.20 (0.51, 2.83)	0.68
Length of treatment period(years)			
≤0.5 year	93	Reference	
0.5～1 years	62	0.82 (0.40, 1.69)	0.59
1～2 years	69	1.12 (0.54, 2.34)	0.76
2～3 years	43	1.95 (0.80, 5.03)	0.15
≥3 years	52	1.00 (0.42, 2.38)	1.00

Figure 2: Logistic regression model for demographic descriptors and depressive symptoms [81].

Treatment-related factors

The type and cause of infertility influence psychological impact. Women with female factor infertility experience higher levels of anxiety and general distress both before and during treatment, likely related to feelings of guilt and responsibility [82]. The emotional toll of infertility is exacerbated by unsuccessful fertility treatments, such as IVF, which can lead to feelings of hopelessness and deepen depression and anxiety [83]. Multiple failed IVF attempts compound psychological distress, with research showing that 75% of women experience sexual dysfunction alongside anxiety disorders [44]. The process of undergoing assisted reproductive technology treatments is associated with increased anxiety and depression, particularly if the outcomes are unsuccessful [84].

Social and relationship factors

Social support plays a crucial role in psychological outcomes. Women neglected by their husbands showed higher prevalence of psychiatric morbidity, while lack of spousal support, negligence, and violence from in-laws were important predictors of anxiety [45]. The study found that stress leads to both anxiety and depression among infertile women [85]. In African contexts, social pressure, stigma, and financial constraints significantly impact the mental health of infertile women, leading to psychological distress and marital problems [86].

While infertility is a significant risk factor for mental health issues, it is essential to consider the broader context of these challenges. Social support, comprehensive healthcare approaches, and addressing lifestyle factors can mitigate some of the psychological impacts. Additionally, cultural and social contexts play a crucial role in shaping the experiences of infertile women, highlighting the need for tailored interventions that consider these dimensions.

Coping Mechanisms and Interventions

Coping mechanisms and interventions for infertile women are crucial in managing the psychological stress associated with infertility. Various studies have explored different strategies and interventions that can help improve mental health and quality of life for these women. The research highlights the importance of psychological interventions, coping strategies, and counseling models in addressing the mental health challenges faced by infertile women.

Psychological interventions

- Cognitive behavioral therapy: This is one of the most common interventions used to promote mental health in infertile women. It helps in restructuring negative thought patterns and improving emotional regulation [87].

- Mindfulness and self-compassion: A study of 457 United States women found that lower positive affect and higher experiential avoidance were associated with depression and anxiety. Mindfulness showed indirect effects on reducing anxiety and depression through improved coping variables [88].

- Resilience building: Chinese research demonstrated that depressive symptoms were inversely correlated with both hope levels ($r = -0.25$) and resilience levels ($r = -0.32$). Interventions aimed at increasing resilience may help mitigate depressive symptoms [81].

- Brief supportive psychotherapy: A randomized controlled trial found that brief supportive psychotherapy administered within the first 24 h of hospitalization for miscarriage was effective in preventing symptoms of anxiety, depression, and grief at four months post-loss [89].

Comprehensive care approaches

Mental health professionals specializing in infertility have identified specific therapeutic techniques and clinical targets. The qualitative study involving 21 women and 14 mental health professionals developed a model addressing five key areas: anxiety management, mood disturbance treatment, self-esteem and identity support, couple relationship strengthening, and support network enhancement [13].

- Collaborative infertility counseling model: This model involves a multidisciplinary approach, including midwives, gynecologists, and psychologists, to provide comprehensive support. It has been shown to enhance problem-focused coping strategies [90].

- Couple coping enhancement counseling: This intervention reduces stress and improves dyadic coping among infertile couples, highlighting the importance of involving both partners in the counseling process [91].

Support system integration

Research emphasizes the need for integrated mental health support within infertility treatment protocols. Studies indicate a disparity between the number of respondents reporting mental health issues (60.4%) and those seeking mental health support (44.1%), highlighting the need for proactive screening and referral systems [92].

While the research provides a comprehensive overview of effective coping mechanisms and interventions, it is important to note that the effectiveness of these strategies can vary based on individual circumstances. Some studies suggest that certain coping strategies, like problem-solving, may not always be beneficial and that even avoidance can be an effective strategy in specific contexts [93]. Additionally, the relationship between coping strategies and pregnancy outcomes remains inconclusive, indicating the need for further research to explore other psychological factors that may influence treatment success [94].

Long-term Mental Health Outcomes and Recovery

The recovery process is complex and influenced by various factors (Table 3), including the success of fertility treatments, social support, and psychological interventions.

- Persistent effects: The longitudinal Australian study provides crucial insights into long-term outcomes, demonstrating that infertility has significant mental health impacts even after resolution [21]. This finding challenges assumptions about recovery and suggests the need for extended psychological support.

- Recovery patterns: Research on recovery patterns reveals variable outcomes. Some studies suggest that with appropriate support, women can develop effective coping strategies. The Chinese study found that hope levels were positively correlated with resilience ($r = 0.67$), suggesting that interventions targeting both constructs may be beneficial [81].

- Treatment success and psychological outcomes: Interestingly, one study found no significant statistical association between anxiety and depression levels and pregnancy outcomes in women undergoing infertility treatment, suggesting that psychological distress does not necessarily diminish chances of conception [95]. However, this finding requires further investigation on larger scales.

Table 3: Long-term mental health outcomes and recovery in women with infertility.

Outcome category	Key findings	Timeframe	Clinical implications	Future research
Persistent distress	• Elevated anxiety/depression even after conception/adoption • Resurfacing grief during life milestones (e.g., child's milestones, menopause)	Years to decades	• Long-term mental health monitoring • Trauma-informed follow-up care	• Studies on epigenetic/neurobiological impacts of infertility-related stress
Identity and self-concept	• Lingering feelings of inadequacy as a parent/woman • Altered life narratives (shadow grief)	Indefinite	• Narrative therapy • Identity-rebuilding interventions	• Cross-cultural studies on identity reconstruction
Relationship strains	• Marital dissatisfaction post-resolution • Social withdrawal despite parenthood	5+ years post-treatment	• Couples counseling integrated into fertility care	• Longitudinal studies on partnership dynamics
Resilience and growth	• Post-traumatic growth in some women (e.g., renewed purpose, advocacy) • Stronger coping skills with intervention	2 - 5 years post-resolution	• Strengths-based approaches in therapy • Peer mentorship programs	• Biomarkers of resilience in infertility populations
Treatment success paradox	• No correlation between psychological distress and pregnancy outcomes • Unmet emotional needs despite biological resolution	Post-partum period	• Decoupling 'success' from conception in counseling	• Qualitative research on 'ambiguous recovery'

While the mental health challenges associated with infertility are significant, it is important to recognize that not all women experience these issues to the same extent. Factors such as personal resilience, coping mechanisms, and cultural attitudes towards infertility can influence individual experiences. Additionally, some women may find empowerment and personal growth through their infertility journey, leading to improved mental health outcomes over time. However, the need for comprehensive mental health support remains critical to ensure that all women have the resources they need to navigate the emotional complexities of infertility.

Conclusion

Infertility imposes a profound psychological burden on women, manifesting as grief, depression, anxiety, and diminished quality of life. The disenfranchised nature of infertility-related grief exacerbates emotional distress, as societal norms often fail to validate this unique form of loss. Risk factors such as prolonged infertility duration, treatment failures, lack of social support, and socioeconomic disparities further intensify mental health challenges. While interventions like cognitive behavioral therapy, mindfulness, and comprehensive care models show promise, the persistent nature of distress—even after resolution—underscores the need for long-term psychological support. Addressing these issues requires a holistic approach that integrates mental health care into fertility treatment protocols and fosters societal awareness to reduce stigma.

Future research should explore resilience-building interventions and the neurobiological impacts of infertility-related stress to inform targeted therapies. Cross-cultural studies are needed to understand how societal expectations shape grief experiences and recovery. Additionally, longitudinal investigations into the efficacy of peer support networks and trauma-informed care could refine intervention strategies. Policymakers must prioritize mental health resources for infertile women, ensuring accessible counseling and community-based programs. By bridging gaps in clinical and societal support, we can mitigate the enduring psychological toll of infertility and empower women to navigate their journeys with resilience and dignity.

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Conflict of Interest

None.

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