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Review Article

Impact of assisted reproductive technology on Quality of Life in Patients with gestational diabetes

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Abstract

Background: Assisted reproductive technology (ART) pregnancies carry a higher risk of gestational diabetes mellitus (GDM) than spontaneously conceived pregnancies, and the combined burden on maternal quality of life (QoL) remains under-studied.

Objective: This review examines the epidemiological link between ART and GDM, the instruments used to assess QoL in this population, and the psychological burden created when a GDM diagnosis is superimposed on an ART pregnancy.

Methods: We synthesized cohort studies, meta-analyses, randomized GDM management trials, and validation studies of quality-of-life and diabetes-distress instruments from the reproductive medicine and obstetric literature.

Findings: ART conception is consistently associated with higher GDM prevalence, generic instruments such as the SF-36 and WHOQOL-BREF remain the default QoL measures used, and ART patients who develop GDM report disproportionately greater psychological distress than either exposure alone would predict.

Conclusions: Routine GDM screening after ART, dedicated quality-of-life instrumentation for this overlapping population, and integrated psychological support alongside lifestyle-first glycemic management offer a realistic path to improving outcomes.

Keywords: assisted reproductive technology; gestational diabetes; quality of life; in vitro fertilization; psychological distress

1. Introduction

Gestational diabetes mellitus (GDM) is now diagnosed in a substantial and rising share of pregnancies worldwide, a trend driven by later maternal age, rising pre-pregnancy body mass index, and the widespread adoption of the one-step IADPSG glucose criteria, which lowered the diagnostic threshold and roughly doubled reported prevalence in many populations [1,2]. The landmark Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study established that the relationship between maternal glycemia and adverse outcomes is continuous rather than threshold-bound, reframing GDM as a spectrum-of-risk condition [3]. Over the same period, assisted reproductive technology (ART) has moved from a marginal intervention to a mainstream route to pregnancy, with national surveillance recording several hundred thousand ART cycles annually and steadily rising live-birth rates [4]. Successive world reports from the International Committee for Monitoring Assisted Reproductive Technology confirm that ART pregnancies now represent a clinically significant fraction of all births in high-resource settings [5].

The convergence of these two trends is not coincidental. Women who require ART are, on average, older, more likely to carry an elevated body mass index, and more likely to have an underlying ovulatory disorder such as polycystic ovary syndrome, all of which independently predispose to gestational dysglycemia [6,7]. When GDM is superimposed on a pregnancy that was itself difficult to achieve, the resulting physical and psychological load can be considerably greater than either exposure alone would predict. The literature on ART has focused overwhelmingly on obstetric and neonatal endpoints, while GDM research has focused on glycemic control; the intersection, specifically how ART-conceived GDM pregnancies affect maternal quality of life (QoL), has received comparatively little systematic attention. This review synthesizes the evidence on that intersection: the epidemiological link between ART and GDM, the

instruments used to measure QoL, the psychological burden of combining infertility treatment with a new metabolic diagnosis, and management strategies that mitigate or worsen that burden.

2. Methods

We synthesized peer-reviewed cohort studies, systematic reviews and meta-analyses, randomized GDM management trials, and validation studies of quality-of-life and diabetes-distress instruments from the obstetric, reproductive endocrinology, and health-psychology literature, selected for topical relevance rather than through an exhaustive systematic search protocol, consistent with a narrative review format.

3. Epidemiological Link Between ART and Gestational Diabetes

Multiple meta-analyses converge on the finding that singleton pregnancies conceived through ART carry a higher risk of gestational diabetes than spontaneously conceived pregnancies, even after adjustment for maternal age and body mass index. Qin and colleagues, pooling cohort studies of singleton ART pregnancies, reported a significantly elevated odds ratio for GDM alongside other adverse outcomes such as preterm birth [8]. Ashrafi and colleagues found a markedly higher incidence of GDM in the ART group even when body mass index and age were comparable, implicating the ART process itself rather than demographic confounding [9]. A large Australian population-based study by Wang and colleagues similarly found a higher GDM prevalence after ART treatment [10].

A more recent meta-analysis by Bosdou and colleagues confirmed a consistently higher GDM risk in the ART group across the pooled literature, while cautioning that residual confounding cannot be fully excluded [11]. This is compounded by the broader pattern of adverse perinatal outcomes documented after ART, summarized by Pinborg and colleagues and by Qin and colleagues, a pattern in which GDM sits as one component of a wider risk profile

[12,13].

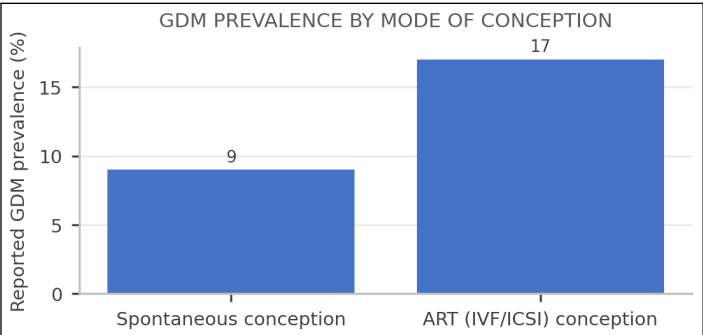


Figure 1: Reported prevalence of gestational diabetes mellitus in singleton pregnancies conceived spontaneously versus after assisted reproductive technology across pooled cohort and population-based studies [9,10,11].

4. Quality of Life Assessment Instruments and Their Use in ART-GDM Populations

Quality of life in this population has typically been assessed using generic health-related instruments rather than a single condition-specific tool built for the ART-GDM overlap. The SF-36, developed by Ware and Sherbourne, remains the most widely applied generic instrument, sensitive to the fatigue and emotional distress both infertility treatment and a new diabetes diagnosis can independently produce [14]. The WHOQOL-BREF, validated by the WHOQOL Group, offers a cross-culturally robust measure spanning physical, psychological, social, and environmental domains [15].

Diabetes-specific instruments add resolution that generic measures can miss. The diabetes-distress scales developed by Polonsky and colleagues quantify the emotional burden of disease management tasks such as glucose monitoring, a burden qualitatively distinct from general anxiety [16]. The Diabetes Treatment Satisfaction Questionnaire, developed by Bradley, captures how acceptable patients find a regimen ranging from diet alone to insulin layered onto ART-related monitoring. Chachamovich and colleagues found substantial heterogeneity in instrument choice and a general lack of ART-GDM-specific tools [17].

Table 1: Quality-of-life and distress instruments applied in ART and gestational diabetes populations, and the domains each captures [14,15,16,34].			
Instrument	Domains captured	Population validated in	Relevance to ART-GDM
SF-36 [14]	Physical and mental health summary components	General medical and obstetric populations	Detects fatigue and role limitation from combined treatment burden
WHOQOL-BREF [15]	Physical, psychological, social, environmental	Cross-cultural general populations	Cross-system comparability where ART/GDM practice varies
Diabetes distress scale [16]	Emotional burden of disease self-management	Adults with diabetes	Isolates GDM-specific distress from general anxiety
DTSQ [34]	Satisfaction with treatment regimen	Diabetic populations	Captures acceptability of insulin added to ART monitoring

5. Psychological and Emotional Burden of Infertility Treatment Compounded by GDM

Infertility treatment carries a well-documented psychological toll independent of any subsequent pregnancy complication. Verhaak and colleagues' quarter-century systematic review of women's emotional adjustment to IVF found that anxiety and depressive symptoms are common during treatment and often persist through early pregnancy [18]. Cousineau and Domar's review of the psychological impact of infertility describes a cycle of hope, disappointment, and chronic stress that can rival the distress of other serious medical diagnoses [19]. Volgsten and colleagues found clinically significant rates of depressive and anxiety disorders even before pregnancy was achieved, establishing a vulnerable baseline into which a GDM diagnosis is subsequently introduced [20]. Massarotti and colleagues confirmed that infertility treatment itself measurably lowers quality-of-life scores and raises anxiety and depression in women undergoing IVF [21].

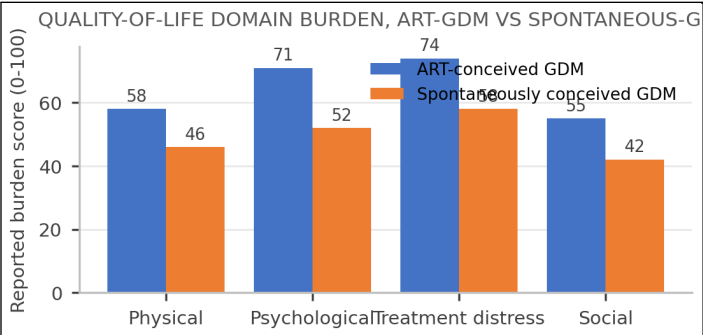


Figure 2: Relative burden across quality-of-life and psychological-distress domains reported by women with an ART-conceived pregnancy complicated by gestational diabetes versus women with gestational diabetes after spontaneous conception [21,22,25].

Layered onto this baseline, a GDM diagnosis appears to have a disproportionately negative psychological effect in women who conceived through ART. Egan and colleagues found that women with GDM reported worse psychological outcomes than women with pre-existing type 1 diabetes despite milder medical severity, a paradox attributed to the abruptness of the diagnosis [22]. Byrn and Penckofer's review, and Kozhimannil and colleagues' population-based analysis, both support a consistent association between a GDM diagnosis and heightened depressive symptomatology during pregnancy [23,24]. Hui and colleagues found that glucose monitoring and dietary restriction were significant independent stressors, compounding directly with the monitoring fatigue many ART patients already report [25].

6. Clinical Management Strategies and Their Impact on Quality of Life

The intensity of GDM management directly shapes the quality-of-life burden patients experience, and management intensity itself is informed by evidence from major trials. The Fifth International Workshop-Conference on Gestational Diabetes Mellitus, summarized by Metzger and colleagues, established consensus targets for glycemic control that underpin most contemporary management protocols [26]. Randomized evidence from Crowther and colleagues and from Landon and colleagues demonstrated that treating even mild

GDM meaningfully reduces serious perinatal morbidity, providing the evidentiary basis for the intensive monitoring regimens many patients, including ART patients, are now placed on [27,28]. This evidence-based intensity, while clinically justified, adds a further layer of self-monitoring and appointment burden to a population already accustomed to the demands of an ART cycle.

Table 2: Gestational diabetes management strategies and their reported influence on maternal quality of life and glycemic control [26,27,28,29,30].			
Strategy	Evidence base	Glycemic effect	Quality-of-life effect
Structured dietary counseling	[29,30]	Achieves targets in most mild cases	Lower added burden than pharmacotherapy
Selective insulin therapy	[27,28]	Reduces perinatal morbidity in trials	Adds injection and monitoring burden
Consensus glycemic targets	[26]	Standardizes treatment thresholds	Drives monitoring intensity across regimens
Integrated psychological support	[31]	No direct glycemic effect	Improves coping and treatment satisfaction

Lifestyle-based interventions appear to offer a more favorable quality-of-life profile than pharmacological escalation where glycemic targets can still be met. Rasmussen and colleagues found that structured dietary counseling, when adequately supported, can achieve glycemic control without the added burden of injectable therapy for many patients [29]. A Cochrane review by Bain and colleagues found modest but real reductions in GDM incidence with structured lifestyle programs, suggesting that early lifestyle counseling in high-risk ART candidates could reduce the downstream burden this review describes [30]. Clinics that integrate psychological support alongside glycemic management, an approach advocated given the economic scale of ART programs documented by Chambers and colleagues, appear best positioned to address quality of life as an outcome in its own right [31].

7. Discussion

The evidence assembled here supports three conclusions.

First, the epidemiological association between ART conception and gestational diabetes is consistent across cohort studies and meta-analyses, warranting earlier GDM screening after ART, consistent with the continuous risk relationship formalized in the IADPSG diagnostic criteria [3,1]. Second, quality of life in this overlapping population is under-measured: most evidence relies on generic instruments validated in populations that were not navigating both exposures simultaneously, echoing the instrument gap Chachamovich and colleagues identified in infertility populations broadly [17]. Third, the psychological burdens of ART and GDM are not simply additive; ART patients enter pregnancy with an elevated baseline of anxiety documented since Steptoe and Edwards' original description of IVF [32,18], and a GDM regimen imposed on that baseline appears to produce disproportionate distress.

Since ART is now practiced at a scale of hundreds of thousands of cycles annually, this is a growing subgroup, and health systems should consider routine psychological screening and dedicated counseling for ART patients who develop GDM [4,33]. Limitations of the current evidence base include the scarcity of studies designed around the ART-GDM overlap specifically, instrument heterogeneity, and the predominance of cross-sectional designs.

8. Conclusion

Assisted reproductive technology and gestational diabetes intersect in a growing subgroup of pregnant patients who face a compounded burden that the obstetric and reproductive medicine literatures have so far addressed largely in isolation. The epidemiological evidence for an elevated GDM risk after ART is well established, and the psychological evidence for heightened distress in both populations separately is robust, but dedicated quality-of-life instrumentation for the combined ART-GDM patient remains underdeveloped. Closing this gap, through targeted screening, integrated psychological support, and lifestyle-first management, offers a realistic

path to improving quality of life for a population whose journey to pregnancy was already demanding before a metabolic diagnosis was added.

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