

Knowledge, awareness, attitudes and perceptions on gestational diabetes among females: A systematic review

SAGE Open Medicine
Volume 14: 1–30
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DOI: 10.1177/20503121261459803
journals.sagepub.com/home/smo



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Abstract

Background: Gestational diabetes mellitus (GDM) is a common pregnancy complication with significant maternal and neonatal consequences. **Aim:** To synthesise evidence on knowledge, awareness, and perception of men and women of reproductive age on GDM to enhance effective prevention and management of GDM. **Methods:** A systematic review was conducted following PRISMA guidelines across PubMed, CINAHL, Embase, Scopus, Web of Science, PsycINFO, JSTOR, Dimensions AI, and HINARI for studies published between 2000 and 2025. 50 studies, with a total sample size of 29,590 participants, assessing knowledge, awareness, attitudes, or perceptions of GDM among pregnant, postpartum, or reproductive-age women were included. Data were extracted, quality-appraised using JBI and MMAT tools, and synthesised thematically. **Results:** Fifty studies were included, primarily cross-sectional (88%), with qualitative (8%) and mixed-methods (4%) designs. Women generally demonstrated limited understanding of GDM risk factors, screening procedures, and long-term implications. Cultural norms, emotional responses, and healthcare experiences shaped perceptions and attitudes, sometimes reducing engagement with preventive behaviours. Factors improving knowledge and adherence included structured education, prior exposure to diabetes, supportive healthcare interactions, and family involvement. **Conclusion:** Awareness and understanding of GDM remain inadequate globally emphasizing major public health concern. Targeted educational interventions, culturally sensitive resources, and enhanced provider–patient engagement are essential to improve knowledge, attitudes, and health outcomes. Future research should prioritise interventional and longitudinal studies using standardised measures across diverse populations.

Keywords

gestational diabetes mellitus, knowledge, awareness, perceptions, attitudes

Received: 28 November 2025; Revised: 14 May 2026; Accepted: 31 May 2026

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Background

Gestational diabetes mellitus (GDM) represents one of the most common metabolic disorders affecting pregnant women worldwide. The condition develops when pancreatic beta cells fail to compensate adequately for pregnancy-induced insulin resistance, resulting in hyperglycaemia during gestation.¹ Global prevalence estimates indicate that approximately one in seven pregnancies is affected by GDM, with regional variations ranging from 5.8% in Europe to 13% in Middle Eastern and North African populations.¹ Moreover, the incidence continues to rise, driven primarily by increasing maternal age, obesity rates, and sedentary lifestyles across diverse populations.² This burden presents substantial challenges for maternal and child health services globally. Furthermore, the consequences of GDM extend beyond immediate pregnancy outcomes. Women diagnosed with the condition face a threefold elevated risk of developing type 2 diabetes postpartum, whilst their offspring experience heightened vulnerability to childhood obesity and metabolic disorders.¹ Short-term maternal complications include pre-eclampsia, caesarean delivery, and labour induction, whereas foetal risks comprise macrosomia, neonatal hypoglycaemia, and shoulder dystocia.² Additionally, long-term evidence demonstrates that intrauterine exposure to maternal hyperglycaemia may contribute to neurodevelopmental alterations, including autistic spectrum disorder, and establishes intergenerational patterns of cardiometabolic disease.² These findings emphasise the importance of early identification and appropriate management strategies during pregnancy and beyond.

However, effective prevention and management of GDM depend substantially on women's knowledge, awareness, and perceptions of the condition. Recent studies reveal concerning gaps in understanding among pregnant women across different geographical contexts. Studies have shown that in Kenya, 86.16% of pregnant women had never heard of GDM, whilst only 13.90% possessed adequate knowledge about the condition.³ Similarly, investigations in China documented that although 70% of women demonstrated satisfactory knowledge scores, merely 45% exhibited positive attitudes, and 43% engaged in appropriate practices for diabetes management.⁴ Furthermore, studies from India reported that only 17.5% of rural antenatal women possessed good knowledge about GDM, with substantial deficits in understanding screening protocols and potential complications.^{5,6} These findings show the persistent educational challenges that healthcare systems must address to improve pregnancy outcomes. Consequently, women's perceptions and attitudes towards GDM influence their health-seeking behaviours and adherence to management protocols. Qualitative research has identified that women often experience psychosocial distress following diagnosis, characterised by feelings of shock, guilt, and anxiety about potential harm to their unborn children.⁷ Additionally, many women perceive the diagnosis as overwhelming, particularly when confronted with dietary modifications, blood glucose monitoring, and frequent medical appointments during an already demanding period.⁸ Studies examining postpartum screening adherence reveal that competing priorities, such as childcare responsibilities and lack of family support, serve as substantial barriers to attendance, with uptake rates falling below 55% in many settings.^{9,10} Moreover, healthcare system factors, including fragmented care pathways, ambiguous provider responsibilities, and inadequate patient education materials, further impede women's engagement with both antenatal and postpartum diabetes services.^{10,11}

Therefore, this systematic review aims to synthesise current evidence on knowledge, awareness, and perception of men and women of reproductive age on GDM to enhance effective prevention and management of GDM. By examining educational interventions, cultural influences, and healthcare delivery systems, this review seeks to identify effective strategies for improving men's and women's understanding and engagement with GDM prevention and management programmes. Such insights will inform the development of targeted interventions that address both individual-level knowledge deficits and systemic barriers within healthcare settings. Ultimately, enhanced awareness and appropriate perception of GDM may facilitate earlier diagnosis, improved glycaemic control during pregnancy, and greater participation in postpartum screening and diabetes prevention initiatives.

Methods

This systematic review adhered to the methodological guidelines established by¹² and endorsed by the Joanna Briggs Institute (JBI). The guidelines consist of seven essential components: (1) formulation of explicit research objectives and questions, (2) specification of precise inclusion and exclusion parameters, (3) detailed search strategy, (4) rigorous quality appraisal of selected studies, (5) systematic analysis of extracted data, (6) coherent presentation and integration of results, and (7) clear documentation of methodological processes. Reporting of the search results of this review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Research questions

1. What is the level of knowledge and awareness about GDM among pregnant women and women of reproductive age?
2. What are women's perceptions and attitudes towards GDM diagnosis and management?

The research questions were formulated based on the Population–Concept–Context (PCC) framework, which is appropriate for systematic reviews that include qualitative, quantitative, and mixed-methods studies. This structured approach ensured that the review remained focused on synthesising evidence regarding knowledge, awareness, and perceptions of GDM among women whilst embracing different study designs and geographical contexts.

Inclusion and exclusion criteria

The inclusion and exclusion criteria were developed to identify studies that addressed the review questions. This was informed by the PCC criteria as proposed by.¹² Table 1 presents the details of the inclusion and exclusion criteria.

Search strategy

The search for relevant studies was conducted in seven main databases, namely PubMed Central, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Embase, Scopus, Web of Science, JSTOR, Dimensions AI, and PsycINFO. The search strategy was done with input from a health sciences librarian and pilot-tested before final implementation. This search strategy was developed using controlled vocabulary such as Medical Subject Headings (MeSH terms) and keywords identified in a preliminary literature search. Search strategies for all databases are presented in Table 2. The search conducted in PubMed Central was modified for searches in other online sources. Additional searches were conducted in other online sources, including university repositories, Google, and Google Scholar. Also, the reference lists of the retrieved studies were manually searched to identify relevant literature for inclusion. Searches were restricted to studies published online since January 2000.

Study selection

All retrieved records were imported into Mendeley referencing software version 1.19.8 for bibliographic management. Duplicate entries were identified and removed through a combination of automated detection and manual verification. Following deduplication, the titles and abstracts of the remaining studies were screened against the predefined eligibility criteria presented in Table 1. This initial screening phase was conducted by two trained graduate students under the supervision of CA and DA to ensure consistency and compliance with the inclusion parameters. Subsequently, the reference lists of potentially eligible records were manually examined to identify additional relevant studies that may have been missed in the database searches. Corresponding authors of eligible studies without accessible full-text versions were contacted via email to request article copies. Full-text articles of all potentially relevant studies were then retrieved and independently assessed by two reviewers against the eligibility criteria. Any disagreements between the two reviewers during full-text screening were resolved through discussion, and where consensus could not be reached, a third reviewer was consulted for final arbitration. The study selection process was systematically documented using a PRISMA flow diagram, indicating the number of records identified, screened, excluded, and included at each stage.

Table 1. Inclusion and exclusion criteria based on PCC framework.

Criteria	Inclusion	Exclusion
Population	Pregnant women, women of reproductive age, and postpartum women with or without the diagnosis of GDM.	Studies focusing exclusively on pre-existing diabetes (Type 1 or Type 2),
Concept	Studies examining knowledge, awareness, perception, attitudes, beliefs, understanding, health literacy, or educational needs, and outcomes related to GDM	Studies focusing solely on clinical outcomes, biochemical markers, pharmacological interventions, or pathophysiology without addressing knowledge, awareness, or perception
Context	All healthcare settings (primary, secondary, tertiary care, community-based settings), antenatal clinics, postnatal care facilities, studies from any country in the world, papers published in the English Language. Papers that have been peer-reviewed, time limit (2000–2025), and all types of study designs	Studies that were not published in English, Editorials, commentaries, opinion pieces, letters to the editor, conference abstracts without full-text availability, case reports, case series, and reviews

Table 2. Search strategy for selected databases.

Database	Search strategy
PubMed Central	((“gestational diabetes”[MeSH Terms] OR “gestational diabetes mellitus”[All Fields] OR “GDM”[All Fields] OR “diabetes, gestational”[All Fields] OR “pregnancy-induced diabetes”[All Fields]) AND (“pregnant women”[All Fields] OR “pregnancy”[All Fields] OR “expectant mothers”[All Fields] OR “women of reproductive age”[All Fields] OR “maternal”[All Fields] OR “postpartum women”[All Fields])) AND ((“knowledge”[All Fields] OR “awareness”[All Fields] OR “understanding”[All Fields] OR “health literacy”[All Fields] OR “education”[All Fields] OR “information”[All Fields] OR (“perception”[All Fields] OR “attitude”[All Fields] OR “belief”[All Fields] OR “view”[All Fields] OR “experience”[All Fields] OR “perspective”[All Fields])) AND (“management”[All Fields] OR “self-care”[All Fields] OR “practices”[All Fields] OR “behaviour”[All Fields] OR “screening”[All Fields] OR “adherence”[All Fields]) AND (“2000”[Date - Publication]: “2025”[Date - Publication])
CINAHL	(gestational diabetes OR GDMOR GDM OR diabetes in pregnancy OR pregnancy-induced diabetes) AND (pregnant women OR pregnancy OR expectant mothers OR women of reproductive age OR maternal OR postpartum women) AND ((knowledge OR awareness OR understanding OR health literacy OR education OR information) OR (perception OR attitude OR belief OR view OR experience OR perspective)) AND (management OR self-care OR practices OR behaviour OR screening OR adherence) AND [2000-2025]/py
Embase	(‘gestational diabetes’/exp OR ‘gestational diabetes mellitus’ OR ‘GDM’ OR ‘diabetes in pregnancy’ OR ‘pregnancy-induced diabetes’) AND (‘pregnant women’ OR ‘pregnancy’ OR ‘expectant mothers’ OR ‘women of reproductive age’ OR ‘maternal’ OR ‘postpartum women’) AND ((‘knowledge’ OR ‘awareness’ OR ‘understanding’ OR ‘health literacy’ OR ‘education’) OR (‘perception’ OR ‘attitude’ OR ‘belief’ OR ‘view’ OR ‘experience’ OR ‘perspective’)) AND (‘management’ OR ‘self-care’ OR ‘practices’ OR ‘behavior’ OR ‘screening’ OR ‘adherence’) AND [2000-2025]/py
Scopus	TITLE-ABS-KEY (gestational AND diabetes OR gestational AND diabetes AND mellitus OR GDM OR diabetes AND in AND pregnancy OR pregnancy-induced AND diabetes) AND TITLE-ABS-KEY (pregnant AND women OR pregnancy OR expectant AND mothers OR women AND of AND reproductive AND age OR maternal OR postpartum AND women) AND TITLE-ABS-KEY ((knowledge OR awareness OR understanding OR health AND literacy OR education OR information) OR (perception OR attitude OR belief OR view OR experience OR perspective)) AND TITLE-ABS-KEY (management OR self-care OR practices OR behaviour OR screening OR adherence) AND PUBYEAR > 1999 AND PUBYEAR < 2026
Web of Science	TS=(“gestational diabetes” OR “gestational diabetes mellitus” OR “GDM” OR “diabetes in pregnancy” OR “pregnancy-induced diabetes”) AND TS=(“pregnant women” OR “pregnancy” OR “expectant mothers” OR “women of reproductive age” OR “maternal” OR “postpartum women”) AND TS=((“knowledge” OR “awareness” OR “understanding” OR “health literacy” OR “education” OR “information”) OR (“perception” OR “attitude” OR “belief” OR “view” OR “experience” OR “perspective”)) AND TS=(“management” OR “self-care” OR “practices” OR “behaviour” OR “screening” OR “adherence”) AND PY= (2000-2025)
PsycINFO	(gestational diabetes OR GDMOR GDM OR diabetes in pregnancy OR pregnancy-induced diabetes) AND (pregnant women OR pregnancy OR expectant mothers OR women of reproductive age OR maternal OR postpartum women) AND ((knowledge OR awareness OR understanding OR health literacy OR education) OR (perception OR attitude OR belief OR view OR experience OR perspective)) AND (management OR self-care OR practices OR behavior OR screening OR adherence) AND publication year: [2000 TO 2025]
JSTOR	((“gestational diabetes” OR “gestational diabetes mellitus” OR “GDM” OR “diabetes in pregnancy”) AND (“pregnant women” OR “pregnancy” OR “expectant mothers” OR “women of reproductive age” OR “maternal”) AND ((“knowledge” OR “awareness” OR “understanding” OR “health literacy” OR “education”) OR (“perception” OR “attitude” OR “belief” OR “view” OR “experience”)) AND (“management” OR “self-care” OR “practices” OR “behaviour” OR “screening”)) AND publication date: [2000 TO 2025]
HINARI	(gestational diabetes OR GDMOR GDM OR diabetes in pregnancy OR pregnancy-induced diabetes) AND (pregnant women OR pregnancy OR expectant mothers OR women of reproductive age OR maternal OR postpartum women) AND ((knowledge OR awareness OR understanding OR health literacy OR education) OR (perception OR attitude OR belief OR view OR experience OR perspective)) AND (management OR self-care OR practices OR behaviour OR screening OR adherence) AND year:2000-2025
Dimensions AI	(“gestational diabetes” OR “gestational diabetes mellitus” OR “GDM” OR “diabetes in pregnancy”) AND (“pregnant women” OR “pregnancy” OR “expectant mothers” OR “women of reproductive age” OR “maternal” OR “postpartum women”) AND ((“knowledge” OR “awareness” OR “understanding” OR “health literacy”) OR (“perception” OR “attitude” OR “belief” OR “view” OR “experience”)) AND (“management” OR “self-care” OR “practices” OR “screening” OR “adherence”) AND publication year: [2000 TO 2025]

Data extraction

A data extraction form was developed using Microsoft Word to systematically capture information from included studies. The form was piloted on five randomly selected studies to assess its reliability and effectiveness in capturing essential information. This pilot phase allowed for necessary refinements based on practical application. Key information extracted included author names, publication year, country of study, study purpose, research design, population characteristics, sample size, knowledge and awareness levels, perception and management practices, and study outcomes. The extracted data were reviewed by EJ and SEB and supervised by CA. Discrepancies identified during the review process were documented and discussed during regular team meetings. Where disagreements persisted, they were resolved by CA. See [Appendix A](#) for details of the extracted data.

Critical quality assessment

Quality appraisal of the included studies was performed in parallel with data extraction using the quality appraisal tools developed by the Joanna Briggs Institute (JBI). The goal was to ensure that study inclusion and interpretation of findings were informed by the extracted data. These tools comprise checklists for evaluating the quality of cross-sectional studies, qualitative studies, cohort studies, quasi-experimental studies, and mixed-methods studies. The scoring procedures adopted for JBI cross-sectional studies¹³ were 1–4 (High risk of bias), 5–6 (Moderate risk of bias), and 7–8 (Low risk of bias). The scoring procedures adopted for JBI qualitative studies¹⁴ were 1–5 (High risk of bias), 6–7 (Moderate risk of bias), and 8–10 (Low risk of bias). For Mixed Method Appraisal Tool (MMAT),¹⁵ 1–2 (High risk of bias), 3–4 (Moderate risk of bias), and 5 (Low risk of bias). Two independent reviewers (EJ and EB) conducted quality assessments, and disagreements were resolved through consensus discussions, with a third reviewer (CA) consulted where necessary. Studies were not excluded based on quality scores; however, quality ratings informed the interpretation of findings and the strength of evidence. Thus, all studies were included to ensure comprehensive evidence representation across diverse populations and settings, with quality appraisal serving an informative rather than exclusionary purpose. Low-risk studies were accorded greater interpretive weight during synthesis, whilst moderate-risk studies were interpreted cautiously with explicit acknowledgement of their methodological limitations in the discussion.

Data analysis and synthesis

Thematic analysis was first conducted to identify, organise, and interpret patterns across the data extracted from the included studies. This process began with familiarisation, involving repeated reading of the extracted data to gain a thorough understanding of the content related to knowledge, awareness, and perceptions of GDM. Initial codes were then generated to capture meaningful features of the data concerning knowledge gaps, awareness levels, perceptions, and attitudes in GDM care. These codes were subsequently grouped into potential themes based on conceptual similarities and alignment with the review objectives. Through an iterative process of review and discussion among the research team, themes were refined to ensure clarity, consistency, and relevance. A thematic framework was then developed to represent and organise the final themes and sub-themes visually. Quantitative data on knowledge scores, awareness prevalence, and perception measures were presented in summary tables and figures to complement the qualitative synthesis. Where appropriate and sufficient homogeneity existed across studies with similar populations, outcome measures, and study designs, descriptive statistical summaries were compiled. Statistical heterogeneity was assessed to determine the feasibility of quantitative integration.

Following thematic analysis, a convergent synthesis approach was employed to integrate findings from studies with varied methodological designs. This approach was chosen to accommodate the inclusion of both qualitative and quantitative evidence within a unified framework. Quantitative findings were transformed into qualitative descriptions through a process known as *qualitisation*, enabling their integration with qualitative data. This allowed for a unified interpretation of all study results across different research approaches. The synthesis involved systematically comparing and interpreting the developed themes across studies to identify areas of convergence and divergence. Key insights were drawn by analysing how knowledge, awareness, and perceptions of GDM were consistently or variably reported across different geographical settings, populations, healthcare contexts, and study types. Both descriptive themes summarising what participants reported and analytical themes generating new interpretations were developed. The synthesis process maintained analytical rigour and transparency throughout. This resulted in the identification of overarching themes that offered a detailed understanding of the factors influencing knowledge, awareness, and perception formation regarding GDM. The integrated perspective supported practical and policy-relevant implications for improving maternal health education, healthcare delivery systems, and pregnancy outcomes.

Results

Search results

The systematic search conducted across the main databases yielded a total of 41,505 records for this review. Additionally, 17,500 records were retrieved from supplementary sources. The studies that were retrieved were uploaded into the Mendeley referencing software version 1.19.8 for the removal of duplicates. Following the removal of duplicates using both automated (Mendeley referencing software) and manual screening methods, 148 records remained for further evaluation. These records underwent title and abstract screening by EJ and EB against the predefined eligibility criteria. Subsequently, 94 records were excluded at this stage due to irrelevance to the review objectives, leaving 54 records for full-text assessment. Furthermore, reference list examination of eligible studies identified 6 additional records, whilst consultation with a librarian and other experts yielded 2 more articles, making 62 in total. During full-text screening, 12 articles were excluded for specific reasons: three were not published in English, and nine did not report variables of interest related to knowledge, awareness, or perception of GDM. Consequently, 50 studies met all inclusion criteria and were included in the final synthesis. This rigorous and transparent selection process ensured that only relevant, high-quality studies contributed to the review findings. [Figure 1](#)

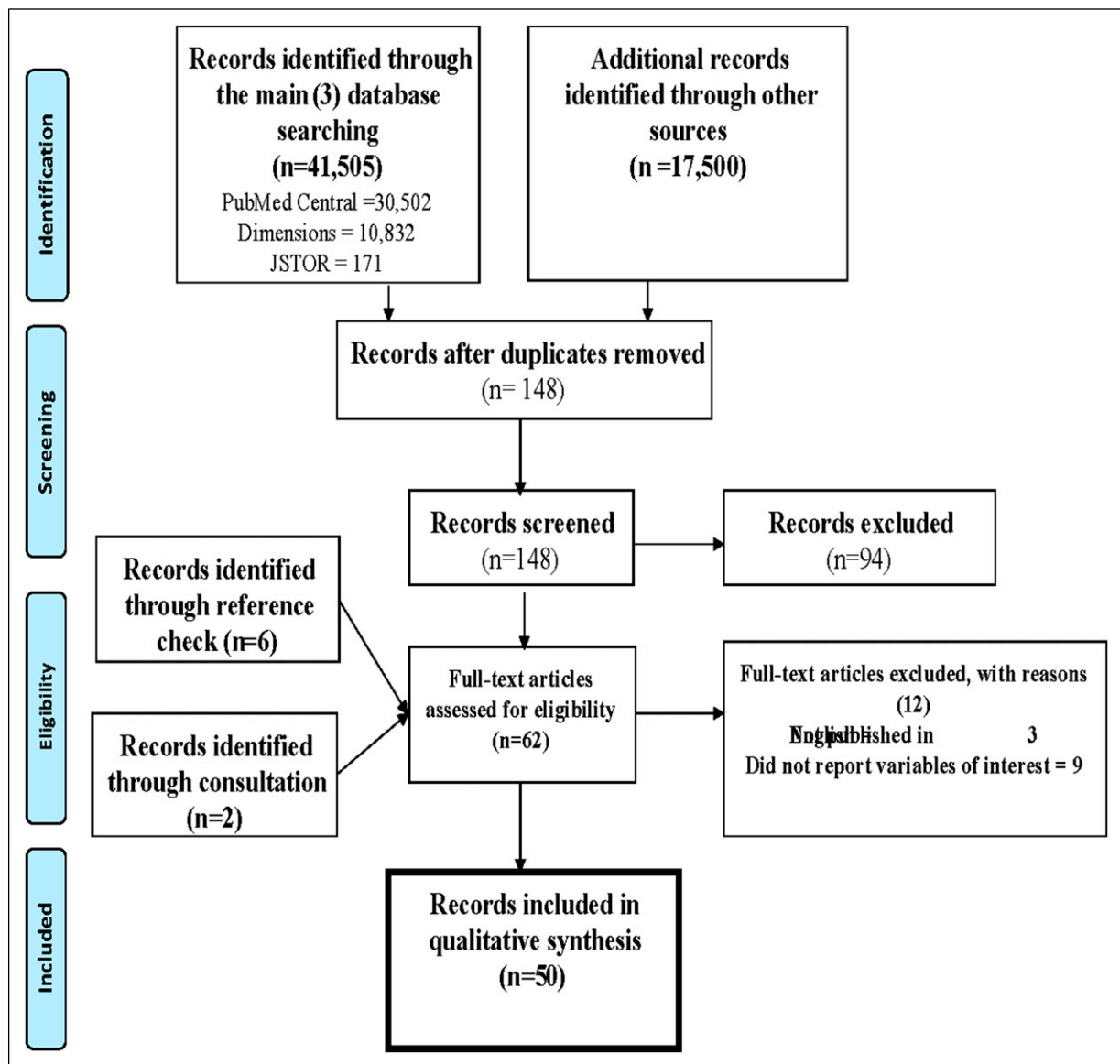


Figure 1. PRISMA flow chart.

presents the complete PRISMA flow diagram illustrating the identification, screening, eligibility assessment, and final inclusion of studies at each stage of the selection process.

Characteristics of the included studies

The 50 studies included in the review are summarised in Table 3. As illustrated in Figure 2, cross-sectional surveys accounted for the vast majority of study designs (44 out of 50; 88%), while qualitative studies represented 8% (4 studies) and mixed-methods designs constituted the remaining 4% (2 studies). Figure 3 further depicts the global spread of the included research. The largest proportion of studies originated from Saudi Arabia (11 studies; 22%), followed by India with 9 studies (18%). Smaller contributions came from Nigeria (3; 6%), Ethiopia, Bangladesh, Turkey, Pakistan, and the United Arab Emirates (each contributing 2 studies; 4% each). Single studies (2%) were identified from China, Australia, Samoa, Kenya, Tanzania, Zimbabwe, Uganda, Egypt, Switzerland, the United Kingdom, Poland, Malaysia, Iraq, and the Philippines, along with one study conducted jointly in Australia and Samoa. This wide geographical distribution enhances the cultural and contextual breadth of the evidence base, strengthening the relevance and transferability of findings on knowledge, awareness, and perceptions of GDM across varied healthcare, cultural, and socioeconomic settings.

Quality appraisal results of included studies

The 50 studies included in this systematic review comprised 45 cross-sectional studies, 3 qualitative studies, and 2 mixed-methods studies (Tables 4–6). The methodological quality of these studies was evaluated using the Joanna Briggs Institute (JBI) critical appraisal tools for cross-sectional¹³ and qualitative studies,¹⁴ and the Mixed Methods Appraisal Tool (MMAT)¹⁵ for mixed-methods studies. Among the cross-sectional studies, most studies (40 out of 45; 88.9%) scored 6 out of 8. These studies demonstrated generally good methodological quality, indicating that their design, sampling, and measurement procedures were adequate for addressing the research questions.^{16–26,28,29,31–36,39–55,59–62} However, these studies often did not fully address Q5 and Q6 of the JBI checklist, which relate to the identification and management of confounding factors. As a result, the potential influence of extraneous variables on the outcomes could not always be entirely ruled out, which is a common limitation in cross-sectional research. Four cross-sectional studies^{5,38,57,63} scored 7 out of 8, reflecting a moderate risk of bias. These studies successfully identified confounding factors but did not consistently implement strategies to manage them, such as statistical adjustment or stratified analyses, which would have strengthened the reliability of their findings. One study^[30; 2.2%] achieved a perfect score of 8/8, demonstrating exemplary methodological rigour and robust handling of potential confounders.

All three qualitative studies scored 8 out of 10,^{37,56,58} indicating low risk of bias. The main limitations in these studies were related to researcher reflexivity and positionality (Q6 and Q7), which are essential considerations in qualitative research to ensure transparency and credibility. Without explicit reporting on how the researchers' perspectives or prior experiences may have influenced data collection, analysis, and interpretation, the findings may be less fully contextualised. Both mixed-methods studies^{3,27} scored 5 out of 5, reflecting rigorous methodological quality and exemplary integration of qualitative and quantitative components. These studies demonstrated clear alignment between research questions, data collection methods, and analytical strategies, which enhances confidence in their findings.

Review findings

Knowledge and awareness levels about GDM among women

Across the included studies, knowledge and awareness of Gestational Diabetes Mellitus (GDM) were measured using structured questionnaires assessing understanding of the condition's definition, risk factors, symptoms, diagnosis, management, and complications. Most studies calculated a total score by summing correct responses to multiple items, with score ranges varying across instruments (e.g., 0–8, 0–18, 0–19, or up to 0–88). Knowledge or awareness levels were then categorised using predefined cut-off points, most commonly as poor/low (<50% of the total score), moderate/fair (50–69%), and good/high (≥70%). Some studies also used scale-specific thresholds (e.g., ≤3 = poor, 4–5 = average, ≥6 = good on an 8-point scale). In addition to total scores, several studies reported mean scores and standard deviations to describe overall knowledge or awareness levels among participants.

Women's knowledge and awareness of GDM were generally limited across the reviewed studies, with most demonstrating only a partial or superficial understanding of the condition. Numerous investigations reported that many pregnant women and women of reproductive age possessed insufficient awareness of GDM, and only a small proportion demonstrated adequate knowledge.^{3,5,26,30,33,59} Even in contexts where overall awareness appeared moderate, a substantial proportion of

Table 3. Extraction sheet for included studies.

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
16 Turkey	To examine the knowledge levels of pregnant women concerning Gestational Diabetes Mellitus (GDM), and to determine the factors that affect the knowledge levels.	Cross-sectional Survey	Pregnant women	184	The mean score of GDM knowledge level of pregnant women is 40.10 ± 19.56 (min = 0, max = 88) points.		Having high income, receiving insulin treatment beside the diet, receiving education about GDM, thinking they have information about GDM, and multidisciplinary approach were found the factors affecting GDM knowledge.
17 Pakistan	To determine the knowledge among gestational diabetic pregnant females.	Cross-sectional Survey	Pregnant females (aged 18 to 40 years)	150	63 participants know about self-care routine of GD, while 58 know about fetal maternal complications. Majority 90 (60%) females don't know about the risk and symptoms of gestational diabetes. 101 (67.3%) have poor knowledge about glucose monitoring. When they asked about the management of hypo and hyper glycemia 81 (54%) don't have enough knowledge about management protocols. Regarding the diagnostic procedures 74 (49.3%) have good knowledge.		
18 Saudi Arabia.	To investigate Qassim women's awareness of gestational diabetes.	Cross-sectional Survey	Women	633	The level of awareness regarding GDM was poor among 60.3% of women, 33% had moderate awareness, and only 6.6% were estimated to have good awareness levels.		

(continued)

Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
19 Saudi Arabia	To assess the awareness of Saudi women about gestational diabetes mellitus (GDM).	Cross-sectional Survey	Women	273	Regarding awareness of GDM, an overwhelming majority (86.4%) exhibited poor knowledge, 13.6% had moderate knowledge, and none demonstrated good knowledge. The mean awareness score was 6.33 ± 2.83 out of 19. Key gaps were identified in understanding risk factors, diagnosis timing, and postnatal screening. Women aged 26-35 years, those with obesity, those employed in the health sector, and those who knew someone with GDM showed significantly higher awareness levels ($p < 0.05$).		
20 Pakistan	To assess the prevalence of GDM and evaluate the knowledge, attitudes, and practices (KAP) regarding its management among affected women in Karachi, Pakistan.	Cross-sectional Survey	Women	189	Mean KAP scores were 10.9 ± 2.8 (knowledge), 32.8 ± 4.5 (attitude), and 12.4 ± 2.9 (practice), with 68% ($n=129$), 73% ($n=138$), and 65% ($n=123$) achieving good scores, respectively. The awareness level was found to be higher in those who had higher educational status ($p=0.0001$), those with higher income levels ($p=0.0001$), and smokers ($p=0.03$).		Higher knowledge scores were independently associated with better practices (OR: 1.145, 95% CI: 1.051–1.247, $p=0.002$).
21 Turkey	To evaluate the awareness of GDM and its complications and the approach to the oral glucose tolerance test (OGTT) in pregnant women.	Cross-sectional Survey	Patients with GDM or pre-gestational diabetes mellitus and without GDM and PGDM history	300 (Fifty patients with GDM or pre-gestational diabetes mellitus (PGDM) and 250 patients without GDM and PGDM history)			
22 Iraq	To evaluate the existing level of knowledge regarding gestational diabetes mellitus, its associated risk factors, and its correlation with sociodemographic features among pregnant women in Department of Obstetrics and Gynecology at AL-Yarmouk – Teaching Hospital.	Cross-sectional Survey	Pregnant women	380	Approximately 20.3% of the participants shown a high degree of awareness of gestational diabetes mellitus. In contrast, 39.5% had a moderate level of awareness, and 40.3% had a low level of awareness.		

(continued)

Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
23 Saudi Arabia	To assess knowledge and attitudes with regard to GDM among pregnant women in Tabuk City, Saudi Arabia.	Cross-sectional study	Women	539	Most participants exhibited strong understanding, with 410 (76.1%) demonstrating awareness of GDM, and 382 (70.9%) having a clear grasp of its definition. The total mean knowledge score for women's correct responses stood at 7.62 (± 4.49).	Additionally, a majority displayed positive attitudes toward managing GDM.	
24 Saudi Arabia	To evaluate the knowledge of pregnant women about GDM and its implications for the mother and fetus. Secondly, to investigate the relationship between knowledge levels and demographic factors like age, education, and socioeconomic status, aiming to identify knowledge gaps regarding this health issue and develop targeted educational initiatives.	Cross-sectional study	Women	979			
25 Saudi Arabia	To identify the level of knowledge about GDM among the adult population in the Kingdom of Saudi Arabia (KSA).	Cross-sectional Survey	Participants (Males and Females)	539 (440 females and 99 males)	The total score of knowledge revealed excellent, good, fair, and poor levels among 334 (62%), 140 (26%), 49 (9%), and 16 (3%) of participants, respectively. Only 19% of the 100 respondents had appropriate understanding about GDM. 51 percent of those polled had somewhat adequate knowledge, and 30% have insufficient knowledge about GDM. Among the study participants, 21% had good knowledge, 50% had relatively adequate knowledge, and 29% had no understanding of GDM risk factors.		
26 India	To determine the knowledge of gestational diabetes mellitus and its risk factors among antenatal mothers.	Cross-sectional Survey	Pregnant women	100			
27 Nigeria	To investigate the previous awareness of GDM among women diagnosed with GDM in Kano metropolis and document their perceived health implications of the condition.	Mixed Method Study	Pregnant women	204	Above average (65.3%) of the respondents obtained their awareness of GDM from the hospitals they had previously attended.		The study revealed that awareness of GDM in Kano metropolis was mostly among women who had previously experienced Gestational Diabetes Mellitus.

(continued)

Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
5 India	To examine the awareness and knowledge about gestational-diabetes-mellitus (GDM) among antenatal-women and found its influential factors through three phases.	Cross-sectional Survey	Antenatal women	523	33 (6.30%) had awareness of GDM whereas 490 (93.69%) participants were unaware of the condition.		
28 Bangladesh	To compare knowledge of GDM including source of knowledge, treatment, awareness about GDM and impact of GDM on the baby among mothers with GDM and healthy pregnant mothers.	Cross-sectional Survey	Pregnant women	89	Majority of the participants both with (53.5%) and without (56.5%) GDM did not have any knowledge on GDM		
29 India	To study the awareness of gestational diabetes mellitus in antenatal women, and medical and paramedical trainees in teaching hospital in North India	Cross-sectional Survey	Nursing and paramedic students, MBBS 1st and 2nd professional students, antenatal, postgraduate residents: obstetrics, physiology, medicine, and MBBS 3rd professional students.	1902 (nursing and paramedic students 680/1402, 48.5%; MBBS 1st and 2nd professional students 422/1402, 30.1%; antenatal women 300/1402, 21.4%; postgraduate residents: obstetrics 50/500, 10%; physiology 25/500, 5%; medicine 25/500, 5%; MBBS 3rd professional students 400/500, 80%)	Antenatal women had significantly better basic knowledge than medical and paramedic trainees ($p < 0.001$).		
30 Tanzania	To assess awareness and history of screening practices for gestational diabetes mellitus among pregnant women in Anusha Urban District of Anusha City Council, Tanzania.	A cross-sectional study	Pregnant women	468	Few women were aware of the existence of gestational diabetes mellitus (10.7%). Among the aware women, 36, 23, 26 and 30% knew the meaning, effects, symptoms and risk factors for gestational diabetes mellitus respectively. 77.8% of them had poor knowledge about GDM and 6.1% had good knowledge.		
31 Saudi Arabia	To assess the awareness about gestational diabetes mellitus (GDM) among married females in Jeddah, Saudi Arabia.	A cross-sectional study	Married females	505			

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
32 India	To evaluate the knowledge in diagnosed GDM pregnant women.	Cross-sectional study	Pregnant women	500	Majority of the women, that is, 57.6% of the women, had an average knowledge about GDM while 21.8% of the women had good knowledge, 1.6% had excellent, and 19% had poor knowledge. The mean knowledge score was 6.51 ± 3.41 . The mean percentage of the knowledge was $36.14\% \pm 18.94\%$.		
33 India	To determine the awareness of GDM among all the antenatal women who attend a Primary Health Center (PHC) for antenatal care	Cross-sectional study	Antenatal women	120	17.5% women had good knowledge, 56.7% had fair knowledge, and 25.8% women had poor knowledge about GDM. Fair knowledge 73 (48.67%) regarding gestational diabetes		
34 India	To assess the awareness regarding anemia, GDM and PIH among antenatal women attending outpatient clinic in a rural hospital.	Cross-sectional study	antenatal women	150			
35 Nigeria	To assess pregnant women's knowledge about GDM, report their attitudes and determine their perception towards GDM.	Cross-sectional study	pregnant women	300	A little over one-fifth of the participants were knowledgeable about GDM.	Three-quarters of the participants demonstrated a positive attitude while just a little over half had a positive perception of GDM.	. A direct significant association was also found between participants' knowledge and their perceived risk of developing GDM ($p = .000$).
36 Bangladesh	To evaluate the level of knowledge about gestational diabetes mellitus (GDM) in Bangladeshi people.	cross-sectional study	Adults	1374 (56% female and 44% male)	Of total knowledge score of 8, participants' mean knowledge score ($\pm$ SD) was 2.7 ± 1.5 . The levels of good, average, and poor knowledge were 26.3%, 63.1%, and 10.6%, respectively.		

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
37 UK	To explore experiences, knowledge and perceptions of women with GDM to inform the design of interventions to prevent or delay Type 2 diabetes.	Qualitative study	women	16	Knowledge and understanding of Type 2 diabetes was poor in general and many women were unconcerned about their future risk.	GDM is not seen as an important, or even real diagnosis among some women, and this perception may result from the perceived minimal impact of GDM on their lives. Some women did experience a bigger emotional and practical impact.	Lower concern appeared to be linked to a lower perceived impact of GDM.
38 Ethiopia	To assess pregnant women's knowledge of GDM and associated factors at antenatal care clinics of public hospitals in the North Shewa zone, Oromia region, Central Ethiopia.	Cross-sectional study	Pregnant women.	417	Overall, 48% (95% CI 43.4% to 52.8%) of pregnant women had sufficient knowledge about GDM. The level of sufficient knowledge for GDM risk factors, screening/treatment and its consequences were 48%, 54.4% and 99%, respectively.		
39 Zimbabwe	To examine the relationship between knowledge of gestational diabetes mellitus (GDM) and self-care practice to prevent GDM in pregnant women.	Cross-sectional study	Pregnant women	200	Mean knowledge on GDM was 20.28%.	Mean score for self-care practice was 49.6%.	There was a moderate positive correlation ($r = 0.499$; $p < 0.01$) between knowledge and self-care practice. Regression analysis ($R^2 = 0.246$, $p < 0.001$) indicated that knowledge explained 24.6% of the variance observed in self-care practice.

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
40 Kingdom of Saudi Arabia	To determine the level of awareness among antenatal women in Saudi Arabia via a case study of patients at the KFMMC.	Cross- sectional study	Women receiving antenatal care	405	Concerning the respondents' knowledge about the risk factors associated with GDM, 75% of them knew that eating unhealthy food, obesity, and depression Put individuals at risk of GDM, and that they needed to engage in physical exercise in order to avoid GDM. However, only 25.4% were aware that GDM was related to hypertension. With regard to awareness about the complications related to GDM, 37% of the interviewees indicated that they were aware that GDM might lead to cases of low Neonate birth weight, while 62.7% of them knew that GDM could lead to hidden DM, and 24.9% acknowledged the possibility of increased risk of congenital anomalies, particularly if DM is not diagnosed. Only 21.7% of the expectant women respondents knew that untreated DM threatened the health of the unborn child, which might force a termination of the pregnancy, while 45.7% were unsure about this, and 32.6% of the women were not aware of such threats.		

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
41 Kingdom of Saudi Arabia	To increase the awareness of GDM and to determine the significance of this study within the Saudi Arabian context.	Cross-sectional study	Prenatal women	471	Overall, 36.5% of the women had good knowledge of GDM, while 50.5% had fair knowledge, and 13% had poor knowledge. The knowledge score concerning how GDM is diagnosed was 45.3%. Approximately 41.4% women had undergone tests for GDM. Furthermore, 65.8% of the participants were aware of GDM treatment. However, only 39.5% were aware of the consequences of GDM. 27.0% (95% CI: 0.23–0.31) of the pregnant women were aware of GDM.		
42 Ethiopia	To determine the awareness of GDM and its associated factors among pregnant women in public hospitals in the East Gojjam Zone, Northwest Ethiopia.	Cross-sectional study	Pregnant women.	423			
43 UAE	To assess the awareness of GDM among females in the childbearing age in Sharjah community.	cross-sectional study	women	450	73.5% were aware of the disease.		
44 Switzerland	To define the knowledge level among postpartum women affected by gestational diabetes and identify its association with women's sociodemographic and clinical characteristics.	Cross-sectional study	Postpartum women	107	As measured with the GDMQ, women with a higher educational level obtained higher scores and therefore showed a better knowledge level about gestational diabetes compared to women with primary and secondary educational levels (M 13.3 vs M 11.1 and 12.5; $\chi^2(2) = 13.003$, $p = .002$). In addition, women with a previous history of gestational diabetes also reached higher scores compared to women with no history of gestational diabetes (M 13.6 vs M 12.5, $Z = -2.278$, $p = .023$).		

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
45 Australia and Somalia	To identify the awareness level of females ages 12 and 51 years, on the long-term risk of obesity and T2DM on their children in Australia and Samoa.	Cross- sectional Study	Females	202	In Australia and Samoa, 15% (n=16) and 34% (n=33) of females respectively, were aware of the long-term complications of GDM on their children. These findings indicate that there is inadequate knowledge regarding the long-term consequences associated with GDM on both the risk for T2DM in women and the risk for long-term complications for their children. Fifty-eight percent women were aware diabetes can occur for the first time during pregnancy		
46 Somalia	To investigate the awareness of GDM and its risk factors among pregnant women in Somalia, exploring where participants obtained information, and understanding their attitudes towards diet and physical activity	Cross- sectional study	women	141			
47 Malaysia	To evaluate the knowledge about GDM and its Corresponding relation with glycaemic level in GDM patients.	A cross- sectional study	GDM patients	175	A total mean knowledge score of 166 patients was 10.01 ± 3.63 and total mean FPG value was 5.50 ± 1.13 . Knowledge had a significant negative association with FPG ($r = -0.306$, $P < 0.01$). Based on the survey, it was demonstrated that the women had moderate knowledge concerning the maternal risk factors and adverse neonatal outcomes associated with GDM		
48 Poland	To assess Polish women's knowledge concerning GDM and their attitude to breastfeeding.	A cross- sectional study	women	410			
49 UAE	To assess GDM knowledge and identifies factors associated with it among United Arab Emirates (UAE) University students.	A cross- sectional study	students	735	Of these, 72.8% had heard of GDM, and 52.9% of males versus 20.3% of female students had never heard of the condition before.		

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
50 Kingdom of Saudi Arabia	To evaluate knowledge and awareness levels among married females regarding the maternal and neonatal outcomes of gestational diabetes mellitus (GDM) in Saudi Arabia.	A cross-sectional study	women	514	Regarding the score results of awareness, knowledge, and attitudes towards GDM, 60.1% displayed high awareness, while 26.3% had moderate awareness, and 13.6% showed low awareness. Knowledge levels revealed 56.6% had low knowledge, 24.1% moderate, and only 19.3% high understanding. The average knowledge, attitude and practice score were 11.55 ± 3.04 , 34.23 ± 4.06 and 10.7 ± 2.87 points, respectively.	Regarding attitudes, 66.7% expressed high concern, 27.8% moderate attitudes, and only 5.4% exhibited low recognition of risks, highlighting the need for educational interventions to improve knowledge about GDM outcomes	
51 China	To evaluate the knowledge, attitudes and practices of GDM management among patients with GDM	A cross-sectional study	women with GDM	499			
52 India	To assess the knowledge levels among pregnant women regarding GDM, its risk factors, symptoms, complications and management; to assess the attitudes of pregnant women towards GDM screening, diagnosis and treatment; to evaluate the practices adopted by pregnant women for preventing, managing, and coping with GDM; and to understand the dietary habits, physical activity and adherence to medical recommendations in these women.	A cross-sectional study	pregnant women	174	The mean knowledge score was 5 ± 3.04 out of a total possible score of 18, indicating poor awareness of GDM among participants.	Attitude scores were moderate, with a mean of 18 ± 5.3 . The mean score in the practice section averaged 8 ± 2 out of a total possible score of 16.	

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
53 India	To evaluate the knowledge of gestational diabetes mellitus (GDM), including risk factors, importance of screening and post-partum follow-up, amongst pregnant women attending antenatal care in maternity clinics in South India.	A cross-sectional study	pregnant women	100	Regarding risk factors of GDM, 48.8% of rural women were unaware of any risk factor while 55.9% of urban women reported a family history of diabetes as a risk factor. 49.2% of urban women and 75.6% of rural women did not know the long-term consequences of GDM to babies born to GDM women. 50.8% (urban women) said GDM could lead to type 2 diabetes mellitus in future while only 45% of rural women were aware of this.		
54 Bangladesh	To assess the knowledge and attitudes regarding GDM among obese pregnant women coming for antenatal checkup at a tertiary care hospital.	cross sectional study	Obese pregnant women	107	Among 107 respondents, the majority 60.7% have poor knowledge.	But they showed positive attitude regarding GDM control, investigated and expressed positive responses for GDM education program.	
55 Kingdom of Saudi Arabia	To assess Saudi women's GDM knowledge and awareness.	cross sectional study	adult female	9002	Participants were mostly aware of the GDM risk factors (54%) while they were least aware of the GDM diagnosis (15.9%).		
56 Nigeria	To fill the gap through an exploratory inquiry on the knowledge, attitudes, and practices of healthy pregnant women in Warri, Delta State, Nigeria, on GDM, and the content of health education delivered by prenatal nurses during ANC with a focus on GDM at a local ANC.	Qualitative research design	Pregnant women and antenatal nurses.	22 (20 pregnant women and 2 antenatal nurses).	Majority of the pregnant women were unaware of GDM as a particular health condition during pregnancy that poses a risk to both maternal and infant health and could lead to a long-term risk of developing the chronic condition of Type 2 Diabetes Mellitus (T2DM).		

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
57 Nigeria	To determine the knowledge of GDM among women of reproductive age.	cross sectional study	women of reproductive age	2,595	The majority (2,351; 90.6%) had heard about DM but only 991 (38.2%) knew that diabetes can occur for the first time in pregnancy. Only 747 (28.8%), 929 (35.8%), and 790 (30.4%) respondents had good knowledge scores for GDM definition and risk factors, GDM screening diagnosis and treatment, and GDM complications, respectively. Only 681 (26.2%) had good overall knowledge of GDM.		
58 Australia	To explore the 'knowledge' of at-risk pregnant women about the role of lifestyle and diet in the prevention of GDM	Qualitative Study	pregnant women	6	Gaps included misconceptions about the cause of GDM, an incomplete understanding of lifestyle risk factors, limited awareness of the effect GDM has on mother and baby, Only 125 (31%) participants were aware of GDM.	Inconsistent views of recommended physical activity and frequency, and limited understanding of GDM preventative measures.	
59 Uganda	To evaluate the level of and factors associated with awareness of GDM among pregnant women attending antenatal care at Kawempe National Referral Hospital (KNRH), the busiest obstetric unit in Uganda, so as to assess their health sensitization needs.	Cross sectional study	Pregnant women	403			
3 Kenya	To establish the underlying factors influencing GDM Knowledge Attitude and Practices (KAP) among pregnant women at Kinango District Hospital.	Mixed-methods design	Pregnant women,	354	29.0% were knowledgeable	46.98% had good attitude and 60.17% had good practice	

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Table 3. (continued)

Author(s)/ Year/ Country	Purpose of the study	Study design	Population	Sample size	Knowledge/Awareness	Perception/Management practices	Outcomes
60 Egypt	To assess women's knowledge of many elements of gestational diabetes mellitus, including general awareness of the condition, risk factors, diabetic patients' diets, and consequences among the women in the governorate of Sohag.	Cross sectional study	Women	500	The mean total knowledge score was 9.62 ± 4.24 . A total of 69.6% of study participants showed good knowledge (≥ 9), while 30.4% of them showed low knowledge about gestational diabetes.		
61 Philippines	To investigate the knowledge of gestational diabetes mellitus (GDM) and associated preventive practices among 100 pregnant mothers in Jolo, Sulu, Philippines.	Cross sectional study	Pregnant mothers	100	Results revealed poor knowledge of GDM across all three knowledge areas	Moderate adoption of preventive strategies.	
62 India	To study the awareness about GDM among antenatal mothers.	Cross sectional study	Antenatal mothers	200	The total knowledge score about gestational diabetes was 7.72. The score for knowledge on GDM and its risk factors was 4.65. The knowledge score for awareness on screening and treatment was 1.78 and a consequence of GDM was 1.29.		
63 Kingdom of Saudi Arabia	To assess gestational diabetes mellitus (GDM) awareness among women in the Northern Borders Province of Saudi Arabia and identify factors associated with knowledge levels.	A cross-sectional study	women	461	Overall, 42.3% demonstrated fair awareness of GDM, 34.3% had good awareness, and 23.4% had poor awareness.		

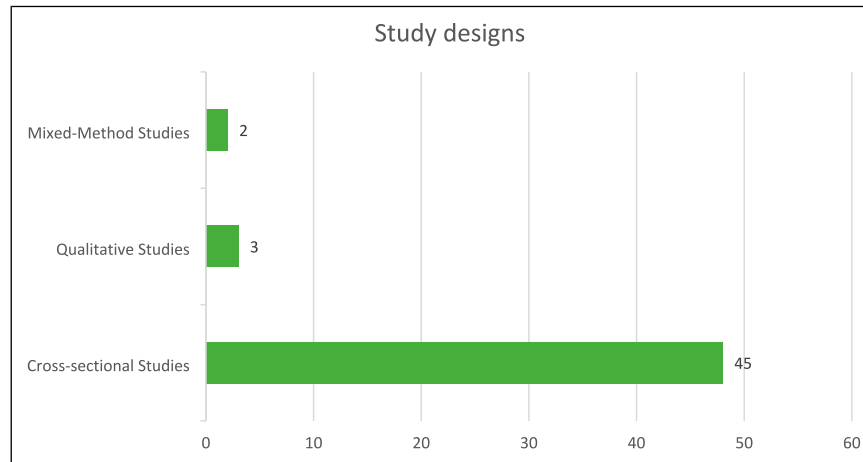


Figure 2. Distribution of study designs.

participants still lacked detailed or accurate knowledge.^{18,19,38,42} This broad pattern of limited understanding suggests that many women encounter gaps in health information related to GDM during pregnancy. Across studies, considerable variability in GDM knowledge levels was observed, with some groups showing basic awareness while others demonstrated substantial knowledge deficits.^{17,21,22,31,43,60} Despite this variability, most studies consistently identified similar knowledge gaps, particularly regarding risk factors, screening procedures, diagnostic criteria, and long-term health implications. Women commonly struggled to identify major risk factors such as obesity, advanced maternal age, and family history of diabetes.^{40,46,53} Many were also unfamiliar with recommended screening schedules, diagnostic processes, and key aspects of GDM management.^{32,39,47} A particularly notable finding was the limited understanding of long-term consequences, as many women were unaware that GDM increases the risk of type 2 diabetes mellitus later in life and heightens the likelihood of metabolic complications in offspring.^{37,45,53}

The findings further indicated that healthcare facilities and healthcare providers constituted the primary sources of information about GDM. Women frequently relied on antenatal clinics, hospital visits, and consultations with nurses, midwives, and physicians to obtain information about the condition.^{23,27,46} Structured educational interventions delivered within these settings were consistently associated with higher knowledge levels compared to routine counselling alone,

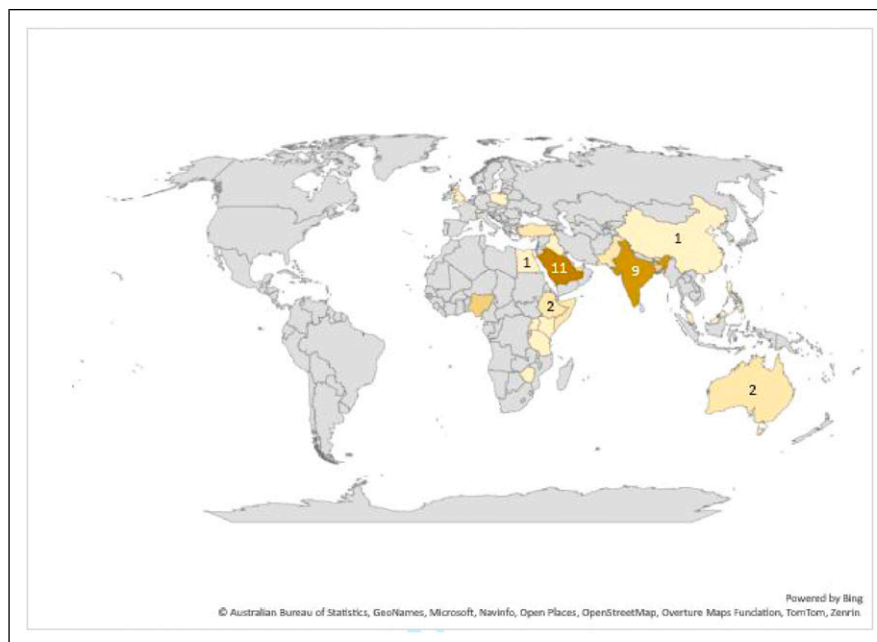


Figure 3. Global distribution of the included studies.

Table 4. Appraisal of cross-sectional studies.

Author(s)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
16	YES	YES	YES	YES	NO	NO	YES	YES	6/8
17	YES	YES	YES	YES	NO	NO	YES	YES	6/8
18	YES	YES	YES	YES	NO	NO	YES	YES	6/8
19	YES	YES	YES	YES	NO	NO	YES	YES	6/8
20	YES	YES	YES	YES	NO	NO	YES	YES	6/8
21	YES	YES	YES	YES	NO	NO	YES	YES	6/8
22	YES	YES	YES	YES	NO	NO	YES	YES	6/8
23	YES	YES	YES	YES	NO	NO	YES	YES	6/8
24	YES	YES	YES	YES	NO	NO	YES	YES	6/8
25	YES	YES	YES	YES	NO	NO	YES	YES	6/8
26	YES	YES	YES	YES	NO	NO	YES	YES	6/8
5	YES	YES	YES	YES	YES	NO	YES	YES	7/8
28	YES	YES	YES	YES	NO	NO	YES	YES	6/8
29	YES	YES	YES	YES	NO	NO	YES	YES	6/8
30	YES	YES	YES	YES	YES	YES	YES	YES	8/8
31	YES	YES	YES	YES	NO	NO	YES	YES	6/8
32	YES	YES	YES	YES	NO	NO	YES	YES	6/8
33	YES	YES	YES	YES	NO	NO	YES	YES	6/8
34	YES	YES	YES	YES	NO	NO	YES	YES	6/8
35	YES	YES	YES	YES	NO	NO	YES	YES	6/8
36	YES	YES	YES	YES	NO	NO	YES	YES	6/8
38	YES	YES	YES	YES	NO	YES	YES	YES	7/8
39	YES	YES	YES	YES	NO	NO	YES	YES	6/8
40	YES	YES	YES	YES	NO	NO	YES	YES	6/8
41	YES	YES	YES	YES	NO	NO	YES	YES	6/8
42	YES	YES	YES	YES	NO	NO	YES	YES	6/8
43	YES	YES	YES	YES	NO	NO	YES	YES	6/8
44	YES	YES	YES	YES	NO	NO	YES	YES	6/8
45	YES	YES	YES	YES	NO	NO	YES	YES	6/8
46	YES	YES	YES	YES	NO	NO	YES	YES	6/8
47	YES	YES	YES	YES	NO	NO	YES	YES	6/8
48	YES	YES	YES	YES	NO	NO	YES	YES	6/8
49	YES	YES	YES	YES	NO	NO	YES	YES	6/8
50	YES	YES	YES	YES	NO	NO	YES	YES	6/8
51	YES	YES	YES	YES	NO	NO	YES	YES	6/8
52	YES	YES	YES	YES	NO	NO	YES	YES	6/8
53	YES	YES	YES	YES	NO	NO	YES	YES	6/8
54	YES	YES	YES	YES	NO	NO	YES	YES	6/8
55	YES	YES	YES	YES	NO	NO	YES	YES	6/8
57	YES	YES	YES	YES	YES	NO	YES	YES	7/8
59	YES	YES	YES	YES	NO	NO	YES	YES	6/8
60	YES	YES	YES	YES	NO	NO	YES	YES	6/8
61	YES	YES	YES	YES	NO	NO	YES	YES	6/8
62	YES	YES	YES	YES	NO	NO	YES	YES	6/8
63	YES	YES	YES	YES	YES	NO	YES	YES	7/8

suggesting that active, intentional teaching strategies are more effective than passive information-sharing during consultations.^{5,16,30} Despite the central role of healthcare settings, significant barriers reduced the accessibility and effectiveness of GDM-related health information. Several studies reported limited availability of structured educational programmes, inconsistent delivery of antenatal health education, and limited use of community-based health promotion or

Table 5. Appraisal of qualitative studies.

Author(s)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
37	YES	YES	YES	YES	YES	NO	NO	YES	YES	YES	8/10
56	YES	YES	YES	YES	YES	NO	NO	YES	YES	YES	8/10
58	YES	YES	YES	YES	YES	NO	NO	YES	YES	YES	8/10

Table 6. Appraisal of mixed-method studies.

Author(s)	Q1	Q2	Q3	Q4	Q5	TOTAL
27	YES	YES	YES	YES	YES	5/5
3	YES	YES	YES	YES	YES	5/5

public awareness campaigns.^{42,56} As a result, many women relied on informal information sources, such as family members, peers, or internet searches, sources that often provided incomplete, conflicting, or inaccurate information.³⁷ Women with limited literacy, language barriers, or restricted access to healthcare services faced additional challenges in obtaining reliable information, leading to further disparities in knowledge.^{5,53}

Studies also highlighted instances in which healthcare providers themselves had insufficient knowledge about GDM diagnosis, management, and long-term follow-up. This limitation may have reduced the accuracy and depth of information shared with patients during antenatal visits.^{29,56} In many settings, antenatal education sessions prioritised topics such as labour preparation, nutrition, or infant care, leaving limited time for detailed discussions on GDM, particularly where routine screening was not consistently practised.^{30,56}

Perceptions and attitudes towards GDM

The studies included in this review revealed diverse and often contrasting perceptions and attitudes toward GDM. A common finding was that many women perceived GDM as a temporary condition that resolved after childbirth, which contributed to reduced concern about its long-term implications for their own health and that of their children.^{37,58} This perception was particularly evident among women who experienced few symptoms or whose condition was managed through dietary changes alone. For some, GDM was not seen as a serious medical condition, especially in comparison with pre-existing diabetes mellitus, leading to limited motivation to adopt lifestyle modifications or engage in postpartum follow-up care.³⁷ Misconceptions regarding the causes of GDM frequently shaped negative emotional responses. Several studies reported that women attributed their diagnosis to personal shortcomings, such as poor diet choices or inadequate self-care, resulting in feelings of guilt, self-blame, and shame.⁵⁸ These emotional reactions influenced their readiness to accept the diagnosis and participate in recommended management strategies.

Despite these challenges, other studies highlighted more positive and proactive attitudes toward GDM. Some women expressed acceptance of their diagnosis and demonstrated willingness to engage with recommended screening, treatment, and lifestyle modifications.^{23,35,54} Women who understood the potential risks of uncontrolled GDM for foetal health showed stronger motivation to adhere to dietary recommendations, physical activity, glucose monitoring, and follow-up appointments.^{20,52} Supportive interactions with healthcare providers played a significant role in fostering such positive attitudes, as women valued clear communication, reassurance, and guidance from clinicians.⁵¹ Additionally, women with prior exposure to diabetes through family experience tended to respond more confidently to the diagnosis and demonstrated greater acceptance of GDM management requirements.²⁷ However, practical challenges such as household responsibilities, financial limitations, and insufficient family support commonly interfered with adherence to recommended behaviours.³⁹ Women's perceptions of susceptibility also shaped their behaviour; those who believed they were at low risk for complications were less likely to engage in preventive actions.³⁵

Social and cultural contexts further influenced women's attitudes and practices. Cultural norms around food, family expectations, and limited autonomy in decision-making sometimes restricted women's ability to prioritise their health needs.^{56,58} Emotional responses to diagnosis also played a critical role. Many women experienced anxiety, fear, or distress, particularly regarding potential harm to the baby and the possibility of childbirth complications, which, in some cases, hindered their capacity to engage effectively in self-management.³⁷

Discussion

Knowledge and awareness of GDM among women

The findings of this review show that women's knowledge and awareness of gestational diabetes mellitus (GDM) remain inadequate across different settings and populations. Many women demonstrated only basic awareness of GDM and had limited understanding of its causes, risk factors, screening procedures, management strategies, and long-term consequences.^{3,5,26,30,33,59} Although some studies reported moderate awareness levels, detailed and functional knowledge required for effective prevention and self-management was often lacking.^{18,19,38,42} These findings suggest that existing

antenatal education approaches may increase awareness without necessarily improving women's understanding of the condition in ways that support informed decision-making and sustained behavioural change.

A consistent finding across studies was the variability in women's understanding of GDM. Knowledge gaps were commonly reported in relation to risk factors, screening schedules, diagnostic criteria, postpartum follow-up, and disease management.^{17,21,22,31,43,60} Women with prior exposure to diabetes, regular antenatal attendance, or positive interactions with healthcare providers generally demonstrated better understanding than those with limited healthcare access or lower health literacy.^{4,64} However, misconceptions remained common. Some women believed that GDM was caused entirely by poor diet or personal negligence, leading to confusion, guilt, and self-blame.^{58,65} These misconceptions indicate the need for clearer and culturally appropriate public health messages that present GDM as a complex pregnancy-related metabolic condition rather than a personal failure.

Limited awareness of the long-term implications of GDM was also evident across the reviewed studies. Many women were unaware that GDM increases the future risk of type 2 diabetes mellitus and other cardiometabolic complications for both mothers and their children.^{37,45,53} This poor understanding may contribute to low rates of postpartum screening and weak adherence to long-term preventive behaviours reported in previous studies.^{4,64} The findings therefore suggest that knowledge alone may not be sufficient to improve outcomes. Women also require supportive environments, practical guidance, and continuous follow-up to translate knowledge into sustained lifestyle modification and long-term risk reduction.^{4,64}

Healthcare providers and antenatal clinics were consistently identified as the main sources of GDM information.^{5,16,30} Studies showed that structured and targeted educational interventions were more effective than routine counselling in improving women's understanding of GDM.^{5,16} However, limited consultation time, competing clinical priorities, and inconsistent provider knowledge often reduced the quality and depth of information delivered during antenatal care visits.^{29,56} These limitations are important because effective communication and supportive patient-provider relationships have been associated with improved engagement in screening, treatment adherence, and postpartum follow-up.^{51,66} Strengthening provider training and integrating structured GDM education into routine antenatal care may therefore improve women's understanding and engagement with care.

The review further showed that many women relied on informal sources of information, including family members, peers, and online platforms.^{37,56} These sources often provided incomplete or inaccurate information, especially in settings where access to formal health education was limited. Low literacy levels, language barriers, and socioeconomic challenges further influenced women's ability to access and understand accurate health information.^{5,53} These findings highlight the importance of community-based and culturally sensitive educational strategies that extend beyond health facilities. Community health workers, peer support systems, and digital health interventions may help improve access to reliable GDM information, particularly in underserved settings.

Perceptions and attitudes towards GDM

The review showed that women's perceptions and attitudes toward GDM were shaped by personal experiences, emotional responses, cultural beliefs, and social circumstances. A common perception across studies was that GDM is a temporary condition that resolves after childbirth.^{7,37,58} Women who experienced mild symptoms or managed the condition through dietary changes alone were particularly likely to minimise its seriousness. As a result, some women viewed GDM as less severe than pre-existing diabetes and showed lower motivation for postpartum follow-up and long-term lifestyle modification.^{37,67} These findings indicate that women may underestimate the long-term health implications of GDM for themselves and their children.

Emotional responses to GDM diagnosis were also prominent in the reviewed studies. Women frequently reported feelings of guilt, anxiety, fear, shame, and self-blame, especially when they believed that their condition resulted from poor lifestyle choices or inadequate self-care.^{58,68} Stigma associated with the diagnosis sometimes further affected women's confidence and willingness to engage fully with management recommendations.⁶⁸ These findings demonstrate that GDM is not only a medical condition but also a psychological and social experience that can influence women's attitudes toward care and self-management.

Despite these challenges, several studies reported positive attitudes toward GDM management. Women who understood the potential risks of uncontrolled GDM for maternal and foetal health were more likely to adopt recommended dietary practices, engage in physical activity, monitor blood glucose levels, and follow medical advice.^{20,23,35,52,54} Supportive relationships with healthcare providers also encouraged positive engagement with treatment and follow-up care.^{51,69} In addition, prior family exposure to diabetes appeared to improve women's acceptance of the diagnosis and their understanding of disease management.²⁷ These findings suggest that supportive counselling, peer support, and family involvement may strengthen women's motivation and confidence in managing GDM.

However, the review also identified a persistent gap between women's attitudes and their ability to implement recommended self-care practices. Even when women expressed willingness to follow medical advice, structural and social barriers often limited adherence to dietary recommendations, physical activity, glucose monitoring, and follow-up care.^{3,39,52,61} Financial difficulties, household responsibilities, limited social support, and restricted access to healthy foods commonly interfered with self-management efforts. Cultural norms and family expectations also influenced women's ability to prioritise their health and maintain lifestyle changes.^{56,58,70} These findings indicate that improving GDM outcomes requires more than education alone. Effective interventions should address the broader social and structural conditions that shape women's health behaviours. Healthcare systems also played an important role in shaping women's perceptions and experiences of GDM. Although healthcare providers were major sources of information and support, inconsistent counselling, limited consultation time, and inadequate provider knowledge sometimes reduced opportunities for comprehensive patient education.^{64,69} Studies consistently showed that structured and patient-centred educational interventions improved women's understanding, confidence, and engagement with GDM care.⁶⁶ These findings highlight the importance of strengthening antenatal education, improving provider communication skills, and integrating culturally appropriate counselling approaches into routine maternal healthcare services.

Implications for policy, practice, and GDM management

The findings of this review demonstrate the need to strengthen educational frameworks and health literacy initiatives targeting GDM across diverse populations. At the policy level, ministries of health and public health authorities must formally recognise GDM education as a core component of antenatal care rather than an optional supplement. National screening programmes should mandate structured patient education at diagnosis, and incorporate clear information about risk factors, long-term maternal and child health consequences, and preventive strategies. Furthermore, policies must ensure adequate consultation time for healthcare providers to deliver meaningful patient education rather than brief, information-dense encounters that overwhelm women. Investment in culturally adapted, multilingual educational resources is essential to address disparities in health literacy and reach socioeconomically disadvantaged populations. Additionally, provider training programmes for obstetricians, midwives, nurses, and dietitians should incorporate communication skills, behaviour change counselling, and health literacy principles to enhance the quality of patient-provider interactions. Accreditation standards for maternal health services should include provisions for patient education quality, ensuring that all pregnant women receive consistent, evidence-based information about GDM regardless of geographical location or healthcare setting.

Moreover, healthcare systems must establish multi-channel health promotion strategies that extend beyond clinical consultations to reach women during preconception and throughout pregnancy. Public health campaigns utilising mass media, social media platforms, and community outreach can raise population-level awareness about GDM and its implications. Furthermore, antenatal education programmes should dedicate substantial time to GDM prevention and management rather than focusing exclusively on labour and newborn care. Healthcare facilities should develop peer support networks to connect women with a lived experience of GDM to newly diagnosed patients, to facilitate knowledge sharing and emotional support. Family-centred education approaches that involve partners and relatives can enhance home-based support for dietary modifications and blood glucose monitoring. Additionally, healthcare systems must address structural barriers to care access, including transportation challenges, appointment scheduling flexibility, and affordability of healthy foods and monitoring supplies. Nevertheless, GDM outcomes require integrated approaches that address individual knowledge deficits alongside interpersonal, community, and systemic determinants of health behaviour. Healthcare providers must move beyond information transmission towards patient-centred counselling that acknowledges women's life circumstances, cultural beliefs, and practical constraints. Postpartum follow-up systems need strengthening through reminder systems, flexible appointment scheduling, and integration of diabetes screening into routine childcare visits. Furthermore, healthcare organisations should implement continuous quality improvement processes that monitor patient education delivery, assess knowledge retention, and evaluate self-management outcomes. Educational interventions must be rigorously evaluated using standardised measures to identify effective strategies for diverse populations. Ultimately, enhanced knowledge and appropriate perception of GDM will facilitate earlier diagnosis, improved glycaemic control, and greater participation in preventive initiatives.

Limitations of this review

This review presents some limitations that may influence the interpretation and generalisability of its findings. The predominant use of cross-sectional study designs among the included studies restricts the ability to draw causal inferences about the relationships between knowledge, awareness, perceptions, and health outcomes in GDM. Whilst the inclusion of all studies regardless of quality rating enhanced comprehensiveness, it introduced the risk that findings from studies with

moderate bias may affect the reliability of the synthesis. Some included studies exhibited methodological limitations, particularly in identifying and managing confounding variables such as maternal age, parity, and socioeconomic status. All eligible studies were retained to achieve thorough evidence coverage across different populations and geographical contexts. However, no subgroup or sensitivity analyses were conducted to account for heterogeneity across study populations. This might have contributed to increased heterogeneity in the outcomes. Additionally, qualitative studies consistently lacked reflexivity reporting, potentially reducing the transparency and trustworthiness of interpretations. These shortcomings may affect the internal validity of findings and should be considered when interpreting the overall results of this review. Moreover, the review focused exclusively on studies published in English, which may have resulted in language bias and the exclusion of relevant research conducted in non-English-speaking regions, thereby limiting cultural diversity and global applicability. The geographical concentration of studies in Saudi Arabia, India, and Nigeria creates a regional skew that may not reflect the realities of GDM education in other healthcare systems, especially in underrepresented regions. Furthermore, variations in how key constructs such as ‘knowledge’, ‘awareness’, and ‘perception’ were defined and measured across studies posed challenges for cross-study comparisons. Different assessment tools, scoring systems, and cut-off points for categorising knowledge levels hindered the direct comparability of findings. These methodological inconsistencies highlight the need for standardised measurement approaches in future research.

Recommendations for future research

Future research should adopt longitudinal and interventional study designs to assess the long-term impact of educational interventions on knowledge retention, health behaviours, and maternal-child outcomes following GDM diagnosis. There is a pressing need for culturally diverse and context-specific investigations, particularly in underrepresented regions such as sub-Saharan Africa, Southeast Asia, and Latin America, to capture the varied educational needs across different healthcare systems. Furthermore, studies should incorporate balanced perspectives by exploring healthcare providers’ knowledge gaps, communication challenges, and educational practices to provide a holistic understanding of GDM education delivery. The development and validation of standardised tools to measure knowledge, awareness, and perceptions across diverse populations would enhance comparability across studies and facilitate evidence synthesis. Moreover, interventional studies evaluating the effectiveness of multi-channel health promotion strategies, family-centred education approaches, and technology-enhanced learning platforms will be instrumental in identifying evidence-based practices for improving GDM awareness and management outcomes globally. Lastly, future studies should explore the long-term impacts of educational interventions across diverse cultural contexts.

Conclusion

The findings from this review show that knowledge and awareness of GDM remain inadequate globally. Most women had only a limited understanding of the condition, particularly its risk factors, screening procedures, and long-term health risks. Women’s perceptions and attitudes were shaped by cultural norms, emotional responses, and the quality of healthcare interactions. While some women demonstrated positive attitudes toward management, a gap between intention and actual self-care practices was common. The findings highlight the need for targeted educational interventions, culturally sensitive resources, and enhanced patient-provider engagement. These strategies could improve understanding, encourage positive attitudes, and support better health outcomes. However, the predominance of cross-sectional studies and geographical concentration limits generalisability. Future research should employ longitudinal designs and standardised measures across diverse populations to strengthen the evidence base.

Acknowledgements

The authors are most grateful to all research assistants.

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CA and EFOA conceptualised the study and developed the review questions. CA, EFOA, DA, EJ and SEB contributed to the development of the methodology, review questions and writing of the manuscript. All authors reviewed, edited and approved the final manuscript.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Supplemental material

Supplemental material for this article is available online.

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