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Review

Incidence, Prevalence, and Associated Risk Factors of Gestational Diabetes Mellitus Among Australian Migrants: A Scoping Review

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Highlights

Public health relevance—How does this work relate to a public health issue?

- Migrant women in Australia experience a disproportionately higher burden of gestational diabetes mellitus (GDM) than non-migrant women.
- GDM is associated with long-term metabolic health consequences and increased intergenerational risk of diabetes and chronic conditions.

Public health significance—Why is this work of significance to the public?

- GDM is a growing public health concern that contributes to maternal and child health inequities in Australia.
- This review maps the available evidence on the incidence, prevalence, and risk factors of GDM among migrant women, identifying important gaps in the literature.

Public health implications—What are the key implications or messages for practitioners, policy makers and/or researchers in public health?

- Culturally responsive prevention strategies, screening, and education strategies are needed for high-risk migrant populations.
- Future research should investigate post-migration-related factors, including length of residence, acculturation, and healthcare access, to inform targeted interventions and improve overall maternal health.

Abstract

Background: Over the past few decades, the prevalence of gestational diabetes mellitus (GDM) has increased, adversely affecting migrant women. Inequities in maternal health persist in Australia, with women from Asian and South Asian backgrounds experiencing worse outcomes. This scoping review compared the incidence, prevalence, and risk factors for GDM among migrant women in Australia. Methods: Following the PRISMA extension for the Scoping Review checklist, we conducted a systematic literature search in MEDLINE, CINAHL, PubMed, Emcare, Scopus, Cochrane Library, and ProQuest in June 2026. We screened 3648 articles and included 19. Results: The incidence of GDM ranged from 3 to 23%, and the prevalence from 4 to 25%. Non-modifiable risk factors included maternal age, ethnicity, country/region of birth, family history of diabetes, parity, length of residency, and

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history of GDM. Modifiable factors included BMI ≥ 30 kg/m^2, perinatal anxiety/depression, and socioeconomic status. Migrant women from China and Southeast Asia were at significantly higher risk than non-migrant Australians, by four and three times, respectively. Lifestyle changes, social support, and access to healthcare in the post-migration period remain poorly studied. Conclusions: The incidence and prevalence of GDM are higher among migrant women from Asia than among other women in Australia. Maternal age, ethnicity, country or region of birth, family history of diabetes, parity, length of residence, history of GDM, obesity, perinatal anxiety or depression, and socioeconomic disadvantage were identified as important risk factors for GDM among migrant women.

Keywords: gestational diabetes mellitus; migration; ethnicity; maternal health; Australia

1. Introduction

Gestational diabetes mellitus (GDM) has increased markedly in recent years internationally and is now recognized as the fastest-growing type of diabetes among women in Australia [1,2]. In 2023–2024, there were around 49,800 women (18% of all pregnancies) diagnosed with GDM [3]. This is double the proportion of women with GDM in 2012–2013 [3]. Such a high prevalence of GDM poses a major challenge for the Australian health system. This gap highlights a broader pattern of racial and ethnic disparities in maternal health outcomes.

GDM is defined as any glucose intolerance diagnosed or first detected during pregnancy [4]. While GDM is usually temporary, it can have immediate and long-term adverse health impacts for women and their offspring. Glucose intolerance usually resolves postpartum, but it can recur in future pregnancies and may increase the likelihood of developing type 2 diabetes mellitus (T2DM) in women and their children [3,4]. In addition, intergenerational risk is evident, as daughters of women with GDM are more likely to develop GDM in their own pregnancies [5,6]. This pattern may contribute to a cyclical process of diabetes and related health concerns within the broader population [7].

Established risk factors for GDM include maternal age ≥ 35 years, body mass index (BMI) > 30 kg/m^2, and a family history of diabetes (FHOD) and/or GDM [8,9]. Furthermore, the literature from multicultural countries, including the United Kingdom (UK), United States (US), Denmark, Sweden, Finland and Australia, indicated that certain ethnic groups were more likely to develop GDM [8,9] and that migrant women from Southeast Asian and Central Asian backgrounds were more likely to develop GDM [7,10–14]. Migrant women from Southern and Central Asian backgrounds had a higher prevalence of GDM in 2023–2024 (33.1%) than Australian women who were not migrants (16%), and there were more adverse pregnancy outcomes [3].

From a public health perspective, migration is known as a social determinant of health [15]. There are currently 8.2 million migrants (30.7% of the population) living in Australia [16], and migrants made up 73% of all arrivals in 2022–2023 [17]. This could significantly affect primary care and maternity services. However, the mechanisms underlying GDM risk remain undefined. It likely involves a combination of genetic, biological, behavioral, and environmental factors. The international research collaboration 'Reproductive Outcome And Migration' (ROAM) study suggested that women who migrated from lower socioeconomic status (SES) environments may face an increased risk of insulin resistance and diabetes due to early-life nutritional deficiencies, with potential intergenerational impacts [9,18]. Women who have migrated are also at greater risk of GDM after migration because they are more likely to change their diets, increasing energy and fat

intake, reducing fruit and vegetable intake, and increasing meat and dairy intake due to food insecurity [9,19,20].

Despite these recognized factors, few Australian studies clearly determine the incidence, prevalence, and risk factors specific to this high-risk subset of the population for GDM. Findings from international studies, often focused on Hispanic and African-descent populations, may not generalize to the Australian migrant context [21,22]. Based on this background, this scoping review aims to examine and summarize the existing literature to understand the current incidence, prevalence, and potential risk factors associated with GDM among migrant women in Australia.

2. Materials and Methods

2.1. Protocol and Registration

We developed a protocol before commencing the review and registered it with the Open Science Framework (https://doi.org/10.17605/OSF.IO/62SDA).

2.2. Review Design

This review uses the methodological framework of Arksey and O'Malley [23] with Joanna Briggs Institute (JBI) enhancements [24], and it is structured into the following steps: (i) identifying research questions; (ii) identifying relevant articles; (iii) selecting articles; (iv) charting data; (v) presenting the results, discussion, and conclusion. To promote transparency and methodological rigor, the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) checklist was used for reporting [25] (see Table S1).

2.3. Identifying the Research Question

The search strategy and specific terms were guided by the following primary research questions that underpinned this review:

1. What are the incidence and prevalence of GDM among migrant women in Australia?
2. Which risk factors are associated with GDM among migrant women in Australia, and do these risk factors differ by country or region of birth?

2.4. Eligibility Criteria

The eligibility criteria for this review were defined using the PCC (Population–Concept–Context) framework, in line with updated JBI methodological guidance [26,27].

- Population: Migrant and all multi-ethnic women.
- Concept: Incidence, prevalence, and risk factors of GDM.
- Context: Australian healthcare or population settings.

A systematic search was conducted from database inception to January 2022 and updated in June 2026 to include the most recent evidence. We included studies reporting the incidence, prevalence, or risk factors for GDM in migrant or multi-ethnic populations. A migrant is defined as a person who was born overseas and has lived in Australia for 12 months or more [28]. We also included studies examining racial or ethnic differences in GDM outcomes, as they are relevant to understanding maternal health disparities among migrants. For this review, we included both published and unpublished articles, including book chapters, and grey literature such as theses and dissertations, technical reports, census reports, and government reports related to GDM. Grey literature was included to reduce publication bias, capture Australian-specific national data not available in the peer-reviewed literature, and align with JBI methodological guidance for scoping reviews [24]. Reference lists from previous reviews on related topics were also screened for relevant articles. We

excluded studies if the full text was unavailable or if they were not published in English. We also excluded studies that did not report on migrant or multi-ethnic populations. The inclusion and exclusion criteria are summarized in Table 1.

Table 1. Inclusion and exclusion criteria for scoping review.

Characteristics	Inclusion Criteria	Exclusion Criteria
Study design	Both quantitative and qualitative studies	Reviews, editorials, conference abstracts, and protocols
Population	Data reported relative to migrant or multi-ethnic women, as well as overseas-born and/or Culturally and linguistically diverse (CALD) women	Indigenous only, non-migrant Australian women only, and studies not reporting migrant/ethnic-specific data
Concept	Incidence, prevalence, and risk factors of GDM	Pathophysiology, genetics, GDM management and treatment, clinical trials, GDM screening and diagnostic only, healthcare experiences, knowledge, attitudes, practice
Context	Australian Studies (any state or territory, and any healthcare setting). Studies from other countries will be used for background only unless they include an Australian migrant sample	Non-Australian Studies
Language	English literature	Non-English literature

2.5. Search Strategy for Electronic Databases

We conducted a comprehensive search using truncation and proximity operators across multiple databases. We searched MEDLINE (EBSCOhost interface), CINAHL (EBSCOhost interface), PubMed, Emcare (Ovid interface), Scopus, Cochrane Library, and ProQuest. We searched ProQuest for book chapters and theses, and Google Scholar for grey literature, government websites, and reports. The MEDLINE search used three concept blocks, combined with AND:

- GDM: "Gestational diabet*" OR GDM OR "Gestational diabetes mellitus" OR (diabet* N3 pregnan*), together with the corresponding exploded MeSH terms (MH "Diabetes, Gestational+").
- Migrant status: Migrant* OR immigrant* OR CALD OR (overseas N2 born) OR ethnic*, together with the corresponding MeSH terms (MH "Emigrants and Immigrants+").
- Australia: Australia* OR Victoria* OR "New South Wales" OR "Western Australia* OR "South Australia" OR Queensland* OR "Northern Territory" OR "Australian Capital Territory" OR Tasmania*, together with the corresponding MeSH term (MH "Australia+")

A sample MEDLINE search using Boolean operators is shown in Table S2. We used equivalent search strategies across all databases.

2.6. Study Selection

Initially, titles and abstracts of records were downloaded, imported into EndNote and then transferred to the Covidence online library (n = 3648) [29]. Duplicates were automatically removed in Covidence. Two authors (MH and RC) independently screened titles and abstracts, and three authors (MH, RC, and SA) then independently evaluated

the full texts of the remaining articles to assess the reliability of the inclusion and exclusion criteria. The third author (MAR) resolved any disagreements.

2.7. Charting the Data

We charted data using a standardized data extraction table developed for this review. The charted data included author(s), year of publication, study location, study design, study period, data source(s), population characteristics, GDM definition and diagnostic criteria, and reported findings, including prevalence, incidence, and risk factors. Two independent researchers subsequently reviewed and verified all extracted data to ensure consistency and accuracy. A descriptive summary table synthesized study characteristics and key findings, including measures of GDM prevalence and incidence, population groups (migrant versus non-migrant Australian women), and reported effect estimates for risk factors. We also identified gaps in the existing literature. Because prevalence and incidence are distinct epidemiological measures, we analyzed and reported them separately and presented the findings in tables and figures. We categorized identified risk factors as modifiable or non-modifiable, summarized them narratively, and presented them in separate sections and figures.

2.8. Quality of the Selected Studies

We assessed the quality of the included studies using the Critical Appraisal Skills Program (CASP) checklist [30]. We conducted the appraisal using a structured CASP tool tailored to each study design, including the *Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies*, where applicable. We then descriptively appraised studies using the CASP checklist and categorized them using an interpretive evidence classification based on study aims, methodologies, research designs, recruitment and sample selection, ethical approval, data collection and analytical depth, results, and overall relevance and applicability to the field. We independently assessed methodological quality and rigor, following JBI and PRISMA-ScR guidance [25,26]. We did not exclude studies based on appraisal results, as critical appraisal in scoping reviews supports interpretation rather than eligibility decisions. The assessments helped interpret and weigh the findings, giving greater emphasis to higher-quality studies and interpreting lower-quality studies with caution. Among the included studies, category A studies received the greatest weight: population-based, nationwide studies; category B studies contributed to large-scale, state-level studies with partial confounder adjustment, and conclusions were to be interpreted with moderate caution; and category C studies were hospital-based or explanatory studies, identifying emerging signals and research gaps rather than establishing definitive patterns.

3. Results

3.1. Search Results

Initially, a total of 3648 articles were identified and imported into Covidence [29]. After removing 692 duplicates, 2956 articles remained and were screened by title and abstract. We then assessed 339 full-text articles for eligibility. Finally, 19 peer-reviewed articles met the inclusion criteria and were included. The selection process is shown in the PRISMA-ScR flow chart [25] as presented in Figure 1.

3.2. Characteristics of Included Studies

Reflecting the distribution of the Australian population, most studies were conducted in Victoria (VIC; $n = 10$) and New South Wales (NSW; $n = 5$), with one article each from Western Australia (WA; $n = 1$) and Queensland (QLD; $n = 1$) [14,31–47]. Of these, one was conducted nationwide ($n = 1$), and another was an international collaboration comparing

native Chinese women living in Shanghai, China, with Chinese migrants residing in VIC, Australia ($n = 1$) [18]. Study designs included hospital-based cohorts, retrospective and prospective population-based studies, and cross-sectional analyses. This scoping review also provides an opportunity to discuss screening and diagnostic methods for identifying GDM in recent decades [48]. Diagnostic criteria varied across studies; the Australian Diabetes in Pregnancy Society (ADIPS) guideline was the most used method for diagnosing GDM ($n = 8$), followed by the International Association of Diabetes and Pregnancy Study Groups (IADPSG) guideline ($n = 4$) and the WHO guideline ($n = 2$). Four studies did not report diagnostic methods ($n = 4$). Previously, the 75 g oral glucose tolerance test (OGTT) was the standard method for diagnosing GDM in Australia, with criteria of fasting ≥ 5.5 mmol/L and 2 h > 8 mmol/L, until the national transition to IADPSG in 2015. Several studies have found that GDM prevalence has increased significantly as diagnostic and screening criteria have changed. A few studies have also reported a substantial increase in GDM prevalence due to changes in diagnostic and screening criteria [49,50]. Table 2 demonstrates the characteristics of the included studies.

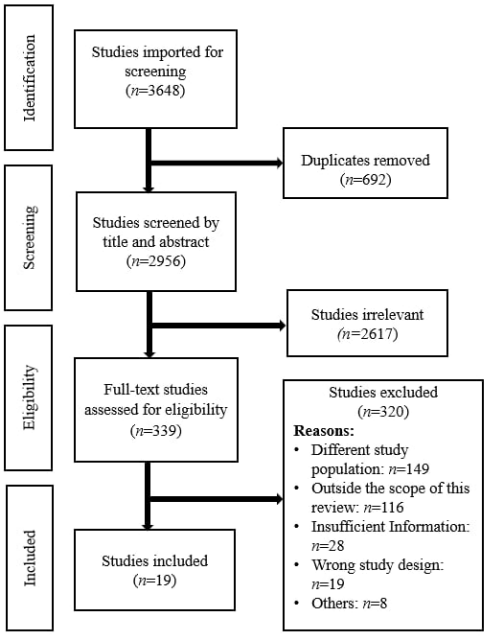


Figure 1. PRISMA-ScR flow chart of the article selection process.

3.3. Incidence and Prevalence

We examined GDM incidence and prevalence from 1979 to 2025 in the selected articles. Across the six studies included in the review, incidence ranged from 3% to 23% [34,37,39–41]. One study reported that the incidence of GDM rose from 3.3% to 7.5% between 1979 and 1988 ($p < 0.01$) [34]. Another study found that Asian migrant women had the highest prevalence of GDM (11.5%) compared with non-migrant women (3.7%) ($p < 0.001$) [46]. A study reported that the incidence of GDM was significantly higher among Vietnamese migrant women (7.8%) than among non-migrant women (4.3%) [37]. In addition, another study found that the overall GDM incidence rose from 3.5% in 2010 to 13.7% in 2017 [40]. The most recent national-level study found that GDM prevalence rose from 9.3% to 15.7% between the pre-COVID-19 (2016–2019) and COVID-19 (2020–2021) periods, corresponding to an AAPC of +10.9% [41]. The largest increase occurred in the Northern Territory (NT), where the percentage rose from 6.7% in 2016 to 19.2% in 2021 (AAPC +24.6%). Over the same period, incidence remained higher among women from Southeast Asian countries (12.2–22.5%) than among non-migrant Australian women (7.2–9.0%) [41].

Table 2. Characteristics of the included articles in the scoping review.

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Abouzeid et al., 2014 [31]	Population-based observational study VIC	All births, n = 634,932	OGTT ≥ 5.5 mmol/L fasting and/or ≥8.0 mmol/L 2 h	VPDC, 1999–2008	Prevalence GDM prevalence increased from 7.3% to 8.2% among migrant women, and 3% to 4% among non-migrant Australian women	Not reported	Large population-based study; lack of BMI and lifestyle data may have resulted in residual confounding
Abouzeid et al., 2015 [14]	Population-based observational study VIC	Primiparous women, n = 269,682	Not reported	VPDC, 1999–2008	Not reported	Maternal age > 30 ROB in SEA (AOR: 2.79, 2.63–2.96) ROB in NEA (AOR: 3.2, 2.95–3.47) ROB in SCA (AOR: 3.51, 3.25–3.78)	Important confounders such as BMI were unavailable, limiting adjustment for metabolic risk factors
Alwash et al., 2023 [33]	Population-based cross-sectional study QLD	All births ≥ 20 weeks gestation or birthweight ≥ 400 g n = 606,662	Not reported	QPDC 2009–2018 with projections to 2030	Prevalence GDM Prevalence increased from 6.8% to 17.5% among migrant women; and from 5.1% to 12.1% among non-migrant Australian women	Not reported	Large population-based study; no adjusted effect estimates reported for individual risk factors

Table 2. *Cont.*

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Anna et al., 2008 [32]	Retrospective cohort study NSW	All births of >20 weeks of gestation n = 956,738	50 g OGTT, WHO 1985 criteria	MDC dataset, 1995–2005	Prevalence Overall GDM prevalence is 4.4%	COB (AOR 4.22, 4.01–4.44) Maternal age > 40 years (AOR: 6.13, 5.79–6.49) Low SES (AOR: 1.65, 1.60–1.70)	Long-term trend data: COB is used as a proxy for migration and ethnicity, which may not fully capture a person's migration status Lack of BMI data
Beischer et al., 1991 [34]	Retrospective cohort study VIC	All women who tested for glucose intolerance n = 35,253	1979–1984 50 g OGTT, fasting ≥9 mmol/L 1 h, and ≥7 mmol/L 2 h 1985–1988 WHO guideline. 75 g OGTT, fasting ≥7.8 mmol/L and ≥12.2 mmol/L 2 h	Hospital record, Mercy Maternity Hospital Research Foundation 1979–1988	Incidence Indian 15%, non-migrant Australian women 4.3% ($p < 0.001$)	Not reported	Diagnostic criteria for GDM have changed over time, given measurement bias
Carolan et al., 2012 [46]	Cross-sectional study VIC	All women who gave birth n = 133,359	Not reported	VPDC, 2005–2006	Incidence Higher in Asian women, 11.5% vs. Non-migrant 4.3% ($p < 0.001$)	Not reported	No definition for GDM diagnosis criteria Lack of comprehensive confounder adjustment

Table 2. *Cont.*

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Dahlen et al., 2015 [35]	Retrospective cohort study NSW	All births at Blacktown Hospital, n = 3092	Not reported	WSLHD ObstetriX™ database 2012–2013	Prevalence Migrant women (13.7%) vs. non-migrant women (6.8%) Migrant Chinese women had a higher prevalence (20.3%)	Perinatal anxiety/depression (EPDS ≥ 13) (AOR: 1.85, 1.14–3.03) No data for migrant women.	Psychological distress was self-reported, and comprehensive adjustment for confounders was limited, but no association was reported among migrant women
Deitch et al., 2023 [36]	Retrospective cohort study VIC	All singleton pregnancies from 20 weeks' gestation at Sunshine Hospital, n= 52,795	2011–2014 ADIPS 2015–2020 IADPSG fasting glucose ≥ 5.1 mmol/L, 1 h ≥10.0 mmol/L, 2 h ≥8.5 mmol/L	BOS 2011–2020	Prevalence Overall GDM prevalence ↑ from 8.9% to 23.7%	Not reported	Risk factors not discussed and no adjusted effect estimates reported for individual variables Single health service cohort limits generalisability
Henry et al., 1993 [37]	Prospective Cohort Study VIC	All singleton births Vietnamese-born migrant women, n = 1839, non-migrant Australian women, n = 27,086	50 g OGTT, fasting ≥9 mmol/L 1 h, and ≥7 mmol/L 2 h	Hospital record, Mercy Hospital 1979–1990	Incidence Vietnamese migrant women had a higher incidence (7.8%) vs. non-migrant Australian women (4.3%)	Maternal age: Vietnamese migrant Women aged ≥ 35 (RR: 3.26, 1.82–5.83, $p < 0.001$) COB: Vietnamese migrant women (RR: 1.43, 1.10–1.86, $p < 0.01$).	The study was conducted over 12 years, and 33 participants did not attend follow-up; this may introduce bias in the study's outcome

Table 2. *Cont.*

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Kirke et al., 2014 [38]	Retrospective cohort study WA	All deliveries at BRH, n = 1635	50 g GCT at 26–28 weeks (≥7.8 mmol/L) underwent 75 g OGTT, fasting ≥5.5 mmol/L and/or ≥8.0 mmol/L 2 h.	Stork database 2009–2011	Not reported	COB: Asian migrant women (AOR: 3.47, 1.25–8.26)	Because of the small sample size and rural location, the sample may not represent Australian women more broadly, introducing selection bias
Li et al., 2020 [18]	Cross-sectional and hospital-based study VIC, Australia Shanghai, China	Australian Chinese migrants, n = 491 Native Chinese, n = 1000	IADPSG guideline 75 g OGTT, fasting glucose ≥ 5.1 mmol/L and/or ≥10.0 mmol/L 1 h, and/or ≥8.5 mmol/L 2 h	Electronic records from two hospitals in Melbourne, Australia & Shanghai, China 1-year study period	<u>Prevalence</u> Migrant Chinese had a higher prevalence (19.7%) vs. native Chinese women (14.6%) p= 0.01	Maternal age: Migrant Chinese women living in Australia were older and had a higher risk of GDM compared to native Chinese women (OR: 1.4, 1.09–1.91)	Short study duration and limited adjustment for migration-related factors such as length of residence and acculturation
McDonald et al., 2015 [44]	Retrospective cohort study VIC	All women who gave birth at Sunshine Hospital, n = 4610	ADIPS guideline 75 g OGTT, fasting ≥5.5 mmol/L and/or ≥8.0 mmol/L 2 h	BOS 2012–2013	Not reported	COB in EA (AOR: 4.77, 3.12–7.31, $p < 0.001$); COB in SA (OR: 3.38, 2.60–4.40, $p < 0.001$) COB in SEA (OR: 3.03, 2.34–3.93, $p < 0.001$)	The study is limited to a single hospital and may not be representative of Australian women more broadly No prevalence estimates

Table 2. *Cont.*

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Mnatzaganian et al., 2022 [40]	Retrospective study VIC	All women who gave birth, n = 7348	ADIPS 2010–2015 & IADPSG 2016–2017	BOS 2010–2017	Incidence Overall GDM incidence from 3.5% to 13.7%	COB in SA (AOR: 5.71, 3.97–8.20, $p < 0.001$) BMI ≥ 35 kg/m^2 (AOR: 5.53, 4.47–6.84, $p < 0.001$)	GDM was defined by free-text/ clinician-recorded diagnosis rather than pathology-confirmed OGTT results, introducing potential misclassification Regional hospitals cannot generalise to metropolitan migrant populations, which differ significantly in ethnic composition from regional Victoria
Moses et al., 1994 [39]	Prospective cohort NSW	All women attended for antenatal care and gave birth at PNCs and PPs, n = 1829	ADIPS guideline 75 g OGTT, fasting glucose ≥ 5.5 mmol/L and/or ≥8.0 mmol/L 2 h	2 PNCs 2 PHs 3 PPs. 1993	Incidence Asian migrant women had the highest rate of GDM at 11.9%, compared with Australian women at 7.1%	Maternal age: Asian migrant women were older than others (29.6 years)	Despite a multi-ethnic study population, the results section provides very little information about migrant women
Pham et al., 2026 [47]	Retrospective observational cohort study NSW	All Singleton births n = 60,701	ADIPS fasting glucose 5.1 mmol/L, 1 h 10.0 mmol/L, 2 h 8.5 mmol/L	e-Maternity Database 2020–2023	Prevalence Overall GDM prevalence: 18.2%. Migrant and non-migrant Australian women: 24.4% vs. 12.9%, respectively	LOR (ARR: 1.37, 1.31–1.43)	Other post-migration factors, e.g., lifestyle changes, may have caused residual confounding

Table 2. *Cont.*

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Stone et al., 2002 [45]	Retrospective study (capture–recapture method) VIC	All singleton live births among women	ADIPS	PMSS & VIMD 1996	Not reported	COB in NEA (AOR: 4.7, 3.92–5.64) COB in SA (AOR: 4.7, 3.92–5.76)	No prevalence estimates
Takele et al., 2025 [41]	Cross-sectional Study Nation wide	All women who gave birth n = 1,845,182	2016–2019 IADPSG/ADIPS criteria 75 g OGTT, fasting glucose ≥ 5.1 mmol/L and/or ≥10.0 mmol/L 1 h, and/or ≥8.5 mmol/L 2 h 2020–2021 (COVID-19) FPG was performed. FPG <4.7 ruled out GDM; 4.7–5.0 triggered an OGTT; ≥5.1 diagnosed GDM	NDSS and ABS 2016–2021	Incidence Southeast Asian women had a higher incidence (12.2% to 22.5%) compared to non-migrant women (7.2% to 9.0%).	Not reported	No prevalence estimates Lake of individual-level risk factors
Wan et al., 2019 [42]	Retrospective cohort study VIC	All singleton births of at least 20 weeks of gestation, n = 73,517	Universal screening 75 g OGTT, fasting ≥5.5 mmol/L and/or ≥8 mmol/L 2 h	BOS at Monash Health and GE Healthcare database 2010–2013	Prevalence Chinese migrant women had higher GDM (11.6%) compared to Non-migrant Australian women (4.1%)	Ethnicity: Migrant Chinese women (AOR: 3.94, 3.26–4.77) Maternal age: Migrant Chinese women were older and had a higher risk of developing GDM than non-migrant Australian women (AOR: 1.10, 1.07–1.14) Pre-pregnancy BMI (AOR:1.10, 1.05–1.08)	Large cohort study; however, findings may not be generalisable beyond one health service region

Table 2. *Cont.*

Authors and Year	Study Design & Location	Study Population & Sample Size	Definition of GDM	Data Source & Duration	Incidence/Prevalence (Migrant vs. Non-Migrant Australians)	Risk Factors	Comments
Wong, 2012 [43]	Retrospective cohort study NSW	Women who attended the antenatal clinic and gave birth at Liverpool Hospital, n = 827	ADIPS guideline 50 g GCT at 26–28 weeks (≥7.8 mmol/L) underwent OGTT with 75 g, fasting ≥5.5 mmol/L and/or ≥8 mmol/L 2 h	Diabetes Centre for the management of GDM 2007–2010	Not reported	FHOD was significantly associated with GDM among SA migrant women compared to others (63.5%, $p < 0.001$) Parity and BMI ≥ 30 kg/m^2 were significantly associated with GDM among migrant women from PI compared to others (2.1 ± 1.1, $p < 0.001$ and 34.5± 8.0, $p < 0.001$)	Despite a multi-ethnic study population, the Results section provides very little information about migrant women. Single health service cohort limits generalisability

Abbreviations: GDM, gestational diabetes mellitus; ADIPS, Australian diabetes in pregnancy society; IADPSG, International association of the diabetes and pregnancy study groups; OGTT, oral glucose tolerance test; GCT, SCA, Southern and Central Asia; EA, East Asia; SA, South Asia; SEA, Southeast Asia, PI, Pacific Islander; BOS, Birthing Outcomes System; PMSS, Perinatal morbidity statistical system; VIMD, Victorian Inpatient minimum dataset; VPDC, Victorian perinatal data collection; QPDC, Queensland Perinatal Data Collection; MDC, Midwives Data Collection; PNCs, prenatal clinics; PPs, private practitioners; PHs, public hospitals; BRH, Bunbury Regional Hospital; LOR, length of residence; COB, country of birth; ROB, region of birth; SES, socioeconomic status; WSLHD, Western Sydney local health district; NSW, New South Wales; VIC, Victoria; QLD, Queensland; WA, Western Australia; FHOD, family history of Diabetes; BMI, body mass index.

Across eight studies, prevalence ranged from approximately 4% to 25% [18,31–33,35,36,42,47]. Differences in prevalence estimates may reflect variation in sampling methods (e.g., hospital-based cohorts vs. population-based datasets) and/or diagnostic criteria (e.g., pre-IADPSG vs. post-IADPSG and Fasting Plasma during COVID-19) across the included studies. This review summarizes the overall findings on increased GDM prevalence among older women, migrants and other ethnic groups in Australia. Dahlen et al. (2015) reported a GDM prevalence of 13.7% among all migrants, compared with 6.8% among non-migrant Australians [35]. Within this study cohort, Chinese-born migrant women had the highest prevalence (20.3%) among various migrant groups [35]. Another study also found a high prevalence of GDM in Chinese migrants (19.7%) compared with native Chinese (14.6%) [18]. However, two other studies reported overall GDM prevalence of approximately 4.4% and 23.7%, irrespective of ethnicity or migrant status [32,36]. Temporal trends showed that GDM prevalence increased among both migrant and non-migrant Australian women between 1999 and 2008. The age-standardized prevalence increased by 12.3% among migrant women and by 29% among non-migrant Australian women, indicating a higher relative increase among non-migrant women [31]. This review consistently found that migrant women in Australia have a disproportionately higher burden of GDM, particularly those of Asian origin [18,31,32,35,42]. Figures 2 and 3 present the GDM incidence and prevalence.

3.4. Risk Factors of GDM

This scoping review identified several risk factors directly linked to an increased risk of GDM. However, current evidence shows that each risk factor is either modifiable or non-modifiable. A modifiable risk factor is a determinant that interventions can change to reduce the risk of disease development [51]. Non-modifiable risk factors are largely irreversible [52]. This review identified the following modifiable risk factors: BMI ($n = 3$), socioeconomic status (SES; $n = 1$), and perinatal anxiety/depression ($n = 1$) [32,35,40,42,43]. The review also identified seven non-modifiable risk factors: maternal age ($n = 5$), ethnicity ($n = 2$), country/region of birth (COB/ROB; $n = 6$), FHOD ($n = 1$), parity ($n = 1$), length of residence (LOR; $n = 1$), and GDM history ($n = 1$) [14,32,37–40,42,44,45]. Maternal age, COB/ROB, ethnicity, and BMI were reported in two or more studies (≥2), whereas LOR, FHOD, parity, perinatal anxiety/depression, GDM history, and SES were each identified in a single study. Figure 4 shows the modifiable and non-modifiable risk factors.

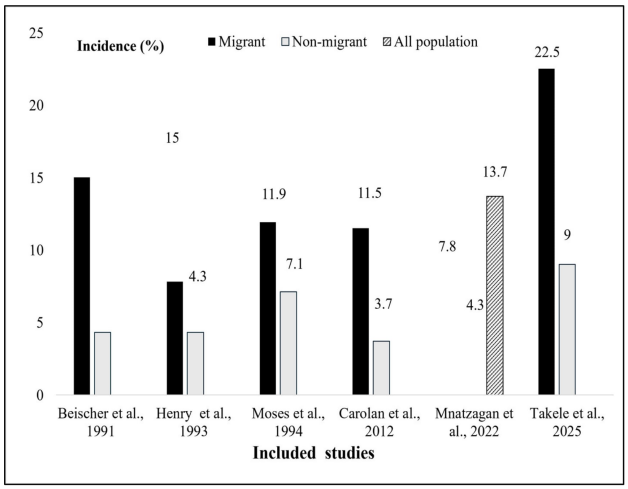


Figure 2. Incidence of GDM among migrant and non-migrant women in Australia. Data synthesized from published studies [34,37,39–41,46].

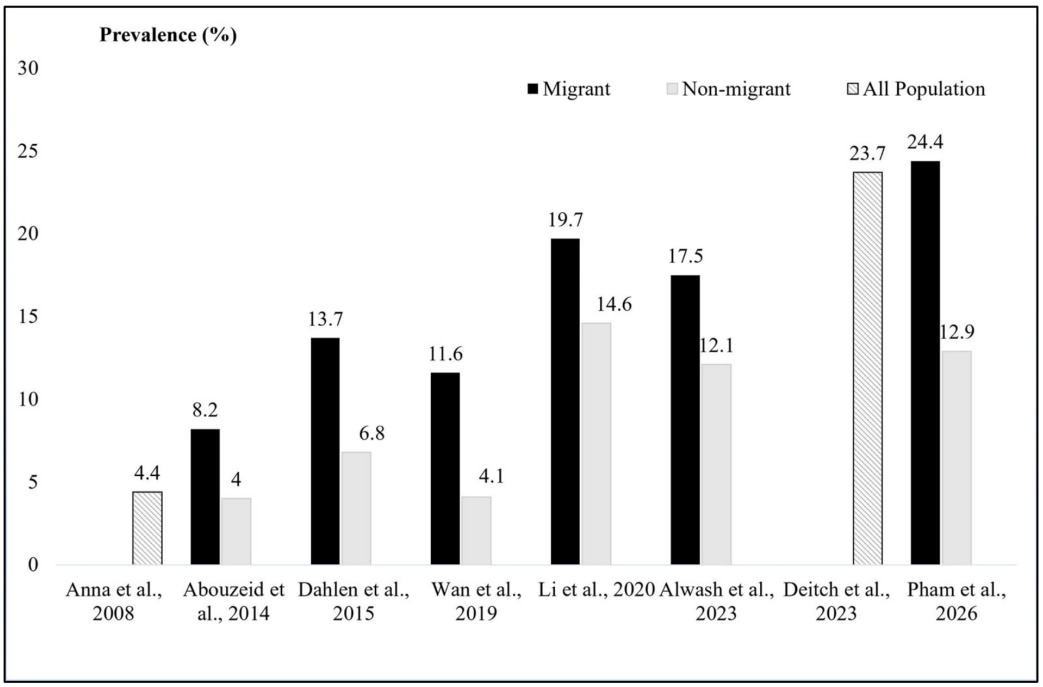


Figure 3. Prevalence of GDM among migrant and non-migrant women in Australia. Prevalence estimates were derived from the studies [18,31–33,35,36,42,47].

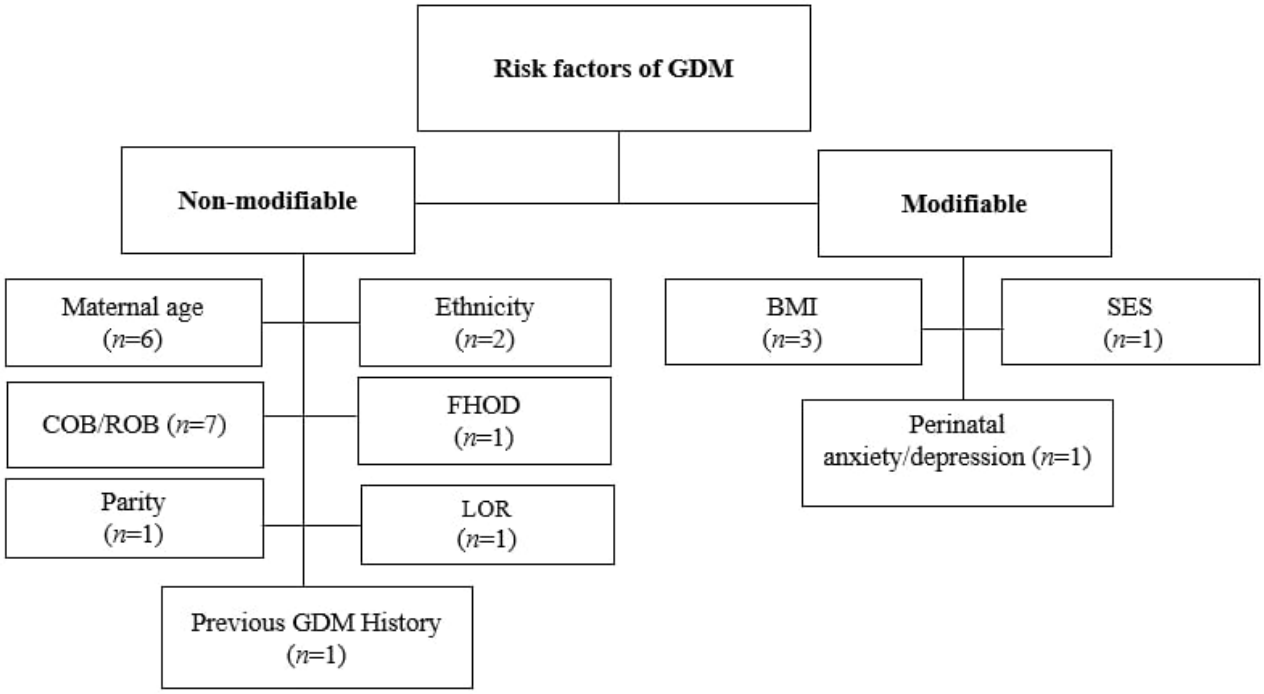


Figure 4. Reported risk factors of GDM among migrant and non-migrant women. COB, country of birth; ROB, region of birth; FHOD, family history of diabetes; LOR, length of residence; BMI, body mass index; SES, socioeconomic status.

3.4.1. Maternal Age

Maternal age was consistently reported as a non-modifiable risk factor ($n = 6$) [14,18,32,37,39,42]. The risk of developing GDM increases with age among migrant women. Migrant women aged 40 years or more had a six-fold higher risk of developing GDM than non-migrant Australian women [32].

3.4.2. Country/Region of Birth and Ethnicity

GDM was significantly more prevalent among women born in Asia, with an approximately threefold higher risk of developing GDM compared with non-migrant Australian women [14]. COB is the most frequently identified risk factor among migrants ($n = 7$) [14,32,37,38,40,44,45]. Another study found that East Asian women had around five times the risk, and South Asian and Southeast Asian women had three times the risk of developing GDM compared with women born in Australia [44].

3.4.3. Perinatal Anxiety/Depression

This review indicated that GDM was significantly associated with high Edinburgh Postnatal Depression Scale (EPDS) scores ≥ 13 at antenatal booking compared with women with normal scores (AOR 1.85, 95% CI 1.14–3.03) [35]. The researchers also found that the prevalence of psychological problems among migrant women was high, but the analysis did not show an association between psychological distress and GDM in this population.

3.5. Critical Appraisal

Of the nineteen included studies, eleven ($n = 11$) were classified as Category A, comprising population-based studies, and received the greatest interpretive weight for their comprehensive coverage, analysis, and high statistical precision [14,31,33,35,38,40–44,47].

Six studies ($n = 6$) were classified as Category B, comprising large-scale state-level cohort studies that provided robust evidence of ethnic disparities in GDM, though their analyses warranted moderate caution due to limited adjustment for confounders and limited generalizability [18,32,34,36,37,46]. The remaining two studies ($n = 2$) fell into Category C [39,45]. They were hospital-based or explanatory studies, primarily intended to identify emerging signals, provide historical context, and highlight research gaps rather than establish a definite population trend [39,45]. The resulting chart appears in Appendix A, Table A1.

4. Discussion

This scoping review found that migrant women consistently report a higher prevalence of GDM compared to non-migrant women, based on more than four decades of research in Australia. These results highlight racial/ethnic disparities in maternal health and make GDM an important example of systemic disparities among migrants. A complex interplay of modifiable and non-modifiable factors influences this risk, and clinicians should assess each woman individually to determine her likelihood of developing GDM. The included studies indicated that migrant women were at higher risk of developing GDM, and other international studies, including those conducted in Finland [7] and the United States (US) [10], found that South Asian migrant women had a higher prevalence of GDM than non-migrant women.

Maternal age is a widely recognized, accepted, and verified non-modifiable risk factor for GDM [18,31,32,46,53–55]. This review found that the average maternal age increased between 1999 and 2008 [31]. Additionally, studies have shown that migrant women are generally older than Australian-born women when they develop GDM [18,37,39,47]. Since migrant women tend to be older than non-migrant women, the overall maternal age is higher. Researchers suggest that migration-related stressors, such as unhealthy diets, social isolation, lack of family support, cultural loss, experiences of racial discrimination, and challenges in finding suitable employment or job security in the host country, along with anxiety, depression, and the overall process of acculturation in Western culture, may contribute to delayed childbearing and greater susceptibility to GDM [18,56–59]. These factors warrant future investigation.

In epidemiological studies, the purpose of using COB and 'ethnicity' in relation to migrants' health status remains unclear. This review also examines definitional and measurement challenges in the existing literature on the migrant population. GDM studies often use ethnicity and migration interchangeably, even though they are distinct concepts. Ethnicity refers to genetic identity and cultural heritage [7]. In contrast, the term 'migrant' refers to a person who is moving or has moved across an international border from their usual residence [60]. In the GDM literature, ethnicity is often recognized as a risk factor [10,46,61], with many using it as a proxy for COB and migration status [41]. However, very few studies differentiate between ethnicity, COB and migration. Fewer still explore the timing of migration and other relevant circumstances that may affect a woman's experiences, pregnancy, and risk factors for GDM.

As in other countries, Australian healthcare commonly uses COB to establish patients' migration status and, consequently, their risk profile. Given complex migration patterns, COB cannot reliably identify a patient's ethnicity or migration status; additional information, such as language, religion, and length of residence in that country, is needed. For example, consider a woman who migrated with her family as a baby, was raised as an Australian citizen for thirty years, and then became pregnant. Her risk factors may differ greatly from those of a woman of the same ethnic background or country of origin who migrated as an adult due to hardship and became pregnant within the first year of arriving in Australia. These differ again for a woman who travels to Australia for a holiday and unexpectedly gives birth while there. One might be born in a country but never have lived there. Therefore, COB does not always reflect a migrant's actual health status, and researchers and clinicians must also consider the social and cultural environment [62,63].

In the post-migration phase, resettlement in a host country is an ongoing process of negotiation across people, cultures, and relationships [64]. This encompasses adjustment to the host country, including cultural adaptation and the localization of lifestyles and behaviors (e.g., dietary habits), as well as experiences of different levels of stress, income and living conditions [11,18,64]. Limited understanding of the host country's health and welfare systems, along with limited comparability of services, can also pose challenges for migrants. Researchers have used migration as a proxy for other GDM risk factors, including lower SES, higher disease burden, cultural norms in the country of origin, language difficulties, and low health literacy [59,65]. The length of time spent in the country of residence also matters. Several international studies have reported that the longer migrant women live in a country, the more likely they are to develop GDM [13,22]. Migrant women who lived in Denmark for 10 years or more were 56% more likely to develop GDM than those who lived in Denmark for under 5 years [13]. In Australia, Pham et al. (2026) found that both recent migrants (<5 years residence) and longer-term migrants (≥5 years residence) had a higher risk of GDM compared to non-migrant Australian women [47]. These findings suggest that GDM risk increases with LOR. One possible explanation is that longer residence is often accompanied by acculturation-related changes in dietary behaviours, physical activity patterns, social circumstances, and exposure to the host-country environment. Over time, these behavioural and social transitions may contribute to increased adiposity, insulin resistance, psychological stress, and broader chronic diseases. These pathways are discussed further below. However, unlike studies comparing LOR within migrant populations, Australian evidence remains limited on whether longer residence independently increases GDM risk among migrant women.

Acculturation blends the original and new cultures, allowing migrants to navigate both simultaneously, which can create identity conflict within migrant groups [66]. This conflict can be temporary or occur in specific phases, particularly during periods of stress and transition, such as pregnancy and matrescence. This struggle with cultural adjustment

could affect GDM development and warrants more attention. This review also revealed that Asian women, particularly Indian migrants, had higher levels of anxiety and depression than non-migrant Australians [35]. Another study found that women with depression in the pre-pregnancy period were more likely to develop GDM than non-depressed women [67]. Although psychological distress and depression are not synonymous, psychological distress encompasses a broader set of non-specific symptoms of stress, anxiety, and depression [68]. Therefore, psychological distress could be a potential risk factor for GDM amongst migrant women, a factor absent from GDM studies in Australia.

This scoping review reported a substantially higher incidence of GDM during the COVID-19 period in Australia [41], consistent with other international studies [69]. During COVID-19, Australia suspended the Universal Oral Glucose Tolerance Test (OGTT) to reduce pathology visits and COVID-19 risk. The key diagnostic fasting threshold (≥5.1–6.9 mmol/L) remained unchanged, but many women were diagnosed based solely on fasting glucose, without an OGTT. This likely contributed to apparent changes in incidence during the pandemic. The recent update to GDM screening, introduced in June 2025, raised the fasting threshold (5.3–6.9 mmol/L), which may affect the prevalence and incidence of GDM compared with earlier criteria [70]. Hence, further research is required to understand why migrant women in Australia are more susceptible to developing GDM and what modifiable and non-modifiable factors have contributed to this phenomenon.

4.1. Strengths and Limitations

To our knowledge, this scoping review is the first to comprehensively map the available evidence on the prevalence and risk factors for migrant women in Australia. A key strength of this review is its broad search strategy and inclusion of diverse study designs, which helped identify important gaps in the literature, particularly regarding migration-related influences on GDM risk. However, several limitations warrant acknowledgment. Very few risk factors were found to be strongly linked to the development of GDM in migrant women, largely because the research base remains quite limited in this area. Although four included studies did not clearly specify the screening or diagnostic methods used to diagnose GDM, they were included because they contributed important evidence on the incidence, prevalence, and risk factors of GDM among migrant women in Australia. Because these studies addressed the review objectives, their inclusion was justified; however, the lack of information on diagnostic criteria may have introduced heterogeneity in the reported estimates. Furthermore, this review included only studies published in English, so it may have overlooked valuable research conducted and published in other languages, particularly in countries with large migrant populations. Additionally, most studies relied on administrative or routinely collected data, limiting researchers' ability to account for critical individual-level factors such as socioeconomic status and cultural acculturation that can significantly influence GDM risk.

4.2. Implications for Clinical Practice and Policy

This review identifies aspects of clinical care specific to migrant women with GDM and emphasizes the need to deliver health services equitably to improve health outcomes. First, clinicians should recognize that the best approach to GDM care is a culturally relevant, collaborative, and culturally competent model that addresses cultural, linguistic, and health literacy issues that can affect understanding of GDM risk. Access to interpreter services and culturally appropriate educational materials during the antenatal period can provide better support throughout pregnancy. Workforce planning must therefore focus on training in culturally responsive care, incorporating migrant health literacy education into nursing programs, and implementing policies that enable nurses to lead collaborative, cross-cultural

care. Systematic, regular screening for anxiety, depression, and social and family support is necessary, especially for recently migrated women who may be unfamiliar with the health system or facing other resettlement stressors. In addition, health services need culturally specific guidelines on diet, physical activity, and lifestyle change that incorporate traditional dietary patterns and beliefs.

5. Conclusions

This scoping review mapped existing evidence on the incidence, prevalence, and risk factors of GDM among migrant women and highlighted gaps in Australian GDM research. This review indicates that migrant women, particularly those from Asian backgrounds, experience a disproportionately higher burden of GDM compared to non-migrant Australian women. Ethnicity, COB/ROB, and migration-related factors such as LOR were significantly associated with GDM among migrant women. Limited research has examined the influence of post-migration experiences, including acculturation, lifestyle changes, socioeconomic circumstances, healthcare access, and psychosocial wellbeing. The study results highlight significant gaps in the literature on GDM risk factors for migrant women and indicate the need for future research to address migration-related determinants of GDM. This could include acculturation, LOR, social support, healthcare access and lifestyle changes following migration. Addressing these factors may help inform targeted prevention strategies and reduce inequities in maternal health outcomes among migrant women.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/ijerph23121458/s1. Table S1: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR Checklist); Table S2: Sample keywords and MeSH terms used in MEDLINE.

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Abbreviations

The following abbreviations are used in this manuscript:

COB	Country of Birth
ROB	Region of Birth
LOR	Length of Residence
FHOD	Family History of Diabetes
GDM	Gestational Diabetes Mellitus
BMI	Body Mass Index

Appendix A

Table A1. Quality assessment of the included studies using CASP assessment tools.

Study Name	Clear Aim	Methodology	Research Design	Recruitment Sampling	Data Collection	Ethics	Data Analysis	Findings	Value of Research	Overall Score
Abouzeid et al., 2014 [31]	√	√	√	√	√	√	√*	√	√	A
Abouzeid et al., 2015 [14]	√	√	√	√	√	√	√*	√	√	A
Anna et al., 2008 [32]	√	√	√	√	√	X	√	√	√	B
Alwash et al., 2023 [33]	√	√	√	√	√	√*	√	√	√	A
Beischer et al., 1991 [34]	√	√	√	√	√	X	√	√	√	B
Carolan et al., 2012 [46]	√	√	√	√	√	X	√	√	*	B
Dahlen et al., 2015 [35]	√	√	√	√	√	√	√	*	√	A
Deitch et al., 2023 [36]	√	√	√	√	√	√*	√	√	√	B
Henry et al., 1993 [37]	√	√	√	√	√	X	√	√	√	B
Kirke et al., 2014 [38]	√	√	√	√	√	√	√	√	√	A
Li et al., 2020 [18]	√	√	√	√	√	X	√	√	√	B
McDonald et al., 2015 [44]	√	√	√	√	√	√	√	√	√	A
Mnatzaganian et al., 2022 [40]	√	√	√	√	√	√	√	√	√	A
Moses et al., 1994 [39]	√	X	X	√	√	X	√	√	√	C
Pham et al., 2026 [47]	√	√	√	√	√	√	√	√	√	A
Stone et al., 2002 [45]	√	√	√	X	X	√	√*	*	√	C
Takele et al., 2025 [41]	√	√	√	√	√	√	√*	√	√	A
Wan et al., 2019 [42]	√	√	√	√	√	√	√	√	√	A
Wong, 2012 [43]	√	√	√	√	√	√	√	√	√	A

Note: Key to ratings: √ = Detailed coverage of screening question; * = Screening question covered but not detailed; X = Screening question not addressed. Overall quality rating: A = Nil or few flaws; the study credibility, transferability, dependability, and confirmability are high; B = some flaws, unlikely to affect the credibility, transferability, dependability, and/or confirmability of the study; C = some flaws which may affect the credibility, transferability, and/or confirmability of the study.

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