Received: 5 May 2024 | Revised: 30 August 2024 | Accepted: 8 September 2024

DOI: 10.1111/aogs.14973

SYSTEMATIC REVIEW

Women's perspectives to improve prenatal care for gestational diabetes: A systematic review and meta-aggregation of qualitative studies

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Abstract

Introduction: In numerous qualitative primary studies, women have identified opportunities to improve prenatal gestational diabetes care. The objective of our systematic review and meta-aggregation was to synthesize patient-guided suggestions for improving prenatal gestational diabetes care that are informed by lived experience of women and their support persons.

Material and Methods: This study was registered a priori on PROSPERO (CRD42023394014). Our search strategy was executed in five databases (Medline, PsycInfo, CINAHL, Scopus, and Web of Science). Primary studies that were qualitative, had full texts in English, studied women who have or had gestational diabetes or their support persons, and included experiential accounts on prenatal gestational diabetes care were included. No date restrictions were applied. Studies that were not qualitative, were secondary analyses, included data on only postpartum care, or evaluated an intervention that was not standard care were excluded. Two independent authors used Covidence software to facilitate screening. The outcomes of interest were patient-reported suggestions to improve quality of gestational diabetes care that are informed by women's or their support persons' accounts of the lived experience of gestational diabetes. Meta-aggregation followed by a thematic synthesis approach was used to analyze the qualitative data to identify women's perspectives to improve gestational diabetes care.

Results: After duplicate removal, a total of 4761 studies underwent screening and a total of 80 studies were ultimately included. Patient- and support persons-reported suggestions to improve care include timely and comprehensive education around gestational diabetes with active engagement of family members, personalized and tailored counseling, patient-centered care, incorporation of digital or online adjuncts to care, and increasing support for women.

Abbreviation: GDM, Gestational diabetes

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Conclusions: Our systematic review and meta-aggregation identifies several actionable and patient-guided suggestions to improve prenatal gestational diabetes care that are important to consider when embarking on clinical quality improvement.

KEYWORDS
delivery of healthcare, gestational diabetes, prenatal care, qualitative research, systematic review

1 | INTRODUCTION

Gestational diabetes (GDM) is diabetes that is diagnosed during the second or third trimester of pregnancy that did not clearly exist before pregnancy.[1] The prevalence of GDM varies by country and by diagnostic criteria, but is estimated to be between 8.5% and 14.7%.[2] Global studies have demonstrated associations between GDM and adverse obstetric and fetal outcomes.[3–6] For example, a systematic review and meta-analysis of 156 studies reported significant associations between GDM and rate of cesarean section, preterm delivery, macrosomia, large for gestational age, low Apgar scores, neonatal jaundice, and admission to the neonatal intensive care unit.[5] Compared to the general obstetric population, women with GDM also have increased prevalence of pregnancy-induced hypertension (17% in GDM group vs. 12% in general obstetric population) and shoulder dystocia (3% in GDM group vs. 0.9% in general obstetric population).[3] Beyond the index pregnancy, there is also increased risk of recurrence of GDM in subsequent pregnancies,[7] and developing type 2 diabetes after pregnancy.[8]

The impact of GDM on women extends beyond physical health outcomes and includes significant psychosocial challenges.[9] For example, receiving a diagnosis of GDM may lead to various psychological or emotional reactions including shock, self-blame, and denial.[10] Women have expressed feeling a sense of "failure" when diagnosed with GDM, and fear of the potential adverse effects specifically for the developing fetus.[10] GDM can result in social impacts for women, such as disruption of their family's usual food intake and meal preparation practices, financial strains of purchasing healthier food or diabetes supplies, and experience of stigma.[9]

GDM has effective treatments and can be managed by behavioral modifications (e.g., nutrition and physical activity) and medical management (e.g., insulin use). However, these management strategies are tolerated variably by women, who face significant barriers to implementing these measures for optimal glycemic management.[11] In order to facilitate access and adherence to healthy lifestyle modifications and medications as required to manage GDM, patient-centered care is highly recommended where improvement of care is driven by women's needs, concerns, and inquiries.[12] Unfortunately, women have described mixed experiences with the care and communication from healthcare providers around GDM, such as receiving generic advice for lifestyle modifications that may not address individual barriers and limited time spent on addressing concerns surrounding the impact of GDM on fetal development.[13]

Key message

Decisions around improving care for gestational diabetes need to be informed by women's lived experience. Women with gestational diabetes want more comprehensive, timely, and personalized education on gestational diabetes with incorporation of digital or online adjuncts and increased support.

Decisions regarding how to improve the care of women with GDM need to be informed by women's lived experience, the barriers they face, and their preferences for GDM care. The objective of our systematic review and meta-aggregation was to summarize women's or their support persons' perspectives to identify patient-guided suggestions for improving quality of prenatal GDM care.

2 | MATERIAL AND METHODS

This systematic review was registered a priori on PROSPERO (CRD42023394014) and was completed in adherence to the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) checklist (Appendix S1)[14] instead of the PRISMA checklist as this systematic review is one of qualitative studies. The research question that we aim to answer in this review is: What are the suggestions for improving quality of prenatal GDM care from women and support persons of women who have GDM?

2.1 | Data sources

A search strategy was developed with the key terms: "GDM Mellitus" AND Qualitative (Appendix S2). The search was developed and carried out by an information specialist on January 21st, 2023. The following databases were screened: Medline, PsycInfo, CINAHL, Scopus, and Web of Science. Clinicaltrials.gov was not included in the search given the qualitative focus of this systematic review and exclusion of primarily intervention-based studies. There was no date restriction placed on the search beyond those inherent in the databases.

2.2 | Eligibility criteria

Inclusion criteria were: qualitative design, women who have or had GDM during pregnancy, data included experiential accounts on prenatal GDM care specifically from the participants or their support persons (i.e., studies only documenting healthcare provider experiences were not included), full text available in English, and primary research studies. Excluded studies were not qualitative, did not include participants who have or had GDM or their support persons, included data on only postpartum care, had a primary objective to evaluate an intervention that was not standard care, were secondary analyses, or full text was not available in English. Commentaries, editorials, opinions, abstracts only and dissertations were also not included. Other reviews were not included, although their reference lists were screened for potentially any relevant studies. Citations and reference lists of included studies were also screened.

The Critical Appraisal Skills Programme (CASP) qualitative checklist was completed for each study to assess risk of bias; each study was appraised by one reviewer and checked by a second reviewer.[15] This checklist includes 10 items that assess the study methods and reporting of results, and each item is answered with a "yes", "no" or "can't tell" to indicate whether it is present or not. Responses to the CASP checklist were scored to create an overall quality score based on the scoring system used in Butler et al. (2016).[16]

2.3 | Data collection and analysis

All retrieved articles were transferred to Covidence software, and duplicate articles were removed prior to screening. Two independent reviewers screened titles and abstracts for inclusion, then evaluated the resulting articles in full text. If there were any discrepancies between the two reviewers at either stage, these were first discussed and if a decision could not be made, then a third reviewer was consulted. Citations and reference lists of included studies were also screened by first reviewing titles and abstracts. If eligible, they were then assessed in their full text for potential inclusion. Data were then extracted from included studies onto a standardized Excel spreadsheet.

2.4 | Data extraction

The following descriptive data were extracted: year of publication, country of study, sample size, mean age, whether the participants included pregnant or postpartum women who have or had GDM and/or their support persons, location of prenatal care for GDM (e.g., inpatient hospital care, outpatient diabetes clinic), race/ethnicity, occupation, and marital status. Other study details extracted included the type of analysis applied, and the mode of data collection (e.g., interviews, focus groups). Next, the author identified themes or main findings were extracted verbatim. All data were extracted by one reviewer and checked by a second reviewer.

2.5 | Data synthesis

The data were synthesized following an aggregated systematic review approach, bringing together common data from the individual studies that provided information on women's suggestions for GDM care.[17] Meta-aggregation is pragmatic in its approach, with the goal of synthesizing data especially in health research for practical application. Meta-aggregation aims to lead to generalized statements, to form recommendations[17] as the primary aim of this research was to identify women's suggestions for care it was deemed an appropriate synthesis approach. The verbatim author reported themes were reviewed independently by two reviewers repeatedly, and while doing so, they developed categories that represented similar themes and ideas that were recurrent among studies. Categories were then developed into overarching themes, with the themes representing the synthesized findings of the review. Findings were then categorized into the overarching themes line by line, and selected quotes to exemplify the themes were also identified. In accordance with meta-aggregation, the themes are indicatory, meaning that they are meant to be characteristic, and representative of the data presented across the studies with the ultimate goal of informing women's suggestions to improve care for GDM. Themes were divided into (1) direct patient-reported suggestions to improve prenatal GDM care; and (2) our interpreted suggestions to improve care based on patient-reported barriers and enablers to their management of GDM.

2.6 | Reflexivity

The authors' backgrounds are as follows: YJF is a resident physician in internal medicine, ZD is a doctor of pharmacy and current medical student, AS is an information specialist and faculty engagement librarian, ROY is an academic endocrinologist who works with patients in a GDM clinic, and TN is a doctor of philosophy and assistant professor in the Faculty of Kinesiology with a research focus on stigma, obesity, and reproduction. We acknowledge that none of the authors have had GDM. The research team also acknowledges that in producing themes, our own experiences and knowledge can inlfuence interpretation. Notably, this research is a part of a larger project that aims to present lived experiences of GDM to healthcare professionals and general audiences as a form of knowledge translation via community-based events. This review was conducted in order to present to the community, more widely, what is reported in terms of directions forward to improve GDM care and experience.

3 | RESULTS

Our search strategy yielded a total of 6029 studies. After titles and abstract screening, 282 studies underwent full-text review using our inclusion and exclusion criteria (Figure 1). References from included studies were reviewed, resulting in inclusion of one additional study. Ultimately, 80 studies were included. Characteristics of studies can be found in Table 1. From the included studies, a

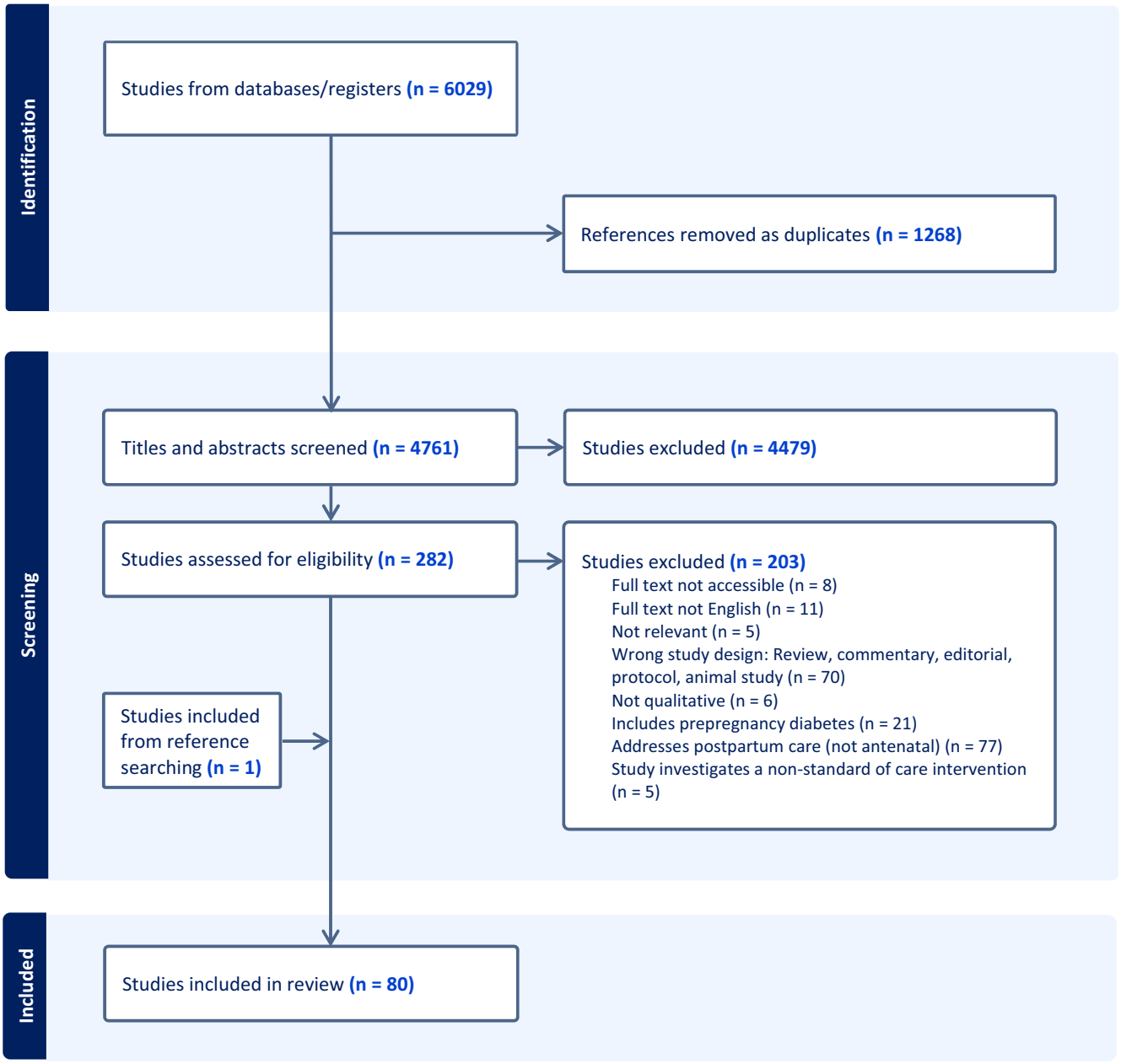

FIGURE 1 PRISMA flowchart outlining screening process for primary studies.

total of 1984 unique women and 27 support persons were included, from a variety of countries including the United States, Canada, Australia, New Zealand, the United Kingdom, Ireland, Norway, Sweden, Denmark, Iran, China, Korea, Singapore, Vietnam, Malaysia, Thailand, Indonesia, India, South Africa, Uganda, Ghana, Brazil, and Tonga. Included studies were published between 1994 and 2023, with 95% ($n = 76$) published on or after 2010. Most studies involved outpatient clinic as the care setting ($n = 50$, 62.5%). The number of participants included in studies ranged between 2 and 393. The age of participants spanned 18 to 55+ years. The race/ethnicity of participants varied, and included White, Asian, South Asian, Black, Indigenous, and Hispanic women. Most studies did not report the occupation ($n = 58$, 72.5%) or marital status ($n = 52$, 65%) of their participants. Support persons were included in 3 studies.[18–20] Qualitative study with thematic analysis was the most used study design ($n = 50$, 62.5%). Table 2 provides a summary of women's suggestions for care derived from the themes below and implications for practice. Table 3 presents illustrative quotes and identifies which primary studies contributed to the development of each theme. Table 4 provides an outline of our assessment of the quality of studies included in this systematic review following the CASP qualitative checklist. Most included studies were of high quality ($n = 69$, 86.3%). A small portion of studies were identified to be of moderate ($n = 10$, 12.5%) or low quality ($n = 1$, 1.3%).

TABLE 1 Characteristics of included studies.

Author, Year	Country	Study design, data collection and analysis	N and Study Population	Setting
Abraham et al., 2014[32]	United States	Qualitative study; Interviewed post-diagnosis, exact time unspecified; Phenomenological analysis	10 females with GDM (mean age 32); Management strategies not specified	Unclear (women reside in rural communities)
Bandyopadhyay et al., 2021[25]	Australia	Qualitative study; Interviewed post-diagnosis, between 24 and 28 gestational weeks; Thematic analysis	23 females with GDM (median age 29); Management strategies included lifestyle and/or medications	Maternity hospitals (outpatient)
Bandyopadhyay et al., 2011[18]	Australia	Qualitative study; Data collected via interviews and focus groups; interviewed in pregnancy post-diagnosis and 6 weeks postpartum; Thematic analysis	17 females with GDM and 7 partners (median age 28); Management strategies included lifestyle and/or medications	Tertiary maternity hospital (outpatient)
Carolan et al., 2013[52]	Australia	Qualitative study; Data collected via interviews and focus groups; Interviewed post-diagnosis; Thematic analysis	15 females with GDM (mean age 32.2); Management strategies included lifestyle and/or medications	Pregnancy Diabetes clinic
Carolan et al., 2012[53]	Australia	Qualitative study; Data collected via interviews and focus groups; Interviewed post-diagnosis around 28–38 gestational weeks; Thematic analysis	15 females with GDM (mean age 32.2); Management strategies included lifestyle and/or medications	Pregnancy Diabetes clinic
Carolan-Olah et al., 2017[23]	United States	Qualitative study; interviewed post-diagnosis and minimum 3 weeks post start of management; Gestational age between 25 and 34 weeks; Interpretative phenomenological analysis	18 females with GDM (age not reported); Management strategies not specified	Pregnancy clinics (located in low socioeconomic areas of El Paso)
Collier et al., 2011[54]	United States	Qualitative study; Focus groups conducted postpartum; Thematic analysis	54 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Unclear
Cummins et al., 2022[31]	Australia	Participatory action research; Workshops conducted post-diagnosis; Exact time unspecified; Reflexive thematic analysis	30 females with GDM (mean age 30); Management strategies not specified	Maternity service in regional Australia (prenatal clinic, birthing and maternity units, home services postpartum)
Dayyani et al., 2019[19]	Denmark	Qualitative explorative study grounded in the phenomenology-hermeneutic tradition; Interviewed post-diagnosis; Thematic analysis	11 females with GDM and their partners (mean age 30.9); Management by lifestyle only	Hospital pregnancy clinic
de Sequeira et al., 2019[35]	Canada	Qualitative study; Interviewed post-diagnosis; Exact time unspecified; Thematic analysis	14 females with GDM (median age 33); Management strategies included lifestyle and/or medications	Hospital Diabetes in Pregnancy clinic
Dickson et al., 2020[40]	South Africa	Qualitative study; Focus groups conducted postpartum; Thematic analysis	10 females with GDM (mean age 35); Management strategies not specified	Diabetes in Pregnancy clinic
Doran et al., 2008[55]	Australia	Mixed methods study; Interviews conducted postpartum; Thematic analysis	8 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Prenatal clinic and 2 community health centres
Doran et al., 2010[36]	Tonga	Qualitative study; Interviewed postpartum; Thematic analysis	12 females with GDM (mean age 34); Management strategies not specified	Unclear
Draffin et al., 2016[56]	United Kingdom	Qualitative study; Focus groups conducted pre and/or post-partum; Conventional content analysis	19 females with GDM (mean age 34.5); Management strategies included lifestyle and/or medications	Outpatient diabetes clinics

(Continues)

TABLE 1 (Continued)

Author, Year	Country	Study design, data collection and analysis	N and Study Population	Setting
Eades et al., 2018[43]	United Kingdom	Qualitative study; Interviewed postpartum; Framework approach	16 females with GDM (mean age 32.6); Management strategies not specified	Diabetes prenatal clinic
Edwards et al., 2021[28]	United Kingdom	Qualitative study; Interviewed postpartum; Thematic analysis	10 females with GDM (age not reported); Management strategies not specified	Sampled from women attending a webinar about technology to support GDM management
Elton et al., 2022[50]	England	Qualitative study; Interviewed pregnant and postpartum females; Inductive analytical approach, ground theory methods	18 females with GDM (age not reported); Management strategies not specified	Unclear
Faal Siahkal et al., 2022[39]	Iran	Qualitative study; Interviewed post-diagnosis at 20 gestational weeks or more; content analysis approach	12 females with GDM (mean age 32.7); Management strategies included lifestyle and/or medications	Inpatient (Al-Zhra and Talegani hospitals)
Gray et al., 2017[22]	United States	Qualitative study; Focus groups conducted postpartum; Inductive coding approach	16 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Unclear
Ge et al., 2016[48]	China	Qualitative study; Interviewed post-diagnosis at 34–38 gestational weeks; Qualitative content analysis	15 females with GDM (median age 30); Management strategies included lifestyle and/or medications	Obstetric clinic
Ge et al., 2017[57]	China	Qualitative study; Interviewed between 34 gestational weeks to 4 weeks postpartum; Phenomenological hermeneutics	62 females with GDM (median age 31); Management strategies included lifestyle and/or medications	Unclear
Ge et al., 2016[41]	China	Qualitative study; Interviewed post-diagnosis between 34 and 38 gestational weeks; Manifest and latent content analysis	44 females with GDM (median age 30); Management strategies included lifestyle and/or medications	Obstetric clinics and an obstetric ward
Ge et al., 2016[58]	China	Qualitative study; Interviewed post-diagnosis between 34 and 38 gestational weeks; Qualitative content analysis	17 females with GDM (median age 27.5); Management by lifestyle only	Obstetric clinic or ward at hospital in outskirts of provincial capital city
Ghaffari et al., 2014[33]	Iran	Qualitative study; Interviewed post-diagnosis between 28 and 38 gestational weeks; Qualitative content analysis	25 females with GDM (mean age 26); Management strategies included lifestyle and/or medications	Teaching hospitals (inpatient) in Tehran, Iran
Gunn et al., 2020[59]	United States	Qualitative study; Interviewed postpartum; Narrative analysis	29 females with GDM (age not reported); Management strategies not specified	Unclear, gave birth at an urban safety-net hospital
Guo et al., 2020[60]	China	Mixed methods study; Interviewed post-diagnosis, exact time unspecified; Qualitative content analysis	11 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Hospitalized for delivery at two tertiary hospitals in a developed city
Harrison et al., 2019[21]	Australia	Qualitative study; Interviewed post-diagnosis; Phenomenological approach with interpretative description theoretical framework and inductive thematic analysis	27 females with GDM (mean age 32); Management by lifestyle (physical activity)	Prenatal clinics at 2 hospitals in Melbourne
Helmersen et al., 2021[61]	Norway	Qualitative study; Interviewed post-diagnosis; Thematic analysis	12 females with GDM (mean age 31.3); Management strategies included lifestyle and/or medications	Diabetes outpatient clinic, a municipal mother and child health center

TABLE 1 (Continued)

Author, Year	Country	Study design, data collection and analysis	N and Study Population	Setting
Hewage et al., 2020[46]	Singapore	Mixed methods study; Interviewed post-diagnosis; Thematic analysis	15 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Private or subsidized clinic
Hirst et al., 2012[62]	Vietnam	Qualitative study; Focus groups conducted post-diagnosis; Thematic analysis	34 females with GDM (median age 31.5); Management strategies included lifestyle and/or medications	High-risk prenatal clinic
Hjelm et al., 2022[63]	Sweden	Qualitative prospective exploratory study; Interviewed post-diagnosis and postpartum; Content analysis	9 females with GDM (median age 33); Management strategies included lifestyle and/or medications	Hospital-based diabetes specialist clinic
Hjelm et al., 2018[64]	Sweden	Qualitative prospective exploratory study; Interviewed post-diagnosis and postpartum; Content analysis	9 females with GDM (median age 31.5); Management strategies included lifestyle and/or medications	Hospital-based diabetes specialist clinic
Hjelm et al., 2012[65]	Sweden	Qualitative prospective exploratory study; Interviewed post-diagnosis and postpartum; Content analysis	14 females with GDM (median age 35); Management strategies included lifestyle and/or medications	Hospital-based diabetes specialist clinic
Hjelm et al., 2007[66]	Sweden	Qualitative prospective exploratory study; Interviewed postpartum; Content analysis	27 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Diabetes clinic
Hjelm et al., 2005[67]	Sweden	Qualitative prospective exploratory study; Interviewed post-diagnosis; Content analysis	2 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Diabetes clinic
Hjelm et al., 2012[68]	Sweden	Exploratory descriptive study; Interviewed post-diagnosis; Qualitative content analysis	23 females with GDM born in Africa or Sweden (mean age 31 for those born in Africa, 30 for those born in Sweden); Management strategies included lifestyle and/or medications	Specialized diabetes clinic
Hui et al., 2014[34]	Canada	Qualitative study; Interviewed post-diagnosis at 26–38 gestational weeks; Thematic analysis	30 females with GDM (median age 29); Management strategies included lifestyle and/or medications	General hospital outpatient endocrinology clinic
Hui et al., 2014[47]	Canada	Qualitative study; Interviewed post-diagnosis at 26–38 gestational weeks; Analysis with constant comparative method	30 females with GDM (median age 29); Management strategies included lifestyle and/or medications	General hospital outpatient endocrinology clinic
Hui et al., 2014[69]	Canada	Mixed methods study; Interviewed post-diagnosis at 26–38 gestational weeks; Thematic analysis	30 females with GDM (median age 29); Management strategies included lifestyle and/or medications	General hospital outpatient endocrinology clinic
Jarvie et al., 2017[37]	England	Qualitative, sociological study; Interviewed post-diagnosis and postpartum; Cross-sectional thematic analysis	27 females with GDM (mean age 30); Management strategies not specified	Diabetic prenatal clinic at 2 NHS hospital trusts
Jirojwong et al., 2017[70]	Australia	Qualitative interpretive study; Interviewed post-diagnosis and postpartum; Thematic analysis	19 females with GDM (age not reported); Management strategies included lifestyle and/or medications	Prenatal clinics at 2 metropolitan hospitals

(Continues)

TABLE 1 (Continued)

Author, Year	Country	Study design, data collection and analysis	N and Study Population	Setting
Kaptein et al., 2015[38]	Canada	Qualitative study; Interviewed post-diagnosis; Thematic analysis	19 females with GDM (mean age 36.8); Management strategies included lifestyle and/or medications	Two out-patient diabetes-in-pregnancy clinics
Khooshehchin et al., 2016[71]	Iran	Qualitative study; Interviewed post-diagnosis between 24 and 36 gestational weeks; Thematic analysis	12 females with GDM (age range 25–38); Management strategies included insulin and/or special diet	Outpatient clinics affiliated with Shahid Beheshti Medical Science University
Kim et al., 2021[49]	Korea	Qualitative study; Interviewed post-diagnosis in third trimester; Thematic analysis	28 females with GDM (mean age 35.9); Management strategies not specified	Unclear
Nielsen et al., 2020[72]	India	Qualitative study; Interviewed post-diagnosis and postpartum; Thematic analysis	19 females with GDM (mean age 28.4); Management strategies included lifestyle and/or medications	Women were from two settings: rural district (care via public primary health center) and state capital (care via private diabetes hospital)
Lawrence et al., 2021[73]	New Zealand	Qualitative study; Interviewed post-diagnosis; Thematic analysis	19 females with GDM (median age 34); Management strategies not specified	Unspecified. Women were from regional health boards
Lawson et al., 1994[74]	United States	Qualitative study; Interviewed within 1-week post-diagnosis and at 6 weeks postpartum; Thematic analysis	17 females with GDM (mean age 32); All were treated with diet, five were treated with insulin	High-risk maternity clinic at a university medical center
Lindmark et al., 2010[75]	Sweden	Qualitative study; Interviewed around 1 year postpartum; Thematic analysis	10 females with GDM (age range 30–40); Five were treated with insulin, give were treated with diet alone	Outpatient endocrinology clinic in a hospital
Mançú et al., 2016[76]	Brazil	Exploratory descriptive study with qualitative approach; Interviewed post-diagnosis; Qualitative content analysis	9 females with GDM (age range 21–43); Management strategies included lifestyle and/or medications	OB/GYN unit of a public hospital. Women were unexpectedly diagnosed with GDM at time of admission to the unit
Martis et al., 2018[44]	New Zealand	Qualitative study; interviewed post-diagnosis; Thematic analysis performed using theoretical domain framework	60 females with GDM (mean age 33); Management strategies included diet only (n = 18), insulin and diet (n = 13), metformin and diet (n = 17), as well as insulin, metformin and diet (n = 12)	Tertiary hospitals in New Zealand
Su et al., 2022[26]	Taiwan	Qualitative study; Focus groups conducted post-diagnosis; Thematic analysis	22 females with GDM (mean age 35.91); Management strategies included diet only (n = 20), and diet and exercise (n = 2)	Maternity outpatient clinic of medical centers
Mensah et al., 2019[77]	Ghana	Qualitative study; Interviewed 6 weeks postpartum; Content analysis approach	7 females with GDM (age range 28–45); Management strategies included lifestyle and/or medications	Women visited the Medical Reception Stations during pregnancy and delivered in military health institutions
Morrison et al., 2014[30]	Australia	Qualitative study; Cross-sectional survey with free text comments given within 3 years postpartum; Thematic framework analysis	393 females with GDM (median age 35.1); Management strategies included lifestyle and/or medications (n = 81 treated with insulin)	Unclear
Mufdlilah et al., 2020[78]	Indonesia	Qualitative study; interviewed postpartum; Thematic analysis	8 females with GDM (mean age 31.6); Management strategies included lifestyle and/or medications	Puskesmas (government-mandated community health clinics)

TABLE 1 (Continued)

Author, Year	Country	Study design, data collection and analysis	N and Study Population	Setting
Mufdlilah et al., 2020[79]	Indonesia	Qualitative study; interviewed postpartum; Thematic analysis	8 females with GDM (mean age 31.6); Management strategies included lifestyle and/or medications	Puskesmas (government-mandated community health clinics)
Muhwava et al., 2020[80]	South Africa	Qualitative study; Interviews and focus groups conducted at least 1 year postpartum; Thematic analysis	35 females with GDM (age range 25–43); Management strategies included lifestyle and/or medications	Prenatal care including delivery at a tertiary hospital in Cape Town (unclear if treated outpatient or inpatient or both)
Muhwava et al., 2019[29]	South Africa	Qualitative study; Interviews and focus groups conducted at least 1 year postpartum; Content analysis using COM-B model	35 females with GDM (age range 25–43); Management strategies included lifestyle and/or medications	Prenatal care including delivery at a tertiary hospital in Cape Town (unclear if treated outpatient or inpatient or both)
Neufeld et al., 2011[81]	Canada	Qualitative study; Interviewed postpartum within 5 years of GDM diagnosis; Thematic analysis	29 females with GDM (age range 18–43, mean age of 32–34 for each ethnic group); Management strategies included lifestyle and/or medications ($n = 18$ used insulin)	Unclear, recruitment of women from clinical and community environments
Oza-Frank et al., 2018[82]	United States	Qualitative study; Focus groups conducted postpartum within 10 years of GDM diagnosis; Thematic analysis	86 females with GDM (age range 18–45); Management strategies not specified	Unclear
Parsons et al., 2018[45]	England	Qualitative study; Interviews and focus groups conducted within 5 years of GDM diagnosis; Framework analysis	50 females with GDM (mean age 37.7); Management strategies not specified	Diabetes pregnancy unit at a large teaching hospital in London, UK.
Persson et al., 2010[83]	Sweden	Qualitative study; Interviewed post-diagnosis; Thematic analysis	10 females with GDM (mean age 31.5); Management strategies included lifestyle and/or medications (n = 1 used insulin)	Prenatal care at local health care centers
Qian et al., 2022[24]	China	Qualitative study; Interviewed post-diagnosis; Thematic analysis	16 females with GDM (mean age 31); Management strategies included lifestyle and/or medications	Delivery at Tongji Hospital (tertiary hospital), details of GDM care unclear
Rasekaba et al., 2021[84]	Australia	Qualitative study; Interviewed post-diagnosis; Thematic analysis	9 females with GDM (age not reported); Management strategies not specified	Outpatient GDM clinic affiliated with a tertiary teaching hospital in Victoria, Australia
de Holanda et al., 2012[85]	Brazil	Qualitative study; Interviewed post-diagnosis; Thematic analysis	10 females with GDM (age not reported, predominant age range 25–35); Management strategies included lifestyle and/or medications (n = 1 used insulin)	Women's medical clinic of a health institution in Brazil
Siad et al., 2018[86]	Canada	Qualitative study; Interviewed post-diagnosis; Thematic analysis	10 females with GDM (age range 28–36); Management strategies included lifestyle and/or medications ($n = 5$ used insulin)	Diabetes in pregnancy clinics as well as in community
Singh et al., 2018[87]	United States	Mixed methods study; Quantitative analysis of cohort data with semi-structured interviews in a smaller cohort; Interviewed post-diagnosis; Qualitative analysis	29 females with GDM were interviewed (age not reported); Management strategies not specified	Outpatient diabetes program of a community hospital
Smith et al., 2022[88]	United Kingdom	Qualitative study supplemented by literature search; Focus group conducted post-diagnosis; COM-B behavioral analysis	10 females with GDM (age not reported); Management strategies not specified	Women's Centre, Oxford University Hospitals NHS Foundation Trust

(Continues)

TABLE 1 (Continued)

Author, Year	Country	Study design, data collection and analysis	N and Study Population	Setting
Smyth et al., 2023[89]	Ireland	Qualitative study; Interviewed post-diagnosis during pregnancy or postpartum; Thematic analysis	32 females with GDM (mean age 35); Management strategies included lifestyle and/or medications	Diabetes and Pregnancy service of a tertiary hospital (National Maternity Hospital), service has a full multidisciplinary team
Ahs et al., 2015[90]	Malaysia	Qualitative study; Interviewed post-diagnosis between 20 and 28 gestational weeks; Thematic analysis	13 females with GDM (age range 26–55+); Management by dietary intervention only	Public health clinic in Negeri Sembilan, Malaysia
Subarto et al., 2022[91]	Indonesia	Qualitative study; Interviewed postpartum within 2 years of GDM; Thematic analysis	7 females with GDM (mean age 33); Management strategies included lifestyle and/or medications	Primary Health Centre in Yogyakarta City
Neufeld et al., 2014[42]	Canada	Qualitative study; Interviewed postpartum within 11 years of GDM; Thematic analysis	29 females with GDM (age range 18–43); Management strategies included lifestyle and/or medications	Various health care locations around Winnipeg Manitoba, details unclear
Toft et al., 2022[92]	Norway	Qualitative study; Interviewed 24–30 months postpartum; Thematic analysis	14 females with GDM (mean age 33.7); Management strategies included lifestyle and/or medications (insulin $n=2$)	Primary care for general follow-up after diagnosis and referred to secondary health care if glycemic control was not achieved
Toxvig et al., 2022[93]	Denmark	Qualitative study; Interviewed post-diagnosis; Phenomenological approach, thematic analysis	9 females with GDM (mean age 31.3); Management strategies not specified	Aalborg University Hospital, Denmark
Wah et al., 2019[94]	Australia	Qualitative study; Interviewed post-diagnosis; Thematic analysis	18 females with GDM (mean age 34); Management strategies included lifestyle and/or medications (insulin n = 5)	Prenatal clinic at the Royal Prince Alfred Hospital
Wan et al., 2020[95]	Australia	Qualitative mixed methods study; Data collected post-diagnosis at around 30–31 gestational weeks. Involved interviews and 3-day recall diaries; Grounded theory approach and thematic analysis	83 females with GDM (mean age 31.9); Management strategies included lifestyle and insulin	GDM clinics
Whitty-Rogers et al., 2016[27]	Canada	Participatory action research study using two-eyed seeing approach; Interviews and talking circles conducted post-diagnosis; Data analysis using hermeneutic phenomenology	9 females with GDM (mean age 38); Management strategies included lifestyle and/or medications	Unclear
Youngwanichsetha et al., 2017[96]	Thailand	Qualitative study; Interviewed post-diagnosis between 24 and 30 gestational weeks; Thematic analysis	30 females with GDM (mean age 32.5); Management strategies included lifestyle and/or medications	Prenatal care units, diabetes clinics and obstetric wards of two government hospitals in southern Thailand
Wazqar et al., 2012[97]	Canada	Secondary analysis of qualitative data; Interviewed post-diagnosis and postpartum; Thematic analysis	12 females with GDM (age range 23–38); Management strategies included lifestyle and/or medications	Unclear
Zalwango et al., 2021[20]	Uganda	Qualitative study; Interviews and focus groups conducted post-diagnosis and postpartum; Thematic analysis	10 females with GDM and 20 family members of those with GDM (mean age of GDM patients was 18–40); Management strategies not specified	Prenatal clinics
Tierney et al., 2015[98]	Ireland	Qualitative study; Telephone interviews conducted between 3.6 and 6.6 years postpartum; Theoretical thematic analysis approach	13 females with GDM (mean age 41.2, age range 31.2–49.6); Management strategies not specified	5 hospitals in Ireland

Abbreviation: GDM, gestational diabetes.

TABLE 2 Overview of Identified Themes and Implications for Practice.

Themes	Implications for Practice
Theme 1: Education on GDM & its management	
Subtheme 1: Content of education	1. Clinicians should educate women on the meaning, implications, contributors, and possible consequences of GDM. 2. Detailed education on both nonpharmacologic and pharmacologic management strategies should be provided. 3. For non-pharmacologic options, women desire clear and specific advice around diet and physical activity. Advice should be tailored to the women's personal beliefs/cultural practices. More information around safe and feasible physical activities should be given. 4. For education on pharmacologic strategies, more information should be provided on insulin (e.g., safety and efficacy, injection technique), blood glucose monitoring, and desired targets
Subtheme 2: Timing of education	5. Education should be provided close to the diagnosis of GDM to alleviate alarm and anxiety
Subtheme 3: Delivery of education	6. Alternative appointment methods (e.g., telephone or online) should be considered, where possible, to increase accessibility 7. A trustworthy online education resource should be designed and provided for women
Subtheme 4: Inclusion of family members	8. GDM education should also include women's family members to engage their support
Theme 2: Personalized or tailored counseling	9. Care decisions and recommendations should be tailored to women's personal situations. Considerations include cultural practices, language barriers, financial resources, and existing support systems. 10. Clinicians should acknowledge and understand individual women's underlying motivations and concerns in GDM management (e.g. avoiding insulin use)
Theme 3: Patient-centered care	11. Clinicians should provide care with greater flexibility (e.g., online methods of delivery), continuity, compassion, and attention. The latter two may be demonstrated through active listening and answering questions. 12. Clinicians should reflect on their own biases and preconceived notions around GDM 13. Education should be delivered in a sensitive manner, and language that directs blame onto women should be avoided 14. Women's experiences of stigma should be acknowledged
Theme 4: Digital or online adjuncts to care	15. Women desire a digital method to aid management of blood glucose (e.g., check reminders and blood glucose tracking), diet (e.g., detailed recipes, carbohydrate calculator), and physical activity (e.g., recommended exercises)
Theme 5: Support	16. Clinicians should acknowledge the emotional impact of a GDM diagnosis and provide emotional support to help alleviate anxiety and enhance trust 17. Women hoped to be connected with others within the GDM community and receive support. Clinicians should educate themselves on existing GDM peer support groups and provide this information to women

Abbreviation: GDM, gestational diabetes.

3.1 | Patient- and support persons-reported needs for improving prenatal GDM care

The following themes were identified from directly reported suggestions for improving care by women with GDM or their support persons. Additional data on their lived experiences and gaps in care are also summarized to provide context for these suggestions.

3.1.1 | Theme: Education on GDM and its management

The first theme involves education received by women from their healthcare providers. Women desired more education on GDM and methods of managing the condition than they had received, resulting in anxiety, confusion, and feeling the need to turn to other sources of information such as the Internet. Subthemes identified include: content of education, timing, delivery, and involvement of family members.

Subtheme: Content of education

Women were often concerned about risks to their baby primarily, and then to their own health and future risk of type 2 diabetes. Women wanted the content of education to include information on the condition itself, risk factors, blood glucose testing and targets, recommended lifestyle modifications including tailored diet and exercise advice, and pharmacological options. In particular, women struggled with increasing physical activity due to a dearth of information around safe and recommended exercises, lack of time, and physical discomfort from pregnancy. They wanted more clear and specific information including why physical activity is recommended, convenient options, intensity, frequency, and safety in pregnancy.[21]

Women requiring insulin often wanted more information and advice on the practicalities of injecting insulin.[22] The logistics of

TABLE 3 Sample quotations and contributing studies.

Theme	Sample Quotations	Contributing Studies
Education: Content of education	"…I wanted to know what insulin was going to do. I knew what it was doing for me, but they couldn't tell me what it was doing to the baby. And I still don't know what it does." (Gray et al., 2017)[22] "There's all these stuff about eating well and stuff but I don't think there's anything about exercise. I don't think it's stressed enough as eating. it's not as emphasized by everyone." (Harrison et al., 2019)[21]	Abraham et al., 2014; Bandyopadhyay et al., 2021; Cummins et al., 2022; Gray et al., 2017; Ge et al., 2016; Ghaffari et al., 2014; Guo et al., 2020; Harrison et al., 2019; Hewage et al., 2020; Hjelm et al., 2012; Hui et al., 2014; Khooshehchin et al., 2016; Lindmark et al., 2010; Martis et al., 2018; Morrison et al., 2014; Mufdlilah et al., 2020; Muhwava et al., 2019; Oza-Frank et al., 2018; Siad et al., 2018; Smith et al., 2022; AHS et al., 2015; Neufeld et al., 2014; Toft et al., 2022; Whitty-Rogers et al., 2016; Wazqar et al., 2012; Tierney et al., 2015 21,22,25,27,29–34,41,42,44,46,60,65,71,75,78,82,86,88,90,92,97,98
Education: Timing of education	"I believe there should be more information prior to the 26–28 week test about GDM, given so as not to cause such alarm. The community also needs to be educated about GDM" (Morrison et al., 2014)[30] "There wasn't room for me to ask questions. I was shown how to prick myself [insulin injections] but I was still in so much emotion; I couldn't even recall how often she said I had to do it" (Muhwava et al., 2019)[29]	Carolan et al., 2013; Doran et al., 2010; Faal Siahkal et al., 2022; Hjelm et al., 2007; Mensah et al., 2019; Morrison et al., 2014; Muhwava et al., 2019; Parsons et al., 2018; Siad et al., 2018; Toft et al., 2022; Tierney et al., 2015 29,30,36,39,45,52,66,77,86,92,98
Education: Delivery of education	"Everything's on your phone … it might be an easier way for people to access (information)." (Cummins et al., 2022)[31]	Cummins et al., 2022; de Sequeira et al., 2019; Hirst et al., 2012; Khooshehchin et al., 2016; Oza-Frank et al., 2018; Singh et al., 2018; Smith et al., 2022; Wah et al., 2019 31,35,62,71,82,87,88,94
Education: Inclusion of family members	"I have a problem with injecting insulin; if my husband could be taught, it'd be a great help. If my husband knows my needs, surely he can better support me." (Ghaffari et al., 2014)[33]	Abraham et al., 2014; Carolan et al., 2013; Ghaffari et al., 2014; Wazqar et al., 2012 32,33,52,97
Personalized or tailored counseling	"I'm finding a meal plan would have been helpful, just to know that if you want to have this, if you put it with this and this you'll be full and you'll be safe" (Hui et al., 2014)[34] "Whatever samples [the Diabetes in Pregnancy clinic] gave it is all Canadian like bread, sandwiches, and the grilled foods, which I'm not used to. So, then I have to change it to my things. I think if country-specific patterns, sample diets [were created], that could be better." (de Sequeira et al., 2019)[35]	Abraham et al., 2014; Bandyopadhyay et al., 2021; Bandyopadhyay et al., 2011; Draffin et al., 2016; de Sequeira et al., 2019; Helmersen et al., 2021; Hjelm et al., 2012; Hui et al., 2014; Hui et al., 2014; Kaptein et al., 2015; Oza-Frank et al., 2018; Siad et al., 2018; Toxvig et al., 2022; Wan et al., 2020 18,25,32,34,35,38,47,56,61,65,82,86,93,95
Patient-centered care	"It makes your life—if you have a demanding job—very difficult because I would have some weeks where I'm having an ultrasound on Monday, I'm going to see the endocrinologist on Wednesday and the obstetrician on Thursday. So I'm missing 3 days in a week" (Kaptein et al., 2015)[38] "Doctors should have more patience and a good attitude, give more time to each woman, say things clearer" (Ge et al., 2016)[41]	Cummins et al., 2022; Dickson et al., 2020; Faal Siahkal et al., 2022; Gray et al., 2017; Ge et al., 2016; Hjelm et al., 2022; Hjelm et al., 2018; Hjelm et al., 2007; Jarvie et al., 2017; Kaptein et al., 2015; Parsons et al., 2018; Rasekaba et al., 2021; Siad et al., 2018; Singh et al., 2018; Neufeld et al., 2014; Toxvig et al., 2022; Tierney et al., 2015 22,31,37–42,45,63,64,66,84,86,87,93,98
Digital or online adjuncts to care	"I mean the most useful, convenient is the app [smartphone application]. Because everyone has a smartphone, and everyone can access" (Hewage et al., 2020)[46]	Edwards et al., 2021; Hewage et al., 2020 28,46
Support	"It's really good for mums to be supported by other mums… Meeting up at a coffee shop or at the hospital … having those conversations with other mums where expectant mums can go and hear relatable stuff … so they're prepared" (Cummins et al., 2022)[31]	Cummins et al., 2022; Gray et al., 2017; Hjelm et al., 2007; Hjelm et al., 2005; Rasekaba et al., 2021; Siad et al., 2018; Singh et al., 2018; Neufeld et al., 2014; Tierney et al., 2015 22,31,42,66,67,84,86,87,98

Abbreviation: GDM, gestational diabetes.

checking blood glucose and injecting insulin were a barrier as women found it inconvenient, cumbersome, and physically uncomfortable. This was worsened if women had a fear of needles. Women who tried to achieve tight glycemic control sometimes experienced hypoglycemia, and thus fear of hypoglycemia was another barrier.[22,23]

In general, insufficient education on GDM represented a barrier for women. Not receiving sufficient education on the risks of uncontrolled GDM led some women to perceive GDM as not serious and to not adhere to management recommendations.[24] Women often felt they did not have enough time with healthcare providers to ask

TABLE 4 Risk of bias assessment (based on critical appraisal skills programme for qualitative studies).

Author, Year	1. Was there a clear statement of the aims of the research?	2. Is a qualitative methodology appropriate?	3. Was the research design appropriate to address the aims of the research?	4. Was the recruitment strategy appropriate to the aims of the research?	5. Was the data collected in a way that addressed the research issue?	6. Has the relationship between researcher and participants been adequately considered?	7. Have ethical issues been taken into consideration?	8. Was the data analysis sufficiently rigorous?	9. Is there a clear statement of findings?	10. How valuable is the research?	Overall Quality[a]
Abraham et al., 2014[32]	Yes	Yes	Yes	Yes	Can't Tell	Can't Tell	Yes	Yes	Yes	Can't Tell	Moderate
Bandyopadhyay et al., 2021[25]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Bandyopadhyay et al., 2011[18]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Carolan et al., 2013[52]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Carolan et al., 2012[53]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Carolan-Olah et al., 2017[23]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Collier et al., 2011[54]	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	Moderate
Cummins et al., 2022[31]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Dayyani et al., 2019[19]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
de Sequeira et al., 2019[35]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Dickson et al., 2020[40]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Doran et al., 2008[55]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Doran et al., 2010[36]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Can't Tell	Moderate
Draffin et al., 2016[56]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Eades et al., 2018[43]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Edwards et al., 2021[28]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Can't Tell	Can't Tell	Can't Tell	Yes	Moderate
Elton et al., 2022[50]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Faal Siahkal et al., 2022[39]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Gray et al., 2017[22]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Can't Tell	Can't Tell	Can't Tell	Yes	Moderate
Ge et al., 2016[48]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Ge et al., 2017[57]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Ge et al., 2016[41]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Ge et al., 2016[58]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Ghaffari et al., 2014[33]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Gunn et al., 2020[59]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Guo et al., 2020[60]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Harrison et al., 2019[21]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High

(Continues)

TABLE 4 (Continued)

Author, Year	1. Was there a clear statement of the aims of the research?	2. Is a qualitative methodology appropriate?	3. Was the research design appropriate to address the aims of the research?	4. Was the recruitment strategy appropriate to the aims of the research?	5. Was the data collected in a way that addressed the research issue?	6. Has the relationship between researcher and participants been adequately considered?	7. Have ethical issues been taken into consideration?	8. Was the data analysis sufficiently rigorous?	9. Is there a clear statement of findings?	10. How valuable is the research?	Overall Quality[a]
Helmersen et al., 2021[61]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hewage et al., 2020[46]	Yes	Yes	Yes	No	Yes	Can't Tell	Yes	Yes	Yes	Yes	Moderate
Hirst et al., 2012[62]	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	Moderate
Hjelm et al., 2022[63]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hjelm et al., 2018[64]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hjelm et al., 2012[65]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hjelm et al., 2007[66]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hjelm et al., 2005[67]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hjelm et al., 2012[68]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Hui et al., 2014[34]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Hui et al., 2014[47]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Hui et al., 2014[69]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Jarvie et al., 2017[37]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Jirojwong et al., 2017[70]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Kaptein et al., 2015[38]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Khooshehchin et al., 2016[71]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	No	No	Can't Tell	Low
Kim et al., 2021[49]	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Nielsen et al., 2020[72]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Lawrence et al., 2021[73]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Lawson et al., 1994[74]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Can't Tell	Yes	Yes	Yes	High
Lindmark et al., 2010[75]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Mançú et al., 2016[76]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Can't Tell	Moderate
Martis et al., 2018[44]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Su et al., 2022[26]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Mensah et al., 2019[77]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Morrison et al., 2014[30]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Mufdlilah et al., 2020[78]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Mufdlilah et al., 2020[79]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High

TABLE 4 (Continued)

Author, Year	1. Was there a clear statement of the aims of the research?	2. Is a qualitative methodology appropriate?	3. Was the research design appropriate to address the aims of the research?	4. Was the recruitment strategy appropriate to the aims of the research?	5. Was the data collected in a way that addressed the research issue?	6. Has the relationship between researcher and participants been adequately considered?	7. Have ethical issues been taken into consideration?	8. Was the data analysis sufficiently rigorous?	9. Is there a clear statement of findings?	10. How valuable is the research?	Overall Quality[a]
Muhwava et al., 2020[80]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Muhwava et al., 2019[29]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Neufeld et al., 2011[81]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Oza-Frank et al., 2018[82]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	High
Parsons et al., 2018[45]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	High
Persson et al., 2010[83]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Qian et al., 2022[24]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Rasekaba et al., 2021[84]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
de Holanda et al., 2012[85]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Siad et al., 2018[86]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Singh et al., 2018[87]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	High
Smith et al., 2022[88]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Yes	High
Smyth et al., 2023[89]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
AHS et al., 2015[90]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Subarto et al., 2022[91]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	No	Moderate
Neufeld et al., 2014[42]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	High
Toft et al., 2022[92]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Toxvig et al., 2022[93]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Wah et al., 2019[94]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Wan et al., 2020[95]	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Whitty-Rogers et al., 2016[27]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't Tell	Yes	Yes	High
Youngwanichsetha et al., 2017[96]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Wazqar et al., 2012[97]	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Yes	Yes	Yes	High
Zalwango et al., 2021[20]	Yes	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes	Yes	Yes	Can't Tell	Moderate
Tierney et al., 2015[98]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High

[a]Responses to Critical Appraisal Skills Programme questions 1–10 were scored (0 points for No, 0.5 points for Can't Tell, and 1 point for Yes). Overall scores of less than 7.5 indicates low quality paper, 7.5–9 indicates moderate quality, and 9–10 indicates high quality. Based on scoring system used in Butler et al. (2016).[16]

questions. Women struggled when dietary and physical activity recommendations conflicted with their pre-existing beliefs or cultural practices, and this was a barrier to following healthcare provider recommendations. Commonly referenced beliefs by both women and their support persons included that restricting the diet would be detrimental to the baby's growth,[18] that pregnancy cravings should be satisfied, and that exercise would cause pregnancy loss or put strain on the baby.[25,26]

Subtheme: Timing of education

Many women experienced significant emotional turmoil on initial diagnosis, including feeling scared, worried, overwhelmed, and shocked, especially if they lacked awareness of GDM prior to diagnosis.[19,27] Receiving education about GDM helped women come to terms with the diagnosis, however women frequently perceived a prolonged delay between diagnosis of GDM and education, causing anxiety.[28] As a result, the majority of women desired the option for more timely education sooner after their diagnosis of GDM.[29] Given many pregnant women have little to no pre-existing knowledge or awareness of GDM, some women suggested that information on GDM be provided prior to screening to avoid alarm or shock upon diagnosis.[30]

Subtheme: Delivery of education

Some women suggested alternative methods of delivering education such as using telephone or online platforms to increase flexibility and accessibility. Women were confused by the vast amount of information on the Internet, and thought hospital-based online education would help provide a trustworthy and reliable online resource.[31]

Subtheme: Inclusion of family members

Women felt that their family members should also receive education on GDM in order to engage and help them better support women.[32,33] Women felt supported when their family members made lifestyle modifications alongside them and this helped them adhere to these changes.

3.1.2 | Theme: Personalized or tailored counseling

Women often felt that the advice they received was too general, and desired more tailored education and support that is appropriate to their own cultures, time constraints, financial resources, and support systems. This was particularly emphasized with "generic" diet recommendations that were difficult for women to implement in their cultural diets.[34] Women often had competing priorities for their time including their job or career, other children, and housework. This resulted in feeling like they didn't have enough time to buy and prepare separate meals from their families and to engage in physical activity. Finances presented another challenge through costs of gym memberships and expenses from buying healthier foods that were often more expensive and separate from that of the rest of the family.

In situations of language or culture discordance between women and their healthcare providers, women wanted information in their preferred language such as through an interpreter at appointments or written materials in their language. The general lack of cultural tailoring in GDM care was highlighted in a study which included South Asian immigrant women in Canada, finding that awareness of pre-existing culturally tailored resources was low among women and healthcare providers,[35] identifying the need for improved dissemination of these resources.

Certain motivations and concerns were shared by most women, whereas others varied person-to-person. Women were highly motivated to manage their GDM for the sake of their baby's health. This almost universally took precedence over their concern for their own health. Another motivator was a fear of needing insulin and/or a cesarean section.[36] For some women, the preference to avoid insulin motivated them to make lifestyle changes to improve glycemic control through non-pharmacological methods. Conversely, other women thought that using insulin made it easier to achieve glycemic control and allowed them more freedom in dietary choices.

3.1.3 | Theme: Patient-centered care

Desires for more patient-centered care in various forms were expressed. Women wanted more flexibility in their appointments such as through online or telephone delivery,[37] and to reduce the amount of time consumed by appointments and travel by having multiple appointments with different healthcare providers on the same day.[38] Perceived differences in the intensity of GDM care (too much or too little) had different impacts on women and should be taken into account when arranging follow-up visits. For example, some women in Australia felt overwhelmed with the intensity of monitoring and appointments.[18]

Women preferred more continuity of care by seeing a consistent healthcare provider instead of seeing multiple specialists.[37] In some study settings, standard of care included initial inpatient management of GDM. The inpatient experience was disliked by most women due to feelings of excessive fear, lack of sleep, separation from family support, and concerns about their work, other children, and hospitalization expenses.[33,39] Women whose prenatal care was divided between community clinics and specialized/hospital clinics often preferred to have as much of their care delivered in the community as possible due to convenience and less crowding, while acknowledging resource disparities between these settings.[40]

Women desired a more humanistic approach to care that involved showing compassion, actively listening without interrupting very quickly, taking time to answer questions, and recognizing the experience of stigma associated with GDM.[41,42] Societal stigma around GDM led to feelings of failure for not having the "perfect pregnancy", and the label of "high risk" caused women to worry more for their baby's health.[31] This led to self-isolation, feelings of shame, and reduced self-efficacy in managing their pregnancy.[33] Social outings and events were challenging as it was difficult to follow diet

recommendations due to unfamiliar ingredients, unknown portion sizes, and social pressures to eat. Women often managed these occasions by choosing not to measure or worry about their blood glucose, skipping meals later, increasing exercise, or not attending social events entirely.[43] Some women also did not want to use insulin in public due to concern of being perceived as a "drug user."[44]

Women also experienced significant stigma during their healthcare interactions, and felt blamed[30] and over-scrutinized by their healthcare providers, which led to increased stress and feeling like their needs were unimportant compared to that of their baby.[45] In a study on women with coexisting BMI≥30 kg/m^2 and GDM, some women felt they were being stigmatized if they perceived elevated BMI as the only indication for their GDM screening and were displeased by the frequency of weight-related comments.[37] Perceived stigma from healthcare providers sometimes prevented women from being truthful with their lifestyle modifications or intentionally not checking blood glucose after dietary indiscretions.

3.1.4 | Theme: Digital or online adjuncts to care

Beyond telephone or line delivery of education as mentioned in subtheme 1.3, women wanted to incorporate digital or online adjuncts to help them organize other aspects of GDM management. Women wanted digital tools with capabilities such as blood glucose tracking, reminders to check blood glucose, calorie/carbohydrate calculators, and storage for recipes and recommended physical activity.[28,46] They hoped that such a tool would also help increase accessibility to healthcare and reduce the number of clinic visits.

3.1.5 | Theme: Support

Support from partners, families, peers, and healthcare providers was a major enabler to women's management of GDM. Emotional support from these sources helped alleviate anxiety. Women often blamed themselves and experienced guilt for their previous lifestyle choices, and in some cases, also attributed previous pregnancy losses or complications to their lifestyle practices.[40] In one study, a few of the partners blamed the women for "not taking good care of themselves" whereas most others were sympathetic.[20] Women felt that they lost a sense of control over their pregnancies as their time and energy was dominated by managing their blood sugars, which was disruptive to their daily life. Elevated blood glucose readings caused a sense of loss of control, which was managed by coping methods such as praying, emotional coaching, and planning to binge restricted foods after delivery.[47] Alternately, measuring and being aware of their blood glucose level also provided a sense of security and control to many women.[19,46] Women who were religious felt that spiritual support was beneficial in managing stress.

Making lifestyle changes including diet and physical activity was difficult for most women. They felt the dietary changes were restrictive and difficult because they could not consume their favorite or usual foods and often experienced hunger. Social events and outings with friends or family made diet control difficult given unfamiliar foods and social pressure to eat. Partners and families often also helped alleviate the burden from some routine tasks.[35] Women felt supported when partners and families made lifestyle changes alongside them or helped facilitate changes. Those who did not feel supported by spouses or family members found it harder to make and maintain lifestyle changes. For example, dietary modifications were more difficult if partners ate junk food while women were abstaining. In one study, partners described struggling with making dietary modifications with the women, and recognized that they were not setting "a good example."[19] Other factors such as having a family member who cooks and plans the meals[48] were also barriers to implementing lifestyle changes.

Women often sought peer support and wished to be connected to other women who were experiencing or had experienced GDM in order to share emotional support and practical advice on managing GDM.[31] Peer support through online groups provided a sense of community and "safe space" for women without fear of stigma and judgment that they perceived from others.[28,49] These sources were regarded as trustworthy because members had the experience of GDM and the information was perceived as evidence-based.[28] In a study of women in England who participated in an online group GDMums, some women turned to GDMums as a more accessible and responsive resource when confronted with healthcare services that they felt were overstretched.[50]

Implications for practice

Data from the included primary studies have been interpreted and synthesized into themes. Based on the synthesized data, relevant clinical implications for practice have been compiled, which are presented in Table 2.

4 | DISCUSSION

This systematic review and meta-aggregation synthesized findings from qualitative studies on lived experience of GDM to identify patient-guided suggestions for improving prenatal GDM care. Suggestions for care largely centered around providing comprehensive, timely, and accessible education that included their support persons and was personalized and tailored to each woman. This was in the context of barriers such as women feeling like they lacked knowledge on GDM and its management, not having sufficient time with healthcare providers to ask questions, and struggling with advice that was generic and, in some cases, not culturally applicable. Encouragement to help women make lifestyle modifications and manage insulin use can be tailored to each woman's motivations and concerns. Support from healthcare workers, partners, and family was important in enabling women to manage GDM, and this informed the implication for practice of acknowledging the impact of the diagnosis and including partners and family in education and counseling to involve them in

supporting women. Peer support was identified as another need by women, for emotional support, knowledge sharing, and a safe space from stigma associated with GDM.

Stigma was a prominent theme in the experience of GDM for many women. Major contributors to societal stigma include low awareness of the existence of GDM, the perception of the pregnancy as not being healthy, and blaming women for "unhealthy" lifestyle habits.[51] Stigma leads to feelings of shame and self-blame by women, which are exacerbated when women also perceive stigma from their healthcare providers, such as excessive frequency of weight-related comments if they have an elevated BMI. Addressing stigma requires a broad approach, and represents a topic requiring education for healthcare professionals as well as counseling for pregnant women.

Previous systematic reviews have synthesized qualitative studies around the lived experience of GDM.[9,10,13] This review extends the current body of literature by synthesizing suggestions for improving prenatal GDM care to provide tangible guidance on potential next steps to improve clinical care that are informed by and important to women. In order to provide the context from which these suggestions for care arose, we also synthesized the themes around the lived experience of GDM, including barriers and enablers to management. Allowing women's suggestions to guide care improves the patient experience, as well as facilitates access and adherence to recommendations.[12] Accordingly, this review provides a summary of patient-guided suggestions for care that may be implemented by healthcare systems and clinicians to improve GDM management. Notably, this review was conducted as a part of a larger initiative to translate GDM experience to community and clinical audiences. Findings were presented in online and community settings (i.e., local library), alongside patients with lived experience who echoed what was reported in this review. Taken together, the ultimate goal is to empower patients to share their experience to guide improvement in quality of care.

Strengths of our study include its direct clinical implications in guiding improvement in prenatal GDM care from women's and their support persons' perspectives. We used a comprehensive search strategy resulting in a large number of included studies, which increased the number and diversity of women's perspectives. We hand searched reference lists and citations, resulting in a thorough search through the existing literature. We applied a meta-aggregation approach to synthesize the data which specifically aims to identify actionable suggestions to improve care. The diversity in studies included is also a limitation in that standards of care differed between studies and women experienced different standards of care. We tried to alleviate this by providing applicable context behind different women's perspectives. We recognize that different healthcare structures exist in different countries and these suggestions may have varying levels of impact in different cultures, however the patient-reported suggestions for improvement of care share numerous commonalities across studies in varying countries, which adds to its transferability. Another limitation is that we did not include perspectives on postpartum care and prevention of type 2 diabetes in order to limit the scope of this systematic review to a practical scale. Due to current resource restrictions of this project, we did not involve an individual with lived experience of GDM in this systematic review. Potential avenues of further study include confirmation of our findings via a patient representative, and measurement of the impact of care improvements, such as cultural tailoring of GDM education, both through a qualitative patient experience lens as well as through measurement of quantitative clinical outcomes.

5 | CONCLUSION

The experience of GDM is impacted by many patient, clinician, and environmental factors. Our systematic review identifies several suggestions for improving care including both direct patient-reported suggestions, as well as interpreted suggestions to improve care emerging from patient-reported barriers and enablers to management of GDM. These patient-guided suggestions are important to consider when embarking on clinical quality improvement of prenatal GDM care.

AUTHOR CONTRIBUTIONS

Yuyang Julianne Feng: Data collection and analysis, writing – original draft, writing – review and editing. Judy Deng: Data collection and analysis, writing – original draft, writing – review and editing. Allison Sivak: Methodology, investigation, writing – review and editing. Roseanne O Yeung: Conceptualization, writing – review and editing, supervision. Taniya Nagpal: Conceptualization, methodology, writing – original draft, writing – review and editing, supervision.

FUNDING INFORMATION

This research was funded by The Canadian Institute of Health Research (Grant #189191) awarded to Drs. Taniya Nagpal and Roseanne Yeung.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Feng YJ, Deng Z, Sivak A, Yeung RO, Nagpal T. Women's perspectives to improve prenatal care for gestational diabetes: A systematic review and meta-aggregation of qualitative studies. *Acta Obstet Gynecol Scand*. 2025;104:267-287. doi:10.1111/aogs.14973