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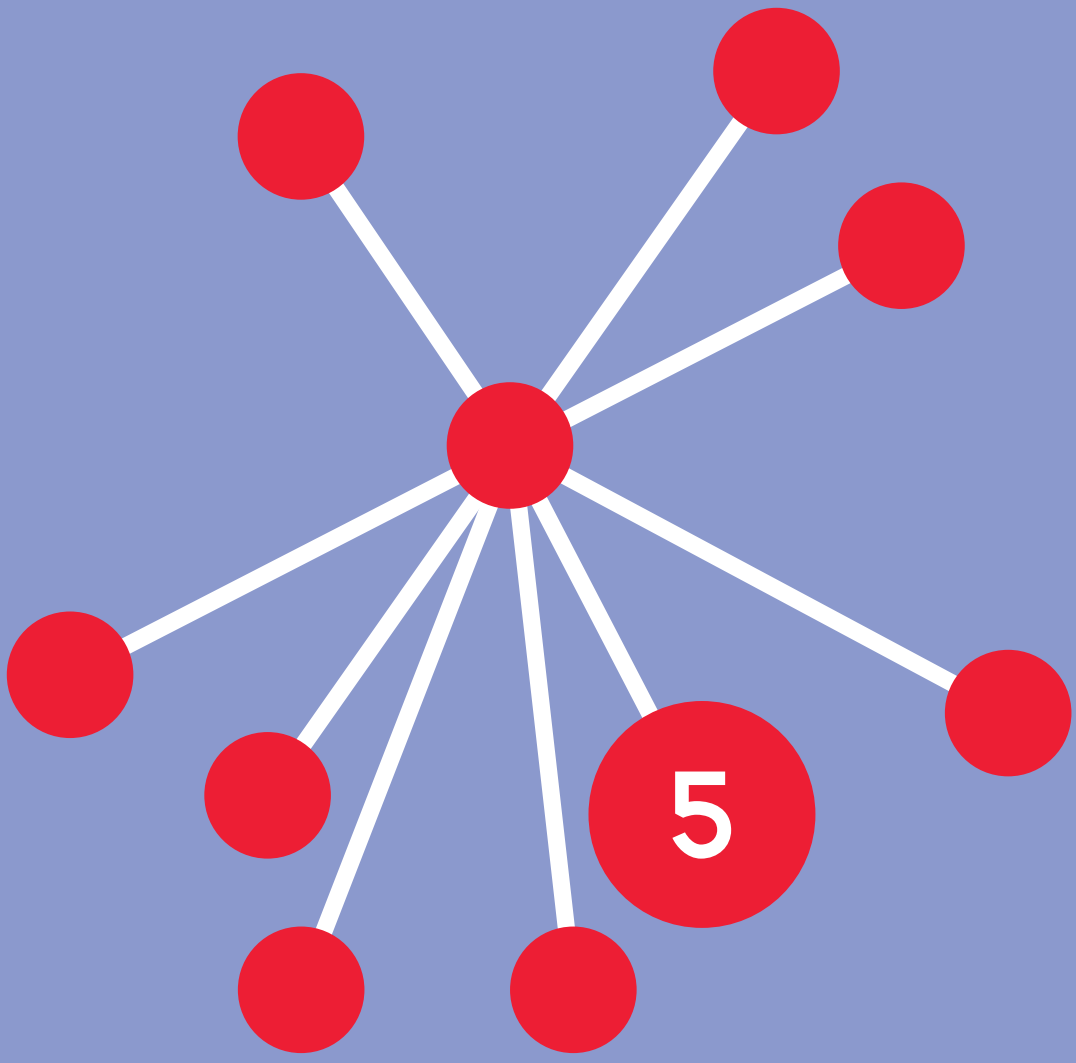
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CARDIOVASCULAR RISK MANAGEMENT AFTER HYPERTENSIVE DISORDERS AND DIABETES DURING PREGNANCY, IN A MULTI-ETHNIC POPULATION: A QUALITATIVE STUDY AMONG WOMEN AND HEALTHCARE PROVIDERS

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Abstract

Background

Pregnancy complications like gestational diabetes and hypertensive disorders increase maternal cardiovascular risk. However, evidence on how to best implement cardiovascular risk management (CVRM) in multi-ethnic contexts remains limited. Existing studies primarily focus on white populations, despite disparities in CVD risk and the risk of pregnancy complications across ethnic groups.

Objective

This study explores experiences, barriers, and improvements in postpartum CVRM from women's and healthcare providers' perspectives, aiming to enhance cardiovascular disease prevention in multi-ethnic contexts.

Study Design

We conducted semi-structured interviews with 25 postpartum women who experienced hypertensive disorders of pregnancy or gestational diabetes, recruited to reflect diverse ethnic and socioeconomic backgrounds. Using a narrative approach, interviews covered CVRM experiences and preferences. Themes were triangulated with findings from 16 healthcare providers, including general practitioners, midwives, and specialists, discussing care delivery, optimal practices, and multi-ethnic considerations. Results were integrated in a patient journey map.

Results

Significant dropout occurred at the transition from obstetric to primary care and during long-term monitoring, especially among ethnic minorities and women with lower socioeconomic status and disease severity. Women often lacked risk awareness and missed follow-ups when self-scheduling was required. Most supported tailored cardiovascular risk education, lifestyle interventions, and proactive outreach. Healthcare providers emphasized the need for interdisciplinary communication, regional protocols, and clearer guidelines, noting variability in general practitioners' support for routine monitoring.

Conclusion

Postpartum CVRM in multi-ethnic contexts could be improved with active outreach, better follow-up utilization, culturally tailored interventions, and regional multidisciplinary protocols to streamline care and address guideline inconsistencies.

Introduction

Hypertensive disorders of pregnancy (HDP) and gestational diabetes mellitus (GDM) are associated with a 2 to 4-fold increased risk of future maternal cardiovascular disease (CVD) compared to healthy pregnancy (1-3). Since complicated pregnancies occur early during the life course, they provide opportunities for early risk profiling and prevention of CVD, which may contribute to lowering the burden of CVD later in life (4). Although the increased CVD risk after HDP/GDM is well established, evidence is limited on how to best implement measures to manage and reduce the future CVD risk in women after HDP/GDM (5).

Despite the existence of national and international guidelines recommending structured postpartum cardiovascular risk management (CVRM) after HDP/GDM (6,7), previous studies have shown that implementation varies, both in healthcare provider (HCP) initiated offering and in the uptake of postpartum-CVRM (8-10). Women's and HCPs' perspectives on postpartum-CVRM have previously been studied to improve care (11-16). However, study participants have been predominantly of white European origin, while disparities exist between women from different ethnic groups. Women from some ethnic minority groups have higher rates of pregnancy complications (17), less favorable CVD risk profiles at younger ages and worse prognoses compared to majority populations in high-income countries (18, 19). Moreover, the studies often lacked diversity in socioeconomic background and often selected a group with high interest in the topic (12-14).

To provide adequate and targeted postpartum-CVRM to all – and potentially reduce the burden of CVD in a broader group of women– perspectives on postpartum-CVRM in a multi-ethnic context should be considered. Therefore, the objective of this study was to uncover experiences, barriers, and potential improvements, from both women's and HCPs' perspectives, regarding postpartum-CVRM in a diverse multi-ethnic context.

Materials and Methods

We performed a qualitative study among women who experienced HDP/GDM (who we proceed to call women for conciseness) and among HCPs generally involved in postpartum care. Integrated Patient Journey Mapping was used as a framework to collect the data and organize the findings from thematic analyses (20-22). A comprehensive description of the methods following the standard reporting of qualitative research (SQSR) guidelines is found in Supplementary Table 1 (23).

In short, we recruited women with diverse, self-reported ethnic backgrounds living in the Netherlands. Women were eligible if they were between three months to five years postpartum and had experienced HDP/GDM, based on self-report. HDP included gestational hypertension, (pre)eclampsia (PE) and Hemolysis, Elevated Liver enzymes and Low platelets (HELLP) syndrome. Women with pre-existing cardiac conditions and/or hypertension and/or type II diabetes mellitus were excluded. Findings were discussed in, and triangulated with data from, interviews with HCPs (e.g., midwives, general practitioners (GPs), GP practice nurses, obstetricians, and internal medicine specialists). We used purposive sampling to reach quota per subgroup of women (six to eight participants per group) and HCPs (three participants per group). The study was approved by the Medical Ethical Review Board of the Amsterdam University Medical Center. All the participants provided informed consent.

Semi-structured interviews with women and HCPs lasted 60 and 40 minutes, respectively, and were held between January 2023 and March 2024 through videoconferencing or on a location of the participant's choice. Supplementary Table 2 contains the translated topic lists. Audio and video recordings were transcribed, de-identified, quality checked and locked before analysis. Women and HCP interviews were thematically analyzed separately. Coding was done by multiple coders, mostly deductively based on the topic list while allowing for inductive coding. Subsequently, we analyzed patterns in the women's data by migration background, socioeconomic status (SES), obstetric history and disease severity. Emerging themes and subthemes from thematic analyses were discussed among the entire research team in monthly meetings and final selection was based on consensus.

Results

In total, n=41 participants were included. The n=25 patient participants, consisted of n=7 women with a Dutch background and n=18 women with an ethnic minority background (i.e., Moroccan, African Surinamese, South Asian Surinamese, Eritrean, Somalian, Ghanaian, Aruban and Turkish backgrounds; Table 1). Of the women with an ethnic minority background, n=16 were born and raised in the Netherlands, while n=2 were born abroad. All women, except one with an ethnic minority background, were sufficiently proficient in Dutch. The distribution of educational level and employment status differed between participants with a Dutch background and those with an ethnic minority background. Participants with a Dutch background were more often highly educated and actively employed, while participants with an ethnic minority background were more often unemployed or had a lower educational level (Table 1). The women with a Dutch background were more often parous compared to those from an ethnic minority

background. The n=16 HCP participants consisted of n=3 midwives, GPs, GP assistants and internal medicine specialists and n=4 obstetricians. The mean age for women and HCPs was 33.3(4.9) and 44.9(13.2) years, respectively. Of HCPs, n=2 were male.

Table 1: *Characteristics of patient sample*

	Dutch BACKGROUND n=7	Ethnic MInority BACKGROUND n=18
Age - mean (sd)	36.7 (0.9)	32 (4.8)
Socioeconomic Status		
Educational Level High – N (%) Educational Level Low to Intermediate – N (%)	5 (71.4) 1 (14.3)	8 (44.4) 10 (55.5)
Paid Work - N (%)	7 (100)	10 (55.5)
Parity (nulliparous) - N (%)	2 (28.6)	14(77.8%)
Self-Reported Diagnosis**		
Gestational Hypertension - N (%)	1 (14.3)	1 (5.5)
(Pre)Eclampsia - N (%)	4 (28.6)	14 (66.6)
-of which HELLP Syndrome - N (%)	2 (28.6)	2 (11.1)
Gestational Diabetes Mellitus - N (%)	2 (28.6)	11 (61.1)
Pregnancy duration (weeks) - median (range)	37 (29-40)	37 (23-42)
Cesarean section - N (%)	4 (57.1)	5 (27.7)
Time between birth and interview (months) - median (range)	11 (5-48)	16 (3-60)

Abbreviations: HELLP = Hemolysis, Elevated Liver enzymes and Low Platelets

**Parity at time of index pregnancy*

***Numbers do not add up, self-reported hypertensive disorders of pregnancy, combined with & gestational diabetes mellitus are included.*

In the next paragraphs, we present general findings that were similar for the total group of women and findings for HCPs on: A) Experiences with the current postpartum-CVRM care pathway and B) Preferences for CVD risk education, lifestyle interventions and routine GP monitoring. We discuss findings that were specific to women from an ethnic minority background separately in paragraph C) Focus points for postpartum-CVRM in a multi-ethnic population. Quotes from the interviews support our principal findings (Table 2). A full overview of all themes and subthemes can be found in Supplementary Table 3.

Experiences with current postpartum-CVRM care pathway

We identified four main phases in the patient journey (Figure 1), based on women's and HCPs' descriptions combined with the organization of obstetric care and CVRM within the Dutch healthcare system: 1) The first ten days postpartum, concluded by a community midwife (home) visit. 2) One to six weeks postpartum, ending with a week 6-appointment

at the community midwife or obstetrician. 3) Six weeks to 12 months postpartum, during which people may receive care at the GP, when indicated. 4) Beyond one year postpartum, routine monitoring by GP, annually in the first five years postpartum followed by once every three years, according to clinical guidelines (5).

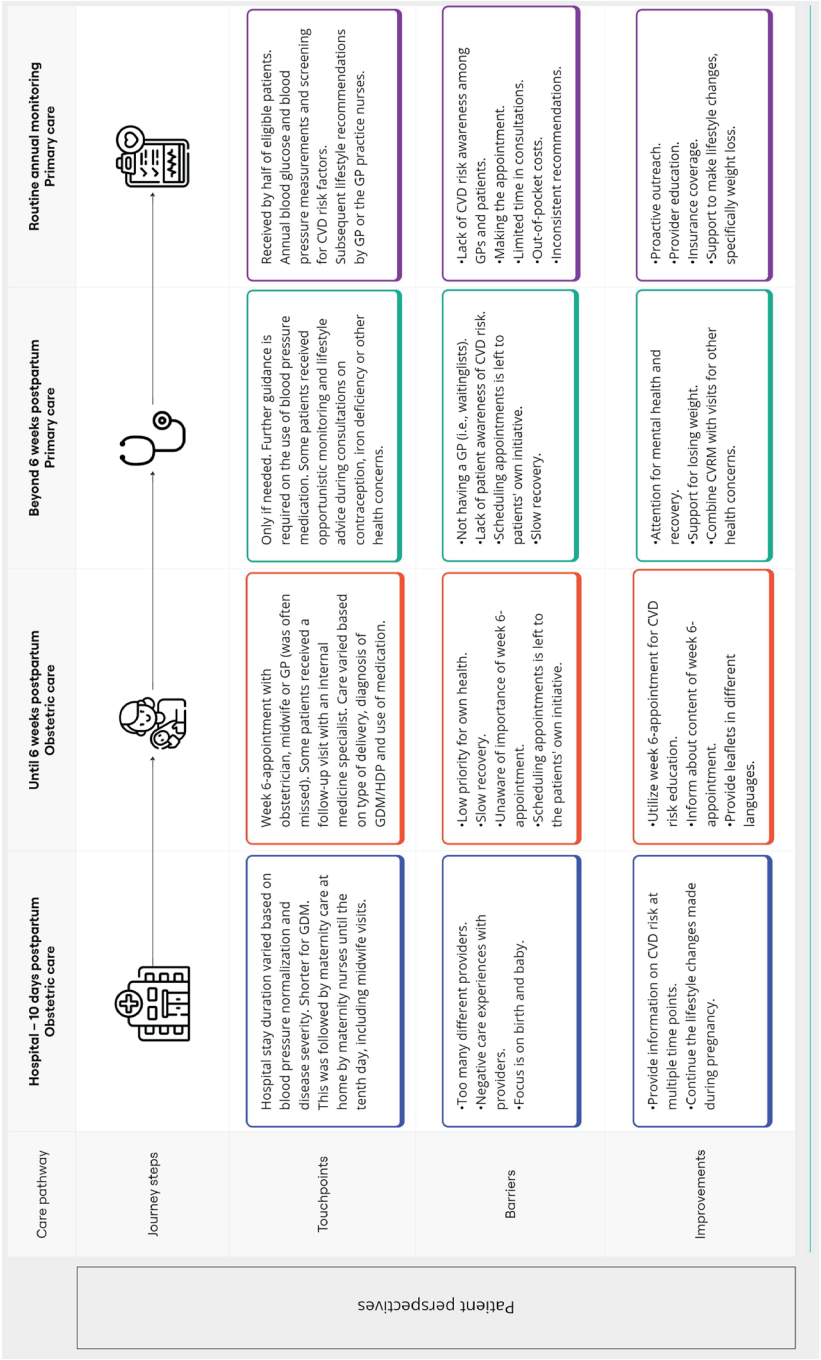

Fig. 1. Patient Journey Map Postpartum Cardiovascular Risk Management. Abbreviations: CVRM = cardiovascular risk management, GDM = gestational diabetes mellitus, HDP = hypertensive disorders of pregnancy, CVD = cardiovascular disease, GP = general practitioner.

Many women did not recall receiving CVD risk education in any phase of the care pathway with some heterogeneity depending on ethnic background. Most women received lifestyle advice, varying from general advice to in-depth personal counselling. While lifestyle advice was often already initiated during pregnancy in women with GDM, many did not follow through postpartum. Less than half of eligible women (those past one year postpartum) received routine monitoring by their GP. Compared to women with GDM, those with HDP were less often informed and less aware of the recommendations for lifestyle improvements and GP monitoring. Here, we also saw a different pattern from women from the majority compared to minority backgrounds. Moreover, women with HDP reported that the disease itself had affected information retention, motivation and initiative concerning CVRM (e.g., through impacted energy levels, mental health, work participation and memory; Table 2, quote 1).

Table 2 *Quotes from patients and providers*

1. "And I think that's a strange thing, too, because I was not all there. I wasn't myself [...] I would say no, I missed [CVD risk information]..Because I'm now a member of the HELLP foundation. That's how I found out. Because I was so sick. Even after [HELLP], I stayed weaker. Maybe they told me, but I wasn't all there." ~ Participant with acute HELLP syndrome, ethnic minority background

2. *"No, I didn't have a follow-up check. That's actually also because she said you have to schedule [the appointment] yourself, but I didn't really feel like it. So, in the end it didn't happen."* ~ Participant with GDM, ethnic minority background

3. *"You know that people who had a hypertensive disorder during pregnancy that their [cardiovascular diseases] risk is increased later on. But what hasn't been shown, or what we don't know is what is sensible care after, right? How often you have to check them to see if it's okay? To medicate so young or not? There's just no evidence for that. So that also makes it difficult to offer structural care for it."* ~GP

4. *"If someone had an otherwise uncomplicated delivery and the blood pressure was all normal, they went home without medication, then from the hospital they won't get the call for the follow-up check, by default [...]There are also [midwife] practices that, only if they themselves have accompanied the delivery, they see those people for follow-up checks. So, I suspect that those people who have indeed been in the hospital, but then went home fairly OK, or just without complications, that those are people who get lost between the cracks."* ~ Community midwife

5. *"I had wanted to hear it [cardiovascular diseases risk information], so I know what to expect. Because now that I know, I know what to expect and I can prepare myself. I can start living healthier, I can do all kinds of things."* ~ Participant with PE, ethnic minority background

6. *"No, I really prefer someone talking to me and to explain clearly. Because nine times out of ten I put a leaflet in my bag and never read it again.* ~ Participant with GDM/PE/HELLP, ethnic minority background

7. *"...when they are 34, 35 weeks pregnant, so to speak, and have severe preeclampsia, yes, there is already quite a lot coming at them. [...] what I particularly go into at that moment is what is going on right now and how we are going to treat it. And the long-term [cardiovascular diseases risk] consequences, I think that's more for when they come for the follow-up visit [...]."* ~Obstetrician

8. *"Well, everybody knows that. Everybody knows that you shouldn't smoke, you shouldn't drink, you should exercise enough, you should eat healthily. [...] You know, it's just such standard textbook stuff. [...] People need more tools than just the standard lines."* ~ Participant with acute HELLP, Dutch background

9. *"I sincerely believe that with the current care burden, how society is developing, with an aging population and more chronic diseases and obesity, we need to have a discussion because it will soon be impossible to sustain. Because there just won't be enough care providers left in institutions to do all those jobs. [...] So just to be clear, yes, we as healthcare providers absolutely have a responsibility and the task there. We need to look at how we can manage it within the healthcare system as good as possible, so that every woman who is entitled to it receives good aftercare and also is detected in a timely manner if they cross the margins. But I also think there is a task and a duty for the individual and for society."* ~Internal medicine specialist

10. *"Because she [the GP] had said to me: 'You have to have your blood pressure measured once a year but, you have to make an appointment yourself'. Then, yeah, if you are busy with kids and work, you think: 'I'll see'. But if someone calls me and says it's time to check my blood pressure, then, yes, that's much easier [...] no, it's not that I think like: 'oh, I have to make an appointment next week because I have to measure my blood pressure.' If I have no symptoms, then I assume that I am doing just fine".* ~ Participant with GDM/PE, ethnic minority background

11. *"I'm very aware of [recommendations for cardiovascular diseases risk monitoring], but I can imagine that women who are either low-literate or don't speak the language or have some other barrier or obstacle in their language skills or something like that. That those are less engaged, because they may not quite understand, either*

what to do or when to come back for another appointment. [...] You have to figure it out yourself and you don't know the infrastructure, for example. You haven't been in the Netherlands that long yet. You can imagine that those women have a worse outcome because they don't know when they have to have blood tests again." ~ Participant with GDM, ethnic minority background

12. *"Well, I know that people of Moroccan descent eat a lot of bread. If someone develops diabetes [...] I do explain that bread contains a lot of carbs. I do try to make them aware. [...] the Hindustani have a lot of white rice, you know. So that's kind of hard [...] I wonder if they manage to adjust."*~GP practice nurse

13. *"Certainly, the people who are less fluent in Dutch are not going to call the doctor themselves to make an appointment. [...] They might barely understand what the problem is. [...]but then to take that step to call the doctor yourself, calling the doctor at all is often complicated. [...]Well, I think, to put it very bluntly: The highly educated Dutch women who are well informed and really understand what the problem is, that they can cope with it. But the people who are less fluent in Dutch, or less educated, who just don't see the problem at all, will never take that step. While in terms of lifestyle, these are also the people who are often less healthy and more at risk."* ~Community midwife

Abbreviations: GDM = gestational diabetes mellitus, GP = general practitioner, PE = preeclampsia, HELLP = Hemolysis, Elevated Liver enzymes and Low Platelets.

The patient journey map shows the variation in received/provided CVD risk education, lifestyle advice and (routine) monitoring, and barriers and solutions along the care pathway (Figure 1). The lack of received care may partly relate to the reported dropout during the care pathway, especially at phase 2 (week 6-appointment) and phase 4 (routine GP monitoring). Those missing the week 6-appointment often had an ethnic minority background and/or had lower disease severity (Table 2, quote 2). Women indicated that they were unaware about the potential important health information provided during these visits, the fact that they had to make appointments themselves, or that they were unsure about where to receive care after transfers between hospitals. Negative experiences during pregnancy and birth, like the perception of not been taken seriously or the lack of shared decision making, sometimes led to care avoidance, including for postpartum-CVRM.

HCPs confirmed patient findings on CVD risk education, lifestyle intervention and GP monitoring. All HCPs indicated having provided CVD risk education and lifestyle interventions to women after GDM and/or HDP, but to varying degrees. They were more likely to do so after GDM than HDP, partly because of implemented guidelines on diabetes

prevention, which include advice on CVRM after GDM. In general, most HCPs see benefits of early prevention for young women but acknowledge the burden on the healthcare system as a barrier. Some GPs were concerned about fragmented CVRM guidelines for specific patient groups and feel there is insufficient evidence for monitoring and lifestyle interventions after HDP/GDM (Table 2, quote 3). Many HCPs also recognized the frequent dropouts and confirm that the reliance on women' own initiative to make appointments may be a contributor, especially for women with a minority background. Some HCPs implemented active outreach with repeated calls, home visits and active scheduling of appointments. However, limited time and financial compensation prevent universal adoption of these strategies.

System barriers may also be a potential contributor. For instance, most HCPs assumed women have a week 6-appointment with either an obstetrician or with a community midwife. However, midwives indicated that this is not standard practice, potentially leading to women experiencing a gap in care (Table 2, quote 4). Additionally, GPs highlighted that while a recent multidisciplinary guideline calls for follow-up and monitoring after reproductive disorders, the central CVRM GP guideline does not. According to GPs, this leads to increased practice variation. Finally, CVRM is not structurally covered after HDP/GDM. HCPs indicate this hampers implementation and innovation. HCPs further noted a lack of regional protocols and interdisciplinary communication at hospital discharge.

To improve current CVRM, HCPs emphasized the importance of interdisciplinary communication across settings to ensure continued CVRM. According to them, this may benefit groups already at higher risk due to lower SES and health literacy. They suggested creating regional protocols with standardized phrases in referral letters to improve care continuity and communication. Midwives suggested a routine week 6-appointment for those that did not give birth in primary care. Moreover, GPs noted that better identifiability of patients in records is needed to allow active outreach and routine monitoring.

Preferences for CVD risk education, lifestyle interventions and routine GP monitoring

CVD risk education

Both women and HCPs acknowledged that being informed about CVD risk is a first, essential step for women to engage in CVRM. According to women, being informed allows them to try and prevent CVD in the future and prepare their health for future pregnancies (Table 2, quote 5). While women from all backgrounds expressed the desire to receive CVD risk education from their HCPs, a few preferred not to be informed during the pregnancy because of potential added stress. In general, repeated information provision was desired during and beyond pregnancy, for example at diagnosis, at the week 6-appointment by the obstetrician or community midwife, and after 3-6 months by the GP. Overall, the week 6-appointment was mentioned by women in all groups as

the most appropriate moment for CVD risk education, even by those who missed the appointment. However, even when a week 6-appointment was planned, women and HCPs indicated it is currently underutilized for the purpose of CVRM because it centers around postpartum recovery. In general, women prefer to receive information in-person from a trusted HCP (Table 2, quote 6), so they can ask questions. Furthermore, women mentioned that information leaflets are likely to go unread although there was some heterogeneity between women depending on ethnic background. Only women that are highly educated mentioned a preference for websites. HCPs added that information on future health risks should at least be given before the patient is released from obstetric care while allowing women time to adapt to their new circumstances (Table 2, quote 7). HCPs confirmed that leaflets should not be the only source of CVD risk education.

Lifestyle interventions

Around half of the women indicated that they were open to personalized lifestyle interventions. The preferred timing of lifestyle interventions according to women, including specific support for weight loss, was around 6 months, and initiated by the GP (or dietician, physical therapist, exercise program). Women also mentioned that putting recommendations into practice is challenging and they need help doing so (Table 2, quote 8). Women who had a negative attitude towards lifestyle interventions were often beyond four years postpartum. We were unable to discern if this was because of lowering of CVD risk perception or lost motivation. Those working in healthcare perceived themselves to be self-sufficient in making the required lifestyle changes.

HCPs from hospital settings recognize that they have limited time (up to six weeks postpartum and in short consultations) to establish behavioral changes and therefore focus on improvements during pregnancy. They feel the designated place for continued lifestyle interventions is in the GP practices. Some HCPs proposed the use of lifestyle apps, but only highly educated women actively mentioned using them. Additionally, HCPs emphasized that effectively changing lifestyle behavior requires motivational counselling skills and tailored interventions to suit patient's personal situations and preferences. All HCPs mentioned ethnic background needs to be taken into account.

Lastly, according to HCPs solutions should not just be sought in healthcare. They advocate for more general measures, such as greater societal awareness of hypertension and weight management (Table 2, quote 9).

Routine GP monitoring

Most women were positive about routine blood pressure and glucose value checks, perceiving such monitoring as important for their health, an opportunity to discover CVD risk factors sooner and be a healthy mother. However, a few women mentioned that out-of-pocket costs (e.g. for laboratory tests), as a barrier to routine monitoring.

In all women, frequently emerging theme was the desire to be actively invited and reminded by the GP. Women indicated this would be a solution to mothers prioritizing other things over their own health and therefore often do not initiate these appointments (Table 2, quote 10). This finding seemed not so much related to the number of children women had, but to being a mother and performing the role of caretaker. Sometimes, women had received opportunistic monitoring during visits for other health problems (i.e., iron deficiency, contraception) and found that this was an efficient way of receiving monitoring. Additionally, some women said they would like a stronger focus on lifestyle interventions (which would perceptively normalize the future risk of CVD) than on routine GP monitoring. These women were all highly educated or healthcare providers.

To facilitate early detection and outreach, and to lower financial barriers for women, some GPs and GP practice nurses suggested to include women after HDP/GDM in the Dutch integrated care program for CVRM for routine monitoring. Other GPs were hesitant to add groups to the Dutch integrated CVRM program due to ongoing debate among GPs about the growing focus on prevention, potentially overburdening the primary care system. Several HCPs called for strengthening of regional protocols and collaborations. As an example of collaboration, we found GPs that organized their clinics to be highly integrated with a community midwife clinic. This initially served a practical purpose: to prevent mental health problems and unintended pregnancies. Due to the close collaboration, the involved HCPs perceived they could keep better track of women who had HDP/GDM and provide CVRM.

Focus points for postpartum-CVRM in a multi-ethnic population

A general pattern was observed of women with an ethnic minority background, lower SES and lower disease severity being less informed and more often missing the week 6-appointment, routine GP monitoring, and the potential subsequent lifestyle interventions. Women with an ethnic minority background often reflected on the downstream effects of missing important health information (sometimes not through their own direct experience but observed in members of their family or community). This was not mentioned by the majority group. Unclear information and recommendations may lead to symptoms not being recognized and delayed care. This may be further compounded when people do not understand the healthcare system (Table 2, quote 11), and by cultural perceptions of pregnancy which may influence lifestyle behavior that can persist in the postpartum period. Although women in general preferred in-person information transfer to written information, written material in several languages was desired to reach people with a language barrier. Women suggested that to adequately reach people with ethnic minority backgrounds, information transfer should take place in peoples' own environments, like community gatherings, outside of the medical system. Moreover, women with ethnic minority backgrounds more often spontaneously mentioned the relevance of having family members with diabetes or CVD who actively supported

them with advice (e.g., to reduce salt intake, home blood pressure monitoring and routine monitoring). At the same time, family members had a negative influence when the family members felt it was a burden to adjust dietary patterns to their needs, dismissed their health concerns or implied they were to blame for the pregnancy complications. Lastly, it was noted that several women with an ethnic minority background experienced being stereotyped as unhealthy, not being provided with adequate care, or being looked down upon by their HCPs because of their ethnic background or language difficulties.

The need for understandable risk communication to people with diverse backgrounds was also a theme that arose frequently among HCPs. HCPs explained that when it is challenging to deliver complex health information, they often limit their communication to more acute health problems. HCPs suggested using translators (translation service or a family member) and providing translated written material to bridge language barriers. However, translated written material on this specific topic is often not available. HCPs also indicated that health- and lifestyle recommendations are often not applicable in ethnically diverse populations that may have their own dietary and physical activity preferences. To motivate women and make recommendations easier to adhere to, personal tailoring and targeting to specific needs of certain populations is perceived as essential and was mentioned by all HCPs (Table 2, quote 12). Lastly, HCPs highlight that what makes people vulnerable may be less tied to ethnicity or having an ethnic minority background, but more often to language barriers, lower SES, health literacy, higher parity, or other health concerns like having mental health problems (Table 2, quote 13).

Comment

Principal findings

Regardless of ethnic background, our study showed a high drop out from the CVRM care pathway after pregnancies complicated by HDP/GDM, particularly at the transfer from obstetric to primary care and before long-term routine monitoring. Women were frequently unaware of the relationship between HDP/GDM and their subsequent increased risk of CVD and had not been followed up. This pattern occurred more often in groups with an ethnic minority background and/or lower SES. Women want to receive well-timed education and lifestyle advice, in-person from their HCPs, that is targeted to their specific (cultural) circumstances, as well as active outreach for monitoring. HCPs signal the need to resolve system barriers and implementation of more structured interdisciplinary communication across settings supported by regional protocols and collaborative care organization.

Results in the context of what is known

Our general findings align with previous international literature describing a lack of awareness of CVD risk after HDP/GDM among women and HCPs, with women from all backgrounds expressing a desire for CVD risk education, personalized lifestyle interventions, and extra check-ups (11,12, 14, 15). Our investigation adds to previous work in several ways: we showed that the short-term aftercare, specifically the week 6-appointment, is currently underutilized for CVD risk education and is a major point of dropout. By patient journey mapping and contrasting the experienced and perceived care trajectories across primary, secondary, and tertiary settings, we identified this critical juncture in CVRM.

We also identified specific needs and barriers for women from ethnic minorities, due to our larger and more socioeconomically diverse multi-ethnic sample, e.g., the concerns around out-of-pocket cost. Additionally, we show the need for culturally tailored information and lifestyle interventions, which Joo et al. (2021) found can reduce health disparities and improve care quality for ethnic minorities (24). However, care must be taken to avoid stereotyping or discrimination, which women in our study reported experiencing. Zemouri et al. (2024) recently showed that people with ethnic minority backgrounds experience discrimination in Dutch healthcare (26). Our study further offers broader insights into HCP perspectives, revealing that while most HCPs recognize the potential benefit, there is much variation in GP support for routine CVRM after HDP/GDM, with barriers listed varying from reimbursements to a perceived lack of evidence on effectiveness.

Clinical implications

We identified several leverage points to improve the provision and uptake of postpartum-CVRM being; active outreach, the timely in-person delivery of CVD risk education, with translated written materials in several languages, and personally tailored (culturally sensitive) lifestyle interventions. Specifically, within Dutch context, a routine week 6-appointment has been suggested by midwives in our study, which would ensure women (who transferred across settings) get information about their future health and monitoring. However, our findings suggest that until these measures are uniformly included in all guidelines and regional protocols, implementation may remain limited.

Research implications

Previous studies have proposed including women after HDP/GDM in the GP CVRM guideline and the Dutch (insurance covered) integrated care program (12, 13). Our study supports that this may improve uptake and the continuation of CVRM and reduce barriers that are sources of disparities. This may require adopting a 'life course approach' to CVD risk in women (26) and gaining more broad support among GPs. To increase

support, we recommend further research efforts to focus on generating evidence on the effectiveness of the prevention of CVD risk factors after HDP/GDM.

Strengths and limitations

There are several study limitations to consider that have impacted our findings. First, we did not achieve the desired quota of 6-8 participants in all ethnic subgroups, although the composition of our patient and HCP samples reflects our effort to recruit a diverse group of women and HCPs. This means we were not able to compare subgroups by ethnicity.

Second, we are cautious to generalize our findings to populations outside of our study sample and context, which is a general concern in qualitative research. Our findings primarily reflect the experiences of individuals from diverse ethnic backgrounds who were born or raised in the Netherlands, rather than those of first-generation migrants or groups with limited language proficiency. The ethnic background of the interviewers (e.g., Dutch, Moroccan) may have facilitated recruitment in the groups of women with Dutch and Moroccan backgrounds within the project duration, while lower number were achieved for other groups. Interviewers proficient in additional languages than Dutch and Darija (Moroccan Arabic), could have improved our ability to reach these women. Moreover, our findings may not reflect experiences across all SES groups; our final sample had a higher proportion of women with higher education in the women with a Dutch background and more unemployed women among those with an ethnic minority background. In addition, women from the lowest SES groups were underrepresented in all groups. We have tried to mitigate this by asking participants (both patients and HCPs) about their views on how women with diverse ethnic and SES backgrounds, also those not easily reached for research, could best be supported. Although this gave us valuable insights, it cannot replace accounts of direct experiences. Thus, despite reaching conceptual saturation in our analysis, adding more women with specific characteristics might have yielded additional insights.

Further, the generalizability of our findings might have been improved if we had been able to include a larger group of HCPs. By design, the HCPs subgroups were too small to reach saturation.

Finally, because we focused on a single context, our findings may reflect experiences, barriers, and improvements specific to the Dutch healthcare context. In the Dutch healthcare system obstetrical care is differently organized than in other countries. Moreover, Dutch primary care has a leading role in long-term CVRM in high CVD risk populations. This may limit the applicability of our findings to other settings, or underestimate the disparities in countries with different organization of birth care and subsequent CVRM, such as the United States.

Conclusions

In conclusion, our study highlights that, at present, there is a high rate of drop out for CVRM after HDP/GDM in women with diverse ethnic and socioeconomic backgrounds in the Netherlands. Leverage points to mitigate dropout and improve postpartum CVRM were identified, including active outreach by healthcare providers to ensure continuation of care, better utilization of existing follow-up moments for CVD risk education and offering culturally sensitive support. Additionally, removing the system barriers, more evidence-based guidelines and implementation of regional multidisciplinary protocols could reduce barriers for healthcare providers to provide continued CVRM and reduce health disparities in increasingsly diverse settings.

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Supplementary tables

Supplementary table 1: *Completed Standards for Reporting Qualitative Research (SRQR) checklist*

Title and Abstract	
Title - Management of future cardiovascular risk in women with a history of pregnancy complications in a multi-ethnic context: a qualitative study among women and healthcare providers.	
Authors - *A.Y.A.M. Reilingh, R.J. Burger, S. el Bachiri, S. McCarthy, S.J. Gordijn, W. Ganzevoort, I.G.M. van Valkengoed*	
Abstract	*In manuscript*
Introduction	
Problem formulation	*In manuscript*
Purpose or research question - *Research questions women* after HDP/GDM:* *1a) What are the healthcare trajectories these women have followed? 1b) Where are the touchpoints with HCPs? 1c) What was their experience? 1d) Would they want to improve anything at these touchpoints, if 'yes', what? 1e) What are their perspectives on possible interventions and where do they fit on the healthcare trajectory? 1f) Do women express similar desires for information and support as previous studies found, if not, how do they differ?* *Research questions HCPs:* *2a) What is the follow-up care for cardiovascular diseases risk management (CVRM) that is currently provided by HCPs to women after HDP and GDM? 2b) What barriers do HCPs experience in providing care in a multi-ethnic population? 2c) Do HCPs see possible solutions (e.g., their perspectives on interventions or linkage between different health care settings? 2d) What would the optimal care pathway look like according to HCPs? 2e) What is the HCPs perspective on women's experience of this postpartum CVRM (reflection on findings from the women's interviews)?* ** We acknowledge that our manuscript primarily references women. However, we also recognize that individuals capable of pregnancy may have diverse gender identities, and we respect the identities of all those who may be impacted by the topics discussed in this manuscript.*	
Methods	
Qualitative approach and research paradigm - *We used a qualitative, interpretivist approach. By using narrative interviewing alongside Integrated Patient Journey Mapping (IPJM)*, we uncovered detailed experiences and perspectives of women with diverse ethnic and socio-economic backgrounds regarding postpartum-CVRM. IPJM was developed by co-author SMC and as a method, has been used in this population before in the leanbh-project**. Additionally, the study explored the perspectives of HCPs from various professions to understand their experiences and gain insights into optimal care provision. IPJM enabled us to navigate the complexities of this specific healthcare context in which women are seen by several different HCPs and are transferred between primary, secondary, and tertiary care settings.* **McCarthy, S., O'Raghallaigh, P., Woodworth, S., Lim, Y. L., Kenny, L. C., & Adam, F. (2016). An integrated patient journey mapping tool for embedding quality in healthcare service reform. Journal of Decision Systems, 25(sup1), 354–368.* ***https://www.infantcentre.ie/leanbh/*	
Researcher characteristics and reflexivity - *Main interviewer AR has a physical therapy background and was additionally trained in body-oriented psychotherapeutic modalities. She is competent in using conversational techniques for a wide range of patient experiences, including potentially traumatic ones (i.e., cases of stillbirth), with sensitivity and empathy. AR has a Dutch ethnic background. The second interviewer SB, has a Moroccan ethnic background and was trained and supervised by AR. The shared ethnic background between interviewers and participants of the respective ethnic groups enabled a swift establishment of rapport and enhanced the cultural understanding, especially in the case of the Moroccan group. This positively affected the sampling rate in these groups and richness of data. The participants and interviewers did not know each other before the interviews. We acknowledge that*	

Context - *There are contextual factors that may have influenced the narratives of patient journey and accounts of HCPs experiences. Factors that repeatedly emerged in women were the lack of attention in the care trajectory for the lasting impact of HDP/GDM on the daily life of women, the emotional journey from diagnosis to delivery, the process of matrescence* and patient-provider dynamics. Factors for the HCPs may include the varying availability of clinical guidelines and/or local practice agreements, inter-professional communication across several healthcare settings and the availability of resources (i.e., time constraints, insurance coverage).

Sampling strategy - *Selection criteria are described in the manuscript. Additionally, conceptual saturation was defined as the moment when with additional interviews, no new themes and subcategories would arise. Given the desired level of diversity in ethnic backgrounds, SES, and obstetric history in women and the several types of professions among HCPs, we did not aim to reach conceptual saturation within all subgroups. Instead, we aimed at attaining a quota of 6-8 participants in ethnic subgroups of women and 3 in each subgroup of HCPs. In the women, we were only able to recruit such numbers within the time of the study in the groups with a Dutch and Moroccan ethnic background (matching the interviewers). We managed to include the aimed for minimum of n=25 participants, of which n=18 had a migration background. Although we did not expect to reach saturation, saturation was reached within the women's sample. However, since we limitedly reached women with a language barrier and who were born abroad, adding participants with these characteristics might have yielded additional findings. In HCPs we succeeded in including 3 participants each of midwives, GPs, GP assistants, obstetrician, and internal medicine specialist. To increase diversity in setting and region, we added a 4th obstetrician. We did not reach conceptual saturation in the HCP group.*
Ethnic background, SES, obstetric history and profession were self-reported. SES levels were categorized as: [Lower] no or elementary schooling, or lower vocational or lower secondary schooling, [Intermediate] intermediate vocational, or intermediate or higher secondary schooling and [High] higher vocational schooling or university.

Ethical issues pertaining to human subjects - *This study was ethically approved by Amsterdam University Medical Center (Amsterdam UMC, W22_395 #22.469). All participants provided informed consent prior to conducting the interviews. Data was de-identified and stored separately of participant information on the secured Amsterdam UMC server with access only granted to the research team.*

Data collection methods - *To collect detailed data about women's lived experiences we conducted semi-structured interviews between January and October 2023. AR and SB interviewed the women. SB was trained by AR by conducting two interviews together and by SB transcribing AR's interviews. After collecting the women's data, AR interviewed the HCPs between October 2023 and March 2024. All participants were offered the opportunity to be interviewed either at a location of choice or online to reduce potential barriers (e.g., childcare arrangements, travel). Apart from women's children in three cases, no additional people were present during the interviews. The online interviews, in our perception, generated the same richness and depth of data as the interviews on location.*

Data collection instruments and technologies - *The semi-structured interview guide for women with HDP/GDM was based on previous literature and further developed in collaboration with experts within general practice, midwifery, obstetrics & gynecology, epidemiology, and a lived experience expert. The topic list was based on themes from previous literature in the field (See supplementary table 2). On two occasions, minor changes were made to the women's interview guide. Firstly, it was expanded to structure the interview for the purpose of training SB. Secondly, we changed the phrasing of questions to be better understandable to women. The semi-structured interview guide for HCPs was developed similarly. Online interviews were conducted, recorded, and automatically transcribed with Microsoft Teams. Interviews on location were recorded with the Philips Speech app. All software was used in an Amsterdam UMC secured environment on the interviewer's laptop or mobile device.*

Units of study — *In manuscript Table 1*

Data processing - *Interviews with women with HDP/GDM were audio recorded. HCP interviews were video recorded. Audio recorded interviews were transcribed by AR and SB who checked each other's entire transcripts for quality, consistency with the recording and for adequate de-identification of participants. For video recorded interviews, an automated transcript was generated in Microsoft Teams which was checked and corrected in entirety by AR, SB, or a research intern. Next, corrected HCP transcripts were quality checked by AR or SB by listening to five minutes of interview chosen at random in each document. All transcripts were de-identified during transcription and codes were used for names, names of places and names of healthcare practices or institutions (i.e., a person's name was replaced by the code [name] and a hospital name for [hospital]. After de-identification and the quality check, all data was locked before analyses took place. Lastly, after analyses were completed, audio- and video recordings were deleted, and only de-identified transcripts were stored at a secure location on the Amsterdam UMC server.*

Data analysis - *For the women with HDP/GDM, AR and SB created an initial set of codes based on ten interviews (n= 8 Moroccan, n=2 Dutch). Several iterations of coding were made by AR for axial coding and subsequent investigating patterns in the data. The research team was consulted at each step. For the HCPs, AR and research assistants developed an initial set of codes. Coding for HCPs was done mostly deductively after which one axial round of coding was performed (AR). Final themes and subthemes for both women and HCPs were based on team consensus (Supplementary Table 3).*	
Techniques to enhance trustworthiness – *Several measures were taken to enhance trustworthiness. Interviewers were trained and regularly discussed emerging themes and subcodes to achieve congruency. Changes to the interview guide were harmonized and applied by both interviewers. All transcripts were quality checked by another person than the transcriber. For maximum data retention, we chose not to require a full member check from all participants that were considered from hard-to-reach groups. Instead, we reached out when we had any doubts about interpretation and have gotten detailed response each time (N=3). We triangulated findings from the women with data from HCPs by asking them about their perspectives on relevant findings from the women's interviews. We used multiple coders and codes were discussed and selected in agreement with the research team (consisting of both clinical and non-clinical experts) in monthly meetings.*	
Results/findings	
Synthesis and interpretation *We presented the women's interview findings first, followed by the findings from HCPs to offer explanations and additional perspectives. Patterns across groups are mentioned whenever present in the data. We focused on relevant findings, i.e., those that offered new insights, better understanding or markable (dis)coherence.*	*In manuscript*
Links to empirical data	*In manuscript Table 2*
Discussion	
Integration with prior work, implications, transferability, and contribution(s) to the field	*In manuscript*
Limitations	*In manuscript*
Other	
Conflicts of interest	*None to declare*
Funding - *ZonMW* grant number 50-54300-98-659, The funding party had no role in data collection, interpretation, and reporting.	

Supplementary table 2: *Translated topic lists*

TOPIC LIST FOR WOMEN AFTER GESTATIONAL DIABETES MELLITUS AND/OR HYPERTENSIVE DISORDERS OF PREGNANCY*	
Topics	**Questions**
Introduction	Welcome and introduce study and interviewer Inform and record/sign informed consent Allow space for emotional experiences during the interview if necessary (do balance time): What has this meant for you and your family? Is a break needed? Glass of water etc.....
Womens' characteristics	What is your name? Where do you live? How old are you? What is your ethnic background? How long postpartum are you? How many people live in your household (partner, children)? What is your work situation?
Medical background	Which one of the pregnancy complications did you have?
Risk awareness and perception *Overall theme to be deepened later at each touchpoint.*	Do you know about the link between [the particular complication] and heart disease? What was it like to hear/read this? For example:, did you worry? Do you feel you can do anything yourself to lower this risk? Did it change a person's perception of their own health? Did that change a person's motivation to live healthier?
Healthcare trajectories	Together we create a timeline of care starting at diagnosis until the present. How did you find out about the diagnosis? How did the process of diagnosis go? What happened in terms of care right before and after delivery? Were you also hospitalized? Did you receive a check-up around week 6? If yes, at the obstetrician, the midwife practice, or elsewhere? What other caregivers did you see? (I.e., maternity nurse, GP, GP diabetes nurse)?
Touchpoints HCPs	How was the contact with your obstetrician/internal medicine specialist/obstetrician/hospital doctor/assistant...? Was increased future risk of heart problems mentioned? Probe further. How can care best be offered for people with your background and experience?
Needs	Have you had needs in this trajectory/contact, if yes, what needs?
Barriers	Have you experienced barriers, if yes, what were they?
Improvements	Are there things you would like to improve? If yes, what, and how?
Future interventions	When and by whom would you prefer to receive education on CVD risk, lifestyle management and annual monitoring? How would this best be offered?
Trendline	Use the completed patient journey map ontology if possible. Point to the timeline with the different points of contact or repeat them back. How do you feel about the care at these moments (use emoticons if supportive)? Ask to elaborate if inconsistent with previous conversation.

Wrap-up	Are there any other topics not discussed you would wish to discuss? Thank you for participating, end recording. Plan follow-up call and provide info if needed.

TOPICLIST FOR HEALTH CARE PROFESSIONALS*	
Topics	**Main questions**
Introduction	Introduction of study and interviewer. Inform and record informed consent.
Current care	What is your profession and role in caring for patients after HDP/GDM? In what setting do you work? (primary care, hospital setting) How is CVRM after HDP/GDM currently organized within your profession? (If helpful, draw a patient journey). Do you provide CVRM to this population? If so, what do you do? Are there guidelines or local agreements on this topic? Are you familiar with the recent multi-disciplinary CVRM-guideline? Is the care as you provide it common in your profession, or do you expect it to vary greatly? If there is variation, on what elements? Can you share about the care trajectory that women have followed before they come to you? Which professionals have a role before you? What does the communication between these professionals/settings look like? What is your experience with providing care in a multi-ethnic population? How are women motivated regarding making lifestyle changes?
Barriers and improvements	Do you experience barriers in providing care, if so, explain? Do you see potential solutions? Is there anything you need to improve the care you are giving? Are there specific barriers, needs or improvements for providing care in a multi-ethnic population?
Triangulation of women's findings *(select the relevant elements for the type of professional)*	What are your perspectives on some findings from the women's interviews (keep it to relevant elements for his/her profession): Women say they would like to be educated on CVD risk and pregnancy complications even before diagnosis. How do you feel about this? Women say the week 6-follow-up visit is an ideal moment for CVRM information. What are your experiences or thoughts? A substantial part of the women had no week 6-follow-up. What do you think happened there? What are your perspectives on timing/provision of education? Women say they would like to be proactively invited for annual GP monitoring, for several reasons (explain reasons). What are your perspectives on this? What is your perspective on educating in conversation versus leaflets. Do you have perspectives on interprofessional communication, if yes, what are they? (I.e., does the hospital give advice to the GP on monitoring? Content of referral letter?). Do you have perspectives on annual GP-monitoring, if yes, what are they? Do you have perspectives on proactively inviting women (pros/cons), if yes, what are they?
Optimal care	Considering all we discussed, what would optimal care look like according to you? (also check the touchpoints before/after). How would you ideally provide education/lifestyle advice? Is there anything else that would be useful that we have not discussed?
Wrap-up	Are there things we did not discuss that you feel are important to add? End recording.

Abbreviations: GP = general practitioner, CVD = cardiovascular disease, GDM = gestational diabetes mellitus, HDP = hypertensive disorders of pregnancy, CVRM = cardiovascular risk management
**The complete interview guide can be made available on request.*