RESEARCH

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Developing a question prompt tool to prevent and manage early cardiovascular disease after hypertensive pregnancy: qualitative interviews with women and clinicians

Madeline Theodorlis¹, Jessica Edmonds¹, Sara Sino¹, Mavis S. Lyons¹, Jessica U. Ramlakhan¹, Kara Nerenberg² and Anna R. Gagliardi^{1*}

Abstract

Background Persons (henceforth, women) who have hypertensive disorders of pregnancy (HDP) are at risk of premature cardiovascular disease (CVD). While largely preventable through lifestyle management, many women and clinicians are unaware of the risk. Based on prior research, we developed a question prompt tool (QPT) on preventing and managing CVD after HDP. The purpose of this study was to refine QPT design.

Methods We recruited Canadian women who had HDP and clinicians who might care for them using multiple strategies, conducted telephone interviews with consenting participants, and used qualitative description and inductive content analysis to derive themes.

Results We interviewed 21 women who varied in HDP type, CVD status, years since HDP pregnancy, age, geography and ethno-cultural group; and 21 clinicians who varied in specialty (midwife, nurse practitioner, family physician, internist, obstetrician, cardiologist), geography and years in practice. Participating women and clinicians agreed on needed improvements: more instructions, lay and gender-neutral language, links to additional information, more space for answers, graphic appeal, and both print and electronic format. Both groups identified similar barriers: clinicians lack time/willingness, and low language/health literacy and access to technology among women; enablers: translated, credible source/endorser, culturally relevant, organized by health trajectory stages; and likely benefits: raise awareness, empower women, encourage them to adopt healthy lifestyle. Women desired exposure to the QPT before or during pregnancy, while clinicians recommended waiting until postpartum to avoid overwhelming women. Similarly, most women said the QPT should be available through multiple avenues to empower them for health self-advocacy, while clinicians thought they should introduce the QPT to women, and decide when and which questions to address. To mitigate reluctance, clinicians recommended self-directed educational materials accompany the QPT.

Conclusions We will use this information to refine QPT design and plan for future evaluation. If found to be effective and widely disseminated, the QPT could improve awareness and communication about this issue, and may reduce

*Correspondence: Anna R. Gagliardi anna.gagliardi@uhn.ca Full list of author information is available at the end of the article



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CVD risk in many women who have hypertensive pregnancies. Ongoing research is needed to more fully understand how QPTs support patient-clinician communication, and how to alert and prime both patients and clinicians to use QPTs.

Keywords Question prompt tool, Person-centred care, Cardiovascular disease, Hypertensive disorders of pregnancy, Qualitative interviews

Background

Hypertensive disorders of pregnancy (HDP) affect 10% of all pregnancies and leads to a two- to five-fold higher risk of premature cardiovascular disease (CVD) compared to normotensive pregnancies [1]. Persons with a first pregnancy at age \geq 40, who are obese, or of some visible minorities (e.g. non-Hispanic Black, Filipino, South Asian) are prone to HDP [2, 3]. HDP, or pregnancy-related elevated blood pressure, includes a spectrum of conditions from gestational hypertension to severe preeclampsia [4, 5]. CVD risk factors often appear early in life – within 5 years postpartum, and CVD events as early as 10 years post-delivery – an important concern given that CVD incidence increases considerably after age 59 from about 40% to 75+% in those aged 60–70 years and 86+% in those aged 80 and greater [4].

While CVD is largely preventable through physical activity, healthy diet and medications, most of these young persons who had HDP pregnancies (henceforth, women) remain unaware of CVD risks; for example, among 79 American women with HDP, 37% received advice about future CVD risks [5]. In Canada, despite HDP guidelines [6], 50% of family physicians, cardiologists and obstetricians surveyed in 2007 [7] and in 2018 [8] were unaware of HDP-related CVD risk and prevention, a finding similar to that of a recent global scoping review [9]. Elsewhere, physicians of differing specialty attributed CVD symptoms reported by women with HDP to stress or humid weather, leaving women confused and anxious about unresolved ongoing symptoms [10, 11]. Such confusion may be why only 50% of Canadian women with HDP-related CVD risk factors referred to cardiologists scheduled a visit, and 17% of those referred to cardiac rehabilitation attended [12]. There was no significant difference in demographic, health status or social factors between those who did and did not attend, and authors surmised that determinants may have included both physician (e.g. referral practices) and women (e.g. post-partum mental health, access to child care) factors.

In a recent survey of Canadian clinicians, most said a lack of tools to support patient-provider communication and decision-making was the main barrier of CVD prevention counselling [13]. Similarly, American women with HDP participating in focus groups said that a pre-formed question list could help them engage in communication and decision-making by preparing them to ask clinicians about worrisome symptoms, CVD risks and prevention strategies [9]. A question prompt tool (QPT) is a list of questions to enable patient-provider communication [14]. QPTs in cancer, arthritis, and mental health improved patient question asking, satisfaction with communication, and the amount and quality of information provided by clinicians without increasing consultation length [14–16]. While QPTs can vary in length and format, simple one-page QPTs alone appear to achieve these positive outcomes [17]. Women said that polycystic ovarian syndrome [18] and early menopause [19] QPTs empowered them to ask questions about sensitive sex- and gender-specific issues.

In 2020, we interviewed 22 Canadian women with HDP [17]. Despite repeated healthcare visits, sometimes over many years, women's health concerns were dismissed (told they were over-reacting) or misdiagnosed (panic attack, migraine, indigestion), and they learned of CVD risk long after pregnancy (mean 9.1 years, range 0.5 to 25), only 3 (14%) from a physician, and 5 (23%) only after a CVD event. When asked about a question-based communication tool as a possible solution, all 22 women said that such a tool would have helped to: raise their own and physician awareness of HDP and CVD, raise confidence to ask questions during visits, reduce anxiety, and prompt preventive lifestyle behaviour. Women said the questionbased tool should address: HDP (cause, risk in future pregnancies), CVD (link with HDP, CVD probability, signs and symptoms) and CVD prevention (recommendations for physical activity, diet, medications, testing and follow-up healthcare plans).

QPTs are proven to enhance the amount and quality of information provided by clinicians [14–16], physicians cited a lack of communication tools to specifically support CVD prevention counselling [13], QPTs were helpful to women with other conditions, and women with HDP have expressed enthusiasm for a QPT [17]. Therefore, we drafted a one-page QPT on how to prevent and manage CVD risk after hypertensive pregnancy. Creating the draft QPT based on the input of women [17] constitutes the conceptual first step of intervention development and testing [20]. The next step involves user-driven development of the QPT to optimize design prior to subsequent pilot-testing and then a future trial [20]. The purpose of this study was to interview women who had HDP and clinicians who might care for them about QPT design, implementation and potential impact. That information could be used to refine the QPT and plan for future evaluation.

Methods

Approach

We employed qualitative description, an approach commonly used in health services research to explore views and gather recommendations from those with lived experience [21]. Qualitative research in general is a suitable approach when detailed insight from involved persons is needed on how to develop or improve health services or behavioural interventions, and qualitative description in particular is suitable for this study, which aims to optimize QPT design, implementation and impact, because this approach collects explicit preferences and advice from stakeholders [21]. We complied with the Consolidated Criteria for Reporting Qualitative Research (COREQ) [22]. All methods were carried out in accordance with relevant guidelines and regulations. Accordingly, the University Health Network Research Ethics Board granted ethical approval for this study (REB #20-6172). All participants provided written informed consent prior to interviews. We operationalized reflexivity in a multifaceted manner. To address personal issues (conscious and unconscious assumptions), research team members discussed data in a collaborative and iterative manner. To address interpersonal concerns, we declared that the researchers had no relationship with the participants, we conducted telephone rather than inperson interviews to minimize potential discomfort of participants, and we reduced power differentials among the research team by working collaboratively to derive themes. To address methodological concerns and minimize subjectivity, multiple researchers independently analyzed data and met to discuss themes, and we did so iteratively. Lastly, to address contextual reflexivity, persons with various perspectives (e.g. junior researcher, senior researcher, clinician with HDP expertise) derived and/or reviewed themes, resulting in a robust analysis [21, 22]. We ensured trustworthiness of the data by complying with COREQ criteria [22], and via additional approaches: transferability - purposive sampling; credibility-multiple researchers iteratively analyzed and discussed data; dependability – transparency of full data set; and confirmability – practising reflexivity as noted above [21].

Sampling and recruitment

We used purposive sampling to recruit women who had HDP and clinicians [23]. Eligible women were: aged 18

and greater, born in or immigrated to Canada for ten or more years at the time of the study, with at least one HDP pregnancy in Canada. We specified ten or more years in Canada, after which adoption of North American lifestyle can adversely influence health [24]. We also aimed to recruit women who varied in age, region of Canada and ethno-cultural group most common in Canada and prone to HDP (African or Caribbean Black, Caucasian, Chinese, Filipino, Indian, Pakistani) [25]. We recruited women through the collaborating clinician (KN, obstetric internist), social media and 62 community organizations (e.g. immigrant settlement agencies or cultural groups) that advertised the study. We provided women with a \$50 grocery chain gift card at the end of the study. Eligible clinicians were those who might care for women before, during or after HDP diagnosis (family physicians, obstetricians, obstetric internists, cardiologists, nurse practitioners, midwives) who also varied by self-reported years in practice and region of Canada. We recruited clinicians through the collaborating clinician (KN), social media, publicly-available directories (e.g. College of Physicians and Surgeons of Ontario), faculty lists on university web sites and collaborating organizations (e.g. specialty societies) that advertised the study. We aimed to recruit 3 women per ethno-cultural background and 3 clinicians per speciality for a minimum total of 18 in each of the two groups or 36 total. In qualitative research, sampling is often concurrent with data collection and analysis. While we had set a minimum target number of participants, to determine an end-point, we sampled to thematic saturation, or when no further unique data emerge from successive interviews, which was established through discussion of themes by the research team. This is consistent with the 12 to 15 interviews by when saturation is often achieved [26]. We commenced recruiting on April 16, 2021 and closed recruitment on August 23, 2021.

Data collection

JE (MPH candidate) conducted women interviews and MT (MPH candidate) conducted clinician interviews with guidance from JUR (MSc-trained research associate), and training and oversight from ARG (PhD-trained researcher with qualitative expertise). In advance of interviews, we shared the draft QPT (Additional File 1) with consenting participants by email, and asked them to review it and have it near them during the telephone interview. While qualitative description is not typically based on nor generates theory, interviews are often semistructured, meaning broad open questions and/or followup probes may be informed by models or conceptual frameworks [21]. Interview questions were informed by the Implementation Fidelity Framework, which suggests that differentiation (QPT design), facilitation (strategies to support QPT use), delivery (QPT implementation), responsiveness (perceived QPT relevance) and complexity (barriers) influence QPT use and impact [27]. This Framework was chosen because the components reflect different ways to optimize QPT design, implementation and impact, which correspond to our study aims. Additional File 2 includes the detailed interview guide that was reviewed by KN. In brief, we asked participants how to improve QPT design (e.g. content, format), how they would use it, how it should be implemented, possible barriers and enablers of use, and potential impact. Interviews ranged from 19 to 35 min, and were audiorecorded and transcribed.

Data analysis

We used content analysis to identify themes inductively through constant comparison and used Microsoft Office (Word, Excel) to manage data [23]. JE and JUR independently coded the first three women interviews, and MT and JUR independently coded the first three clinician interviews. JE, MT and JUR met with ARG to refine

 Table 1
 Characteristics of participating women

coding and develop a preliminary codebook of themes and exemplar quotes (first level coding). JE and MT coded subsequent interviews to expand or merge themes (second level coding) with assistance from JUR. MSL and SS independently analyzed all data to verify coding, and KN and ARG independently reviewed all data (themes and quotes). We tabulated data (themes, quotes) by group (women, clinicians) to compare themes. We used summary statistics to describe participants, and text and tables to describe key themes.

Results

Participant characteristics

Of 66 women that expressed interest, 21 consented and completed an interview (Table 1). Of 28 clinicians that expressed interest, 21 consented and completed an interview (Table 2).

Participant views about QPT design, use and impact

Additional Files 3 and Additional File 4 provide themes and all quotes from women and clinicians, respectively.

Characteristic	Categories	Number	Percent of 21
HDP type	Gestational hypertension	8	38.1
	Preeclampsia (and severe)	5	23.8
	Chronic hypertension (and pre-existing)	5	23.8
	Unsure	3	14.3
CVD	Yes	7	33.3
	No	14	66.7
Most recent HDP pregnancy (years)	<5	11	52.4
	5+	10	47.6
Age (years)	< 30	3	14.3
	30 to 39	8	38.1
	40 to 49	3	14.3
	50 to 59	4	19.0
	60+	3	14.3
Dwelling	Urban	14	66.7
	Rural	7	33.3
Province in Canada	Alberta	3	14.3
	Ontario	14	66.6
	Nova Scotia	3	14.3
	Newfoundland	1	4.8
Ethno-cultural group	Caucasian	6	28.6
	Black (African, Caribbean)	5	23.8
	East Asian (Chinese, Filipino)	3	14.3
	South Asian (India, Pakistan)	7	33.3
Education	Less than secondary	1	4.8
	Secondary	2	9.5
	Post-secondary	12	57.1
	Post-graduate/professional program	6	28.6

Table 2 Characteristics of participating clinicians

Characteristic	Categories	Number	Percent of 21
Specialty	Midwife	7	33.3
	Nurse practitioner	6	28.6
	Family physician	1	4.8
	Internist (and obstetric)	4	19.0
	Obstetrician	2	9.5
	Cardiologist	1	4.8
Gender (self-reported)	Woman	21	100.0
	Man	0	0.0
Dwelling	Urban	17	81.0
	Rural	4	19.0
Years in practice (self-reported)	<5	9	42.9
	5 to 9	6	28.5
	10 to 20	3	14.3
	21+	3	14.3
Practice setting (self-reported)	Academic	9	42.9
	Community	8	38.1
	Both	4	19.0
Province in Canada	British Columbia	2	9.5
	Alberta	5	23.8
	Saskatchewan	1	4.8
	Ontario	10	47.6
	New Brunswick	1	4.8
	Quebec	2	9.5
Ethno-cultural group (self-reported)	Caucasian	16	76.1
	Black	2	9.5
	East Asian	1	4.8
	South Asian	1	4.8
	Latin	1	4.8
See women who had HDP (self-reported)	Rarely	6	28.6
	Sometimes	7	33.3
	Often	8	38.1

Table 3 summarizes and compares themes and exemplar quotes between women and clinicians. Themes are discussed here, organized by interview question, noting discrepancies between women and clinician participants where relevant. Figure 1 encapsulates findings to show how QPT design, implementation, enablers and barriers may influence QPT use and impact.

QPT design

Women and clinician participants agreed on several needed improvements to QPT content, layout and format. Both groups suggested elaborating the introduction to provide users with more information about the purpose of the QPT and how to use it, urging them to bring it to their provider. Both groups recommended replacing medical jargon with more easily understood terms such as heart disease instead of cardiovascular disease, and replacing the word women with people to be more gender-neutral. Women and clinician participants also noted the need for more links to sources of additional information. Regarding layout, women and clinician participants said to enlarge the blank space where women users could write answers, and to enhance visual appeal by adding colours and graphics. Within groups, women and clinician participants offered differing opinions on format, with some preferring print, others digital, and many of both groups noting that the QPT should be available in multiple formats to suit all women and clinician users.

I think all formats will be the best options (woman 16, aged 35).

Making the tool both digital and paper format will probably reach the most people (clinician 11, internist)

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Interview question	Theme	Women	Clinicians
QPT design	More instructions about purpose and how to use the QPT	Adding a specific sentence that says it is a question to discuss with your physician or your family doctor so they know what they're discussing and who they're bringing this to (woman 10, aged 38)	At the top, "tr's a communication tool for women diagnosed and their clinician; it can be used during your perinatal care to guide and supplement discussion" and say "bring this to your providen" because clear instructions are important (clinician 10, nurse practitioner)
	Modify language	Non-medical I think the first thing is taking it down to a lower level and getting rid of the medical jargon (woman 19, aged 41) Inclusive/gender-neutral The use of the word woman, I would probably change it to be more inclusive (woman 13, aged 33)	Non-medical It needs to be adapted for sixth grade literacy level because they will not understand how it is at this stage (clinician 14, internist) Inclusive/gender-neutral I would encourage more gender inclusive language (clini- cian 20, midwife)
	Links to other sources of information	You can put the telephone numbers or websites where we can get information (woman 18, aged 53)	I feit like I had to go looking further to get information that I wanted to help answer the questions (clinician 07, family physician)
	More space for answers	Maybe give them a little more space to write (woman 15, aged 59)	That box can be a little bit bigger because you're not gonna get an awful lot in those boxes (clinician 21, midwife)
	Enhance visual appeal	If you see something that's gonna stick out and draw your attention then you're more inclined to look at it because of the visual (woman 11, aged 58)	From a design perspective, make it a little bit more colour- ful (clinician 09, internist)
	Both print and digital versions needed	You might want to have multiple platforms. So have one printed and then also have a [it] on a website (woman 04, aged 49) Print and phone app. I think all formats will be the best options (woman 16, aged 35)	Making the tool both digital and paper format will prob- ably reach the most people (clinician 11, internist)
QPT use	Receive as early as possible VERSUS clinicians varied on when to use	As soon as you know you're pregnant, you should have the knowledge of all this (woman 15, aged 59)	Not during the pregnancy but at their discharge visit because it is a postpartum tool (clinician 20, midwife) This is more of a conversation that would be best hap- pening over years, not just in one visit (clinician 04, nurse practitioner)
	Need time to review in advance of appointments	Weeks in advance is better. Then I will have time, not just a few hours before, because I need time and then I can read it over about 2 or 3 times (woman 18, aged 53)	Being able to send [it] home with patients after their diagnosis might help focus their questions when they come for their follow up visits (clinician 17, obstetrician)
	Clinicians would choose which issues to address and when	1	I might not go over all the questions. I would probably just talk about their concerns and would probably choose the questions I ask, also for the sake of time (clinician 12, cardiologist)

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Interview question	Theme	Women	Clinicians
QPT implementation	From clinicians	It would be good if your family physician or your obste- trician gave you that information (woman 08, aged 52) The onus has to sit in the healthcare community and not be shoved down to the woman as their respon- sibility to seek out the information (woman 08, aged 52)	As clinicians, we would be responsible for sharing the tool with our patients (clinician 12, cardiologist)
	Multiple sources	Make sure it's in as many different places as possible (woman 01, aged 33) Maybe it's a poster that's posted in obstetric offices or family physician offices that has you know a QR code that you can scan (woman 08, aged 52)	It would be excellent as a discussion point [at] our regional and national conferences (clinician 17, obstetrician) Having it embedded within a guideline on hypertensive disorders in pregnancy (clinician 09, nurse practitioner)
	Professional society to clinicians	1	Probably through our association or through the college. That's what is gonna get everybody for sure (clinician 06, midwife)
Barriers of use	Physicians may not be willing or have the time	Having a doctor that is willing to take the time to discuss this information with you (woman 06, aged 33)	You can't cover this and all the other things in 15-min, it's not enough (clinician 12, cardiologist)
	Questions may provoke anxiety/stress in women	More stress because the more questions you ask, the more answers you don't want to hear (woman 20, aged 28)	To think about their life-long risks and consequences might increase their stress and anxiety for the remainder of the pregnancy (clinician 17, obstetrician)
	Low health or language literacy among women	I could see people who have low health literacy having challenges with it (woman 19, aged 41)	In its current format, somebody who didn't have health or language literacy found it overwhelming (clinician 18, midwife)
	Low access to information technology	Older women or people who are not computer savvy, I think they're gonna have issues with it (woman 12, aged 32)	The challenge with all of these tools is accessibility and actually getting into people's hands (clinician 02, midwife)
	Not affiliated with a physician	If you don't have a physician that you can go in and ask (woman 14, aged 73)	A lot of people don't have a primary healthcare provider (clinician 02, midwife)
	Women not confident to self-advocate	The biggest barrier is people having the confidence and the knowledge to be able to advocate for them- selves (woman 10, aged 38)	1
	Clinician lack of knowledge	1	I wonder if it'll create a frustrating interaction between the doctor and the patient because the patient would assume that most physicians would know the answer but I'm not so certain that most would (clini- cian 09, internist)
	Questions best answered by differing specialists	1	The first five [questions] are what's useful for [obstetri- cians] but the rest would be followed under family practice (clinician 08, obstetrician)
	Clinicians overwhelmed with many tools	1	The amount of tools for all different things that we see in a primary care office do become kind of burdensome (clinician 07, family physician)

Table 3 (continued	(p		
Interview question	Theme	Women	Clinicians
Enablers of use	Translate to different languages	English is not the first language for a lot of woman. So other languages would be better (woman 07, aged 34)	Making sure that you have it multi-lingual (clinician 02, midwife)
	Legitimized by credible source or endorser	If she can take something that has some legitimacy to it, like with a letterhead or something, I think that would help get around that really awkward conversation (woman 02, aged 45)	If it was accessible on a website through the < professional society > or if it was endorsed by one of those societies (clinician 11, internist)
	Ensure content is culturally relevant	I'm African so the rates of hypertension for us are very high and there's no information out there that could educate me as a Black woman around a risk that impacts my culture (patient 11, aged 58)	I'm wondering whether you could incorporate any prac- tices or whether we wanted something more First Nation driven (clinician 21, midwife)
	Organize content by stages in health trajectory	I wonder if we could do kind of like two, side by side. One for new moms and one for moms who had it awhile ago (patient 02, aged 45)	Separating it into short-term, like questions 1 and 2, and then prompts 3, 4, 5 and 6 are more as your future like short term needs, intermediate needs and long-term needs (clinician 17 obstetrician)
	Self-directed education for clinicians	1	Maybe talk about the evidence behind this (clinician 03, midwife) With the answers already populated so that healthcare practitioners get educated the same time and can feel confident in answering the questions with patients (clinician 09, internist)

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Table 3 (continue	d)		
Interview question	Theme	Women	Clinicians
Potential impact	Raise awareness about CVD risk after HDP	So really understanding what it means and the risks associated with you know having high blood pressure (woman 21, aged 29) It's got those [finks] right there for the doctor to then reference (woman 02, aged 45)	For the patient to make sure they understand what it is, why we care, why we need to treat it and what next steps would be (clinician 10, nurse practitioner) For providers who perhaps are not as familiar with HDP being a risk a factor, it can be prompting for them to check that HDP is a strong risk factor for early cardiovascular disease (clinician 13, internist)
	Helps woman know what to ask in credible way so they can self-advocate	So that it didn't look like I was Googling things to ask. But instead these were legitimate questions that I should be discussing when someone else has crafted the questions for you in a meaningful way I think that carries a little more clout (woman 08, aged 52)	It empowers the woman to ask questions so that it's more of a shared care so using this tool can be empowering (clinician 13, internist)
	Reduce feeling anxious or overwhelmed	Yes, I was overwhelmed but having a tool like this to help me get through it and to understand what was happen- ing really would have helped It kind of gives you some light at the end of the tunnel (woman 04, aged 49)	1
	Help women adopt healthy lifestyle	It's really about take care of yourself, you have a real good reason to eat a bit better everyday, to be diligent with your exercise (woman 02, aged 45)	She and the healthcare provider come up with a little bit of a prescription about her future health (clinician 09, internist)
	Helps clinicians be comprehensive and systematic	1	It's a good overview of everything I as a provider want to cover and make sure that the patient knows. Each of those questions are an important conversation piece to have in terms of making sure I'm covering my bases (clinician 10, nurse practitioner) The real benefit is that it systematizes it. It would make it part of our process (clinician 06, midwife)



Fig. 1 Conceptual framework of factors that may influence QPT use and impact

QPT use

Women and clinician participants both said that women users should receive the QPT in advance of appointments so that they had time to reflect on the questions. However, participant views diverged on the optimal time for sharing the QPT with women users and how it should be used. Women participants said the QPT should be shared before pregnancy, as soon as women users are pregnant and post-partum to inform them about all topics addressed in the QPT. In contrast, clinician participants said they would choose which questions to address and when in the course of the health trajectory to avoid overwhelming women users with too much information.

I'd say before and after. Before, because women might not even be aware that they actually have it or potentially could get it during pregnancy. And afterwards too so that they can know what the risks are, what the signs and symptoms are, and by having a conversation with their doctor, how to prevent it, how to change their lifestyle (patient 11, aged 58)

I might not go over all the questions. I would probably just talk about their concerns and would probably choose the questions I ask, also for the sake of time (clinician 12, cardiologist)

QPT implementation

Some women and clinician participants agreed that clinicians should provide the QPT to women users. In contrast, other women participants noted several ways to directly share the QPT with women users that did not rely on clinicians to be aware of it or to share it with women users: posters in healthcare settings, web sites, phone applications and social media. Clinician participants suggested sharing the QPT with clinician users via professional associations, at professional meetings and embedded in clinical guidelines.

The onus has to sit in the healthcare community and not be shoved down to the woman as their responsibility to seek out the information (woman 08, aged 52)

Make sure it's in as many different places as possible (woman 01, aged 33).

Probably through our association or through the college. That's what is gonna get everybody for sure (clinician 06, midwife)

Barriers of use

Women and clinician participants agreed on several barriers of QPT use. Both groups expressed concern that clinician users may not be willing to, or have sufficient time to discuss the QPT. Some women and clinician participants thought that the QPT might provoke anxiety or stress among women users. Both groups noted that low health or language literacy, and low access to information technology (e.g. computers, Internet) may prevent women users from accessing or using the QPT. Both groups also said that women users may not be affiliated with a clinician that could discuss the QPT with them. Women participants only identified that lack of confidence among women users to self-advocate may prevent use of the QPT. Clinician participants mentioned three barriers specific to clinician users: QPT questions are likely best answered by differing specialists (e.g. some questions fall within the domain of primary or obstetrical care), which might frustrate women users if a given clinician was not able to answer all QPT questions; lack of knowledge on how to answer the questions among clinician users may frustrate both women and clinician users; and clinicians feel overwhelmed by the plethora of available tools.

The biggest barrier is people having the confidence and the knowledge to be able to advocate for themselves (woman 10, aged 38)

I wonder if it'll create a frustrating interaction between the doctor and the patient because the patient would assume that most physicians would know the answer but I'm not so certain that most would (clinician 09, internist)

Enablers of use

Women and clinician participants articulated several similar enablers of QPT use. Both groups said the QPT should: be translated to various languages, legitimized by identifying a credible source (e.g. logo or letterhead) or endorser (e.g. professional society), reflect culturally-relevant content (e.g. ethno-culturally specific risk factors or health practices), and be organized by stages in the health trajectory to emphasize short- (e.g. what is HDP), medium- (how can I prevent heart disease) and longerterm (how should I manage heart disease) concerns. Clinician participants only suggested providing clinician users with a version of the QPT including answers to the questions.

Targeted links or resources for each question to some of the algorithms and guidelines (clinician 10, nurse practitioner) With the answers already populated so that healthcare practitioners get educated the same time and can feel confident in answering the questions with patients (clinician 09, internist)

Potential impact

Participating women and clinicians said the QPT would: raise awareness among both women and clinician users about CVD risk after HDP, empower women users to ask questions, and encourage them to adopt a healthy lifestyle to prevent CVD. Some women participants only said they would have felt less anxious or overwhelmed by the health issues they had experienced because the QPT would have helped them to understand what was happening and how to manage it. Some clinician participants only said the QPT, by functioning as a checklist, would ensure they systematically covered relevant topics with their patients.

Yes, I was overwhelmed but having a tool like this to help me get through it and to understand what was happening really would have helped... It kind of gives you some light at the end of the tunnel (woman 04, aged 49)

The real benefit is that it systematizes it. It would make it part of our process (clinician 06, midwife)

Discussion

By interviewing diverse women who had HDP and diverse clinicians who might care for them before, during or after pregnancy about a QPT on how to prevent or manage CVD, we identified several ways to improve QPT design, implementation, use and impact. Participating women and clinicians largely agreed on how to improve QPT content (more instructions, lay and gender-neutral language, links to additional information), layout (more space for answers, graphic appeal) and format (print and electronic); barriers (clinicians lack time/willingness, low language/health literacy and access to technology among women) and enablers (translated, credible source/ endorser, culturally relevant, organized by health trajectory stages) of QPT use; and potential benefits (raise awareness, empower women, encourage them to adopt healthy lifestyle).

Our study confirms and builds on prior research that assessed user views about QPTs. Some prior research consulted healthcare professionals about QPTs, unlike our study, which focused on patients. For example, interviews with 20 clinicians and hospital managers about QPTs for cancer patients revealed concern about relevance of the questions and ensuring patient access [28]. Similarly, in a survey of 66 physicians, about acceptability

of an end-of-life decision-making QPT, most thought it would help them to discuss difficult topics but wanted training to be able to answer the questions [29]. Some research on QPTs involved patients, but did not examine elicit information about the design and implementation of QPTs, and/or explore preferences among women. For example, in interviews about QPTs in general, 31 patients said it would make them feel empowered and help them to prepare for appointments [30]. A survey of 96 patients with heart failure, 63 family members, and 26 health care professionals in Sweden and the Netherlands largely found a heart failure QPT acceptable and led to refining the questions [31]. In research that focused on QPTs specifically for women, findings did not examine preferences among different ethno-cultural groups. For example, interviews with 18 women about a QPT on polycystic ovary syndrome was easy to understand, user-friendly, and encouraged information seeking and targeted question asking [18]. A review of 16 studies on QPTs in oncology largely focused on impact (e.g. patient question asking, anxiety at follow-up, recall of information) but also found that the number of questions and clinician training appeared to influence impact [15]. Another review of QPTs also largely focused on impact, noting the need for further research on the QPT characteristics and other conditions that influence use and impact [14]. Our study adds to this literature by comprehensively exploring factors such as QPT design, implementation, barriers and enablers that could influence QPT use and impact. Furthermore, our study is unique due to the context of HDP, not addressed in prior research, and exploration of factors among ethno-culturally diverse women when most prior research on QPTs involved clinicians or did not sub-analyze the results by sex, gender or other intersectional factors.

While views were largely consistent within and across participating women and clinician groups, unique or discrepant views warrant some analysis in considering study implications. One notable discrepancy pertained to when and how women users accessed the QPT. Women participants said the QPT should be shared with women users as early as possible, even before pregnancy, to inform them about all topics addressed in the QPT. In contrast, clinician participants said they would choose which questions to address and when in the course of the health trajectory to avoid overwhelming women users with too much information. Given considerable research showing that women who had HDP were sometimes repeatedly under- or misdiagnosed, possibly due to lack of clinician knowledge about HDP-related CVD risk [5–11, 17], the intent of the QPT is to inform and empower women to self-advocate should concerning health symptoms arise. This intent cannot be realized if clinicians function as gatekeepers. While some women participants, like participating clinicians, thought that the QPT might induce anxiety or stress about health status among women users, many said that the QPT would instead relieve anxiety through greater understanding of HDP and CVD risk, giving them some measure of knowledge and control over lifestyle behaviours that could reduce that risk. Furthermore, both women and clinician participants viewed the QPT as empowering for women users. To mitigate potential concerns among some clinician users, our study yielded insight on how to promote and enable use of the QPT including endorsement by professional societies, embedding the QPT in clinical guidelines, and education, including continuing professional development via professional societies and self-directed learning through educational materials that accompany the QPT when disseminated to clinician users.

In a similar vein, clinician participants said they should be responsible for providing the QPT to women. Some women participants agreed, but this opinion may have been partially influenced by two concerns: (1) that clinicians should be responsible for knowing about CVD risk after HDP, and (2) clinicians may not react favourably to women who present them with the QPT. These issues could be addressed in a few ways. Prior research showed that curriculum at medical schools did not address women's health or person-centred care [32, 33], so medical education could better prepare physicians to both identify precursor symptoms of CVD particular to women and engage diverse women in their own health and healthcare decision-making. As already mentioned, this study identified the need for ongoing professional development and self-directed learning on the topic of HDP-related CVD risk. Another way to influence clinician knowledge and behaviour is through peer interaction, which could be fostered via the Canadian Post-pregnancy Clinical Network, a consortium that seeks to link interdisciplinary clinicians across Canada in preventing and managing CVD risk among women [34]. In keeping with the imperative to empower women users to self-advocate for their health, many women participants said the QPT should be made available to women users through many sources including posters in healthcare settings, pharmacies, community agencies such as immigrant settlement services, web sites, telephone applications and social media. Implementation science research shows that patient-provider communication supports such as QPTs are more likely to be effective when targeted to both patient and clinician users, in part so that patients are empowered, and in part so that clinicians are primed for use [16]. Hence, once fully evaluated though future research, dissemination of the QPT must include multiple mechanisms that reach both women and clinician users.

In ongoing research, we will refine the QPT based on learnings from this study, and evaluate use and impact of

the QPT on women's knowledge of CVD risk and confidence for preventive lifestyle behaviours. At the same time, further theory-guided research is needed to more fully understand the mechanism by which QPTs support person-centred communication, insight that will reveal how to optimize QPT implementation. For example, Communication Accommodation Theory explains how individual beliefs and motivations influence interpersonal dynamics in a way that either does or does not accommodate the other party, a concept germane to patientprovider interaction based on a QPT [35]. Other research could explore if and how a QPT enables continuity of care across clinicians of different specialties, a point raised by clinician participants of our study who noted that different specialties could best address various topics in the QPT. Another avenue for future research involves assessing the integration of QPTs in electronic medical record systems, something suggested by several clinician participants, which could overcome a barrier they noted of being overwhelmed by multiple point-of-care tools. Future research could also explore the role of clinicians such as midwives as QPT knowledge brokers [36]. Ongoing research might assess how best to disseminate the QPT to women and clinicians, also compare womens use and impact of other informational material (e.g. pamphlet) to that of a QPT.

This study featured multiple strengths including use of rigorous qualitative methods [21, 23], compliance with qualitative research reporting criteria [22] and inclusion of women and clinician participants with diverse characteristics. We must also acknowledge some limitations. We collected demographic data by self-report from participants so we lacked information about CVD risk factors or events, or comorbidities among women participants to allow for analysis of views by health status. Some interviews were brief, and this may reflect the fact that we conducted interviews in English language, which may have constrained the level of detail offered by women of diverse ethno-cultural groups with English as a second language. Recruitment was challenging due to the third wave of the COVID-19 pandemic so we recruited few physicians and all self-reported as women. Still, we achieved informational saturation, signaling concordance in themes across participants, which further verifies the findings. Because we focused on a QPT for HDP, the findings may not apply to QPTs for other clinical contexts. Furthermore, this study was conducted in Canada, so the findings may not be relevant to other jurisdictions with different healthcare systems.

Conclusions

Interviews with 21 ethno-culturally diverse women who had HDP and 21 clinicians of differing specialties revealed how to optimize the design, implementation, use and impact of a QPT on how to prevent and manage CVD after HDP. Participating women and clinicians largely agreed on the need for more instructions, lay and genderneutral language, links to additional information, more space for answers, graphic appeal, and print and electronic format. Both groups noted similar barriers (clinicians lack time/willingness, low language/health literacy and access to technology among women) and enablers (translated, credible source/endorser, culturally relevant, organized by health trajectory stages) of QPT use; and likely benefits (raise awareness, empower women, encourage them to adopt healthy lifestyle). We will use this information to refine QPT design and plan for future evaluation. If found to be effective and widely disseminated, the QPT could improve awareness and communication about this issue, and may reduce CVD risk in many women who have hypertensive pregnancies. Ongoing research is needed to more fully understand how QPTs support patient-clinician communication, and how to alert and prime both patients and clinicians to use QPTs.

Abbreviations

CVD Cardiovascular disease

HDP Hypertensive disorders of pregnancy

PCC Patient-centred care

QPT Question prompt tool

Supplementary Information

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Additional File 1.	
Additional File 2.	
Additional File 3.	
Additional File 4.	

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Authors' contributions

ARG and KN conceptualized the study; ARG planned and supervised all aspects of the study; KN, MT, JE and JUR assisted in recruitment; MT, JE, JUR and ARG collected and analyzed data; KN, MSL and SS assisted in data analysis; MT, JE, JUR, MSL, SS, KN and ARG drafted the manuscript; and all authors read and approved the final manuscript.

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Data availability

All data generated or analysed during this study are included in this published article and its supplementary information files.

Declarations

Ethics approval and consent to participate

All methods were carried out in accordance with relevant guidelines and regulations. This study was approved by the University Health Network Research Ethics Board in Toronto, Canada. All participants provided written informed consent before interviews.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹Toronto General Hospital Research Institute, University Health Network, Toronto, Canada. ²Libin Cardiovascular Institute of Alberta, University of Calgary, Calgary, Canada.

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