

Research Paper

The role of the pharmacist in contraception and pre-pregnancy management for women with diabetes: a study of patient and pharmacist perspectives

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Abstract

Objectives Women with diabetes are at increased risk of adverse pregnancy outcomes compared to women with gestational diabetes (GDM) or no diabetes. Pregnancy outcomes are improved by specialist pre-pregnancy care. We aimed to explore pharmacists' and women with diabetes' perceptions of the roles and barriers to pharmacist participation in a diabetes contraception and pre-pregnancy program in South-Western Sydney (SWS).

Methods The Diabetes Contraception and Pre-pregnancy Program (DCAPP) aims to reduce adverse pregnancy outcomes among women with diabetes. This includes awareness raising among, and through, pharmacists. Surveys to explore pharmacists' roles in contraception and pre-pregnancy management (CPPM) were completed by SWS pharmacists and women with diabetes from diabetes clinics aged 18–50 years. Survey themes were then discussed in interviews and focus groups with pharmacists across Australia. Thematic analysis of transcripts was undertaken.

Key findings Pharmacists were seen to have a role in diabetes health promotion, information distribution and referral to pre-pregnancy clinics. Pharmacists and women recognised the need for increased knowledge and educational materials about CPPM and effective awareness and coordination of CPPM services. Some pharmacists recognised deficits in their knowledge regarding diabetes in pregnancy, including CPPM and differences to GDM. Barriers to pharmacists' involvement in CPPM included difficulty identifying applicable women and reluctance to initiate pregnancy planning and contraception conversations, often due to language and cultural barriers.

Conclusions Pharmacists and women with diabetes see an important role for pharmacists in CPPM. Co-designed diabetes training for pharmacists and increased communication about DCAPP were seen important for ongoing implementation.

Keywords: pre-pregnancy care; type 1 diabetes; type 2 diabetes; pharmacist; contraception

Introduction

Diabetes is the most common medical disorder affecting pregnancy: approximately 9.9% of Australian mothers have diabetes.^[1] Women with type 1 diabetes (T1D) and type 2 diabetes (T2D) have a heightened risk of adverse pregnancy outcomes compared to those with gestational diabetes (GDM) or no diabetes in pregnancy.^[1] This risk is increased when pregnancies are unplanned and hyperglycaemia is present.^[2] There is a 4-fold increase in spontaneous abortion and up to a 9-fold increase in major congenital malformations when glycosylated haemoglobin (HbA1c) of the mother is above 7.5% (58 mmol/mol).^[3] Women with diabetes are also at higher risk of preeclampsia, preterm labour, stillbirth, macrosomia, related birth injury and perinatal mortality, and increased post-natal neonatal hypoglycaemia.^[4]

By consensus, best practice contraception and pre-pregnancy management (CPPM) involves detailing information about outcomes and risks for mother and baby and empowering women to manage diabetes. This involves explaining the importance of pregnancy planning and the role of contraception, taking folic acid (5 mg/day) from 3 months preconception until 12 weeks gestation, monitoring blood glucose and ketones (in T1D) during preconception and aiming for glycaemic control where fasting glucose levels are 5–6 mmol/L on waking, 4–6 mmol/L before meals and an HbA1c target of ≤ 48 mmol/mol (6.5%).^[4] Review of medications and retinal and renal assessments are also recommended in preconception for women with diabetes.^[4]

T1D is managed in specialist care. T2D prevalence before pregnancy is increasing and is more likely managed without referral to specialist care.^[5,6] Women with T2D are more likely to have concomitant factors associated with adverse pregnancy outcomes including older age, social disadvantage and obesity and are more likely than women with T1D to manage diabetes with medications harmful or contraindicated in pregnancy.^[6] Specialist pre-pregnancy care is associated with decreased congenital malformation rates and perinatal mortality.^[7] Regional pre-pregnancy care programs are associated with increased uptake of 5 mg preconception folic acid, improved glycaemic control at conception and reduced adverse pregnancy outcomes in T1D and T2D.^[8] Pre-pregnancy management has stronger correlations with greater adverse pregnancy outcome changes than other factors, including maternal obesity and social disadvantage.^[8]

Previously CPPM has been included in medical specialist or general practice roles. Pharmacists are recognised to have a role in CPPM of all women through incorporating measures into their practice, providing the most recent, comprehensive contraception advice, appropriate folic acid supplementation advice, monitoring of maternal chronic disease and medications, substance use prevention advocacy and vaccination encouragement.^[9] Specific to diabetes, there is scope for pharmacists to provide advice regarding pre-pregnancy glucose control tightening and to identify potentially harmful medications requiring adjustment or cessation in pregnancy.^[10] Pharmacists are positioned to provide frontline contraception advice; for example long-acting reversible contraceptives (LARCs), the oral contraceptive pill (OCP) and emergency contraception options are available over the counter in Australia. Women with diabetes are less likely to have documented contraception counselling than those without health conditions and are less likely to utilise LARCs.^[11] Despite recommendations for pharmacy involvement in CPPM, there is limited literature exploring the role of pharmacists in promoting pre-pregnancy health, specifically for women with diabetes.

South-Western Sydney (SWS) has a high burden of diabetes compared with the New South Wales (NSW) state average (6.8% in Campbelltown in SWS versus 5.5% across NSW), and higher

rates of congenital malformations and adverse pregnancy outcomes in children of women with diabetes than the NSW and Australian average.^[12] SWS has some of the poorest communities in NSW, which is associated with worse health literacy and access to health care.^[12,13] Responding to high rates of adverse pregnancy outcomes for women with diabetes in SWS, the Diabetes Contraception And Pre-pregnancy Program (DCAPP) was launched as an integrated approach between health care professionals (HCPs) to support these women.^[12]

We aimed to evaluate the roles and actions of and barriers to pharmacists participating in DCAPP through surveys for pharmacists and women with diabetes, and interviews and focus groups with pharmacists.

Method

Setting

DCAPP was based on existing literature, review of local pregnancy outcomes and consultation with women with diabetes and district-wide multidisciplinary HCPs, to cater for a multi-ethnic population and the Australian healthcare system.^[12] It aims to increase the understanding of HCPs and women of child-bearing age with T1D or T2D of the risks of unplanned pregnancy in diabetes and to educate HCPs and women about best-practice CPPM. It also endeavours to make CPPM care for women with diabetes more accessible, thereby encouraging pre-pregnancy clinic attendance to manage their diabetes. The model aims to reduce rates of congenital malformations and other adverse pregnancy outcomes.^[12] As part of programme implementation, pharmacists working in SWS were given DCAPP CPPM information packs, containing resources targeted for them and women with diabetes. They were informed in person about DCAPP's goals, best-practice recommendations for patients and referral pathways to local pre-pregnancy services.

Approach

A mixed-methods design with two stages was utilised. Stage 1: Surveys were administered to pharmacists in SWS pre-implementation of DCAPP and to women with diabetes from SWS post-initial implementation of DCAPP. Stage 2: One to one interviews and a focus group were conducted post-initial implementation of DCAPP with pharmacists across Australia, to gain in-depth perceptions on themes identified in stage 1 surveys (see [Supplementary Table 1](#) for content addressed in each stage). Ethical approval was granted from the SWS Local Health District (HE16/136) and Western Sydney University Human Research Ethics Committee (H12906).

Participants

Participants consisted of:

- (1) Pharmacists working in SWS (Stage 1): A geographically representative sample of 30 community pharmacists from 189 SWS pharmacies, who had not been introduced to DCAPP, were invited into the study by phone and email through a public collection of NSW pharmacy contact details managed by the Primary Health Network.
- (2) Women aged 18–50 years with diabetes from SWS (Stage 1): Women were recruited at T1D, pre-pregnancy and antenatal clinics at Campbelltown Hospital. It was not necessary that they knew about or had been involved in DCAPP.
- (3) Pharmacists working across Australia, including from SWS (Stage 2): Pharmacists in SWS were invited through DCAPP. Advertisements were also placed on the Pharmacy Guild of Australia's social media pages.

Methods

Surveys were via an interview with data entered into Qualtrics on-line survey software (topics detailed in [Supplementary Table 1](#)).

An interview/focus group topic guide was developed for Stage 2 based on themes identified in the step 1 survey. Interviews/focus groups were conducted online via Zoom and by telephone. Discussions were audio-recorded and transcribed verbatim.

In Stage 1, postcode of the pharmacists and age, type of diabetes and pregnancy status of women were collected. In Stage 2, the length of time practicing as a pharmacist and gender were recorded.

Frequencies of responses were identified for close-ended survey questions. Qualitative data were analysed using a constructivist thematic approach.^[14] All transcripts were read, coded, then sorted into themes (recurring patterns in the data) by the primary researcher. Other members of the team independently coded a subset of transcripts. Coding and theme descriptions were refined in team discussions. Data were collected until saturation in main themes was achieved. Excerpts are used to highlight themes identified; excerpt numbers link table excerpts to the results.

Results

Stage 1: Pharmacist pre-DCAPP surveys

Eleven pharmacists completed surveys (see quantitative results in [Supplementary Table 2](#)).

Current CPPM practices for women with diabetes

If a woman with diabetes indicated that they intended on becoming pregnant, most pharmacists said they would review diabetes medications, discuss smoking and alcohol risks and the importance of immunisation, encourage tightening of blood glucose and recommend folic acid. Overall, 91.9% of pharmacists incorrectly reported or did not know folic acid requirements. Pharmacists reported contraception conversations were often initiated with patients if they asked about emergency contraception. If they were to give contraception advice, the majority would give verbal advice and suggest seeing a GP or endocrinologist. The most common contraceptives recommended were OCPs and barrier contraception, a few recommended LARCs and one mentioned permanent solutions.

Role of the pharmacist in diabetes CPPM

Most pharmacists stated a need for better awareness raising of the impact of diabetes in pregnancy and pre-pregnancy services available, potentially by distributing educational materials.

Pharmacists recognised that they needed support to assist in CPPM. Suggestions included the distribution of information for pharmacists with a CPPM information kit, more diabetes education training and more information about local diabetes-specific services to refer clients to.

Pre-pregnancy risk discussions between women with diabetes and pharmacists included risks to the mother and neonate, including diabetes/obesity later in life, miscarriage risk, hypertension, premature delivery, developmental delay, macrosomia and increased hypoglycaemic events. Three pharmacists left such conversations to GPs.

Blood glucose level (BGL) monitoring and educational programs could be, or already were, integrated into services. Two pharmacists encouraged BGL testing at their pharmacies or subsidised BGL machines. A few pharmacists believed pharmacist-led seminars were the most useful medium for meaningful pharmacist information

distribution. Online resources were recognised to be the most useful format for women, especially social media. Advertisements at pharmacies were also useful. Contraception advice and pregnancy supplementation were particularly important educational resources.

Barriers to pharmacists providing CPPM

Pharmacists believed their clients lacked awareness about CPPM, specifically contraception options, high-dose folic acid supplementation, lifestyle measures for health and teratogenic medications. Some felt this was due to limited information, fear of healthcare interactions or reluctance to capillary BGL testing and insulin administration adherence.

Cultural beliefs and language barriers also prevented effective contraception by limiting the scope of effective communication about options. The costs of supplements were also seen as a barrier.

Most pharmacists reported difficulty in recognising the target population group and reluctance to ask women if they are planning pregnancy. Overall, 72.7% would not ask women about pregnancy plans – due to fear of causing offence, cultural sensitivity and not seeing it as a relevant question from pharmacists.

Facilitators included ensuring low-cost (ideally free) services in convenient locations, involving diabetes educators and a multi-disciplinary approach, where GPs and other HCPs could refer to services. Awareness about services could be through pharmacy advertisements, and in major community languages, and distributing information through local community settings.

Stage 1: Women's surveys post-initial implementation of DCAPP

Twelve women aged 20–41 years participated in surveys: six had T1D and six had T2D. Ten were pregnant at the time of participation (seven planned, three unplanned). Three of 10 pregnant women had been referred to a pre-pregnancy clinic. The two non-pregnant women had visited pre-pregnancy clinics. Five said their pharmacist had told them about the importance of high-dose folic acid supplementation before pregnancy. All women took high-dose folic acid supplements during pregnancy, with 50% taking it before pregnancy. Women provided their perspectives on four consumer themes: (i) the role of the pharmacist, (ii) educational resources and types, (iii) improvements to DCAPP and (iv) barriers to pharmacists providing CPPM. [Supplementary Table 3](#) presents these findings which help to contextualise the perspectives of pharmacists found in the qualitative interviews/focus group.

Stage 2: Pharmacist interviews/focus group

Six pharmacists, four from SWS, participated in interviews and two in a focus group. All were female with 1–15 years in practice. Discussions lasted 30–47 min.

Six themes drawn from pharmacists in Stage 1 were explored in discussions: (i) current practices, (ii) best-practice role of the pharmacist in CPPM, (iii) barriers to best-practice CPPM, (iv) features of an ideal CPPM, (v) strengths of DCAPP and (vi) strategies for refining DCAPP.

Current practices

Most participants would ask women if they were currently pregnant or breast-feeding but not if they were planning pregnancy ([Table 1](#), excerpt 1.1a–b). Some participants had never considered pregnancy planning or contraception conversations (excerpt 1.2). Most

Table 1 Current practices and best-practice role of the pharmacist in CPPM

Subthemes	Example excerpt	Excerpt number in the text
Current practices		
Only ask if the patient is pregnant or breastfeeding rather than planning pregnancy	<i>I never ask if they're planning pregnancy, I always ask if there is any chance they are pregnant or if they are currently breastfeeding. Sometimes that will open up the confirmation of planning ... but I always ask the question whether they are in fact pregnant. (P2)</i>	1.1a 1.1b
Not given	<i>When we are doing diabetes checks, we ask are you pregnant... but we don't really ask more than that. It's kind of a topic that we leave up to them to discuss to us. (P3)</i>	1.2
Only if checking medication safety	<i>I don't give contraception advice to women. I've actually not considered it. (P2)</i>	1.3
If prompted by a patient asking for emergency contraception or pregnancy tests	<i>With certain medications that is definitely a counselling point that we do need to cover but, generally speaking, it's not one that I personally ask on a regular basis. (P6)</i> <i>I will ask people, like ... if they were to have, ask a request about medication or pregnancy tests or anything, morning after pill, anything that relates to any kind of potential risk in pregnancy. (P1)</i>	1.4
Best-practice role of the pharmacist		
Checking the safety of medications in pregnancy	<i>Making sure the medications that they're currently using for diabetes are compatible with pregnancy. (P2)</i> <i>If they have existing medical conditions... they should be ... talking to their doctor in regards to that ... they will most likely need to change their medication regime, especially if they are type 2. (P4)</i> <i>I think it's important that we do tell them about which medications you're not meant to fall pregnant on as well. I don't know, some of them might be on a statin tablet or an ACE inhibitor for example, diabetes comes as a package, like you know they have other co-morbidities and you know other ... they get put on other tablets for prevention not just diabetes tablets. (P8)</i>	2.1a 2.1b 2.1c
Educational and health promotion role	<i>I think there's a lot of scope for health promotion, and just promoting ... best practice, evidence-based practice, having information about ... if you identified what the main questions and topics that they might have with respect to diabetes, pregnancy, pre-pregnancy for women with child-bearing age, having resources and information. (P1)</i> Glucose control <i>I think the biggest, biggest thing is controlling their blood sugar levels ... If they don't know how to control their blood sugar levels, I think that can come with its own set of problems during the pregnancy ... in terms of like their general lifestyle as well. There's no point saying ... 'control your blood sugar levels' and then not tell them how to do that. (P6)</i> <i>It's essential that women of child bearing age that have diabetes should plan pregnancy prior to falling pregnant, just to ensure that their blood sugar, their glycaemic control is well prior to falling pregnant to prevent the complications associated with diabetes in pregnancy ... from the community perspective if you get a patient who you see frequently to pick up their medication, then engaging in the conversation about ... 'How is your sugar control going? Are you having any issues?' (P7)</i> Supplementation advice <i>I think, um, the first thing I would probably just suggest is 'Are you taking a supplement... Can I show you what's in them? Can I explain to you why it's good to take them?... you should take folic acid in the lead up to falling pregnant and while you are pregnant to prevent malformations.' (P1)</i> Diet and exercise <i>I would definitely talk about diet and exercise because it's very important, that both of those are very important in controlling your diabetes. (P1)</i> Contraception options <i>We could play a part in terms of checking whether or not they are planning to become pregnant or whether or not they are on decent contraception. (P5)</i> <i>Perhaps monitoring for the pharmacies that do have diabetes monitoring. (P2)</i> <i>If they had a chronic disease and there was some issues with their diabetes or if they had other associated chronic diseases, I think the first thing I would say is I think you should do this but you should go speak to your GP ... perhaps you should go here if you're concerned about this, or if you do need more information, you could go here. (P1)</i> <i>Maybe they're asking about how they can plan their pregnancy and all that kind of stuff it's not part of my um, I guess, scope of practice. So I would probably be referring them off to a doctor or even a diabetes educator purely because they are more well-versed in that area and they would be able to give better advice. So, at this point in time, because I don't know very much about it, I usually do refer. (P6)</i>	2.2a 2.2b 2.2c 2.2d 2.2e 2.2f
Glucose monitoring		2.3
Appropriate referral to other HCPs for additional management		2.4a 2.4b

Table 2 Barriers to best-practice CPPM

Subthemes	Example excerpt	Excerpt number in the text
Both pharmacists and patients may be uninformed about the importance of CPPM in diabetes	<p>When I was reading the blurb [provided about DCAPP], there is a higher rate of congenital malformation [in SWS]... that is crazy. So being able to communicate why it is so important, because I don't think people [pharmacists] understand this issue and why it is so important, so if you can't demonstrate why it's worth it, people don't want to engage. (P1)</p> <p>I think that a lot of them aren't aware that there are such complications with being a diabetic, from generally seeing patients it's not something we [pharmacists] generally discuss. I think that them not understanding the implications is always one thing... a lot of diabetic women don't know there are such complications that can occur or that they need to be on decent contraception beforehand. (P5)</p>	3.1a 3.1b
Health literacy of patients can act as a barrier to engagement in CPPM	I guess their understanding of their own medical condition so maybe like health literacy ...a lack of understanding of their own medical condition and what can potentially make it worse and what they can do to make it better... they don't understand just how important it is to understand what diabetes is exactly. It's not just high blood sugar levels. It's basically what can happen if that's not managed. (P6)	3.2a
Patient's fear may prevent them from engaging in CPPM	Be mindful of the language that's used to incite a bit of fear, the last thing a woman wants to hear is the potential of something because you have diabetes... obviously there is the higher chance of them having abnormalities, just being mindful that the language that's actually being used doesn't scare people... Which then I guess loses a bit of trust in the health care professional and the advice that they're actually giving. (P7)	3.3
Compliance with management may act as a barrier	Diabetes is a chronic condition, so you know I guess they are battling, they are trying to keep on top of their diabetes and insulin and whatever... they can be young women for whom compliance may be an issue and then maybe getting them to take another medication or to enquire about something else maybe... something that they're not really interested in [may be a barrier]. (P7)	3.4
Lack of digestible information in educational resources for patients	I think people find it hard to find digestible information about chronic diseases, oral contraception and a lot of different... common health issues that people do encounter... I think one of the barriers is just being able to access digestible information and knowing where to go and having that readily available for you... if you open that... leaflet, and it's meant to be in consumer language but there's so much detail on there... it can be a bit overwhelming. (P1)	3.5
Both pharmacists and patients can find pre-pregnancy and contraception sensitive topic areas to discuss with patients	<p>Stigma</p> <p>There's probably also a bit of stigma about contraception, particularly in the community setting... bringing it up. (P7)</p> <p>We do have times when you look at a customer and you are not sure whether you should ask them or not. There are times where customers can get very offended and it's just how people are, it's not as easy to ask someone if they are of child bearing age, it's hard to add it into the conversation. You can be just handing out the insulin, some NovoRapid to someone it's not an easy thing to bring up. (P4)</p> <p>Cultural barriers</p> <p>I work in South-Western Sydney... and I think one thing that I've noticed is that... I think there's even cultural barriers where talking about contraception, pregnancy, falling pregnant, it's not a very comfortable or normal thing that people have grown up, grown up even talking about. It's a taboo subject and it can be embarrassing to talk about. (P1)</p> <p>Gender-related barriers</p> <p>Especially if you have a male pharmacist, there's a lot of issues out there... there's more and more barriers to asking a female patient a lot of questions. (P8)</p>	3.6a 3.6b 3.6c 3.6d
Lack of clinical therapeutic relationship with a patient makes CPPM counselling more challenging	Within pharmacies we build rapport with customers, so once that is built, getting onto the topic is a lot easier. It is interesting that that is seen as a barrier I guess. because usually we have regular patients who come in and I wouldn't see it as an issue if it was a regular patient of mine to talk about that. (P5)	3.7
Lack of privacy in the pharmacy setting	There can be issues with privacy, because sometimes you don't even know the pharmacist, and you might be standing on the other end of the counter saying... I'm trying to fall pregnant... it might be busy, there might be other people there... if you're just having a conversation across the counter about something that might seem very intimate... or private to someone... they might not feel comfortable about discussing it out in the open. (P1)	3.8
Language and time barriers to effective CPPM	<p>We have a lot of non-English and non-Australian people in our community, so it's all unwritten information... that might not capture all of the non-English reading, if not non-English speaking individuals. (P2)</p> <p>If they're unable to understand us and what we're trying to recommend for them then that is quite an obvious barrier. Sometimes I would even say... the contact time with these patients are also quite limited as well... comparing to a patient who... doesn't have a language barrier or anything like that, we don't really have to spend that much time with them. Whereas with these patients... we might have to spend a little bit more and, where I work personally, it's a very busy environment so that's definitely another kind of barrier. (P6)</p>	3.9a 3.9b
Lack of support for CPPM counselling within a workplace	<p>The pharmacists that are involved in the program may need continuing support and I think often if, especially if you work in a busy pharmacy, if you don't have support and it's not easy for you to execute a program, you probably won't promote it to people who may need it... it may be perceived as a barrier and it might be a little bit too difficult. (P1)</p> <p>Time constraints is a very big issue... unless you have an understanding boss who's happy to have one pharmacist who just ploughs through the scripts, and one pharmacist who spends a bit more time with the patients who need it. (P2)</p>	3.10a 3.10b

Table 3 Features of an ideal pre-pregnancy program

Subthemes	Example excerpt	Excerpt number in the text
<i>Features of an ideal pre-pregnancy program</i>		
Well planned with input from health care professionals	I think if you were to roll out some sort of initiative... it probably needs comprehensive planning... which is great because you're consulting with pharmacists and doing this focus group, but really looking at the barriers and looking at how to address those barriers... really speaking to other primary care providers or other service providers about it. (P1)	4.1
Multidisciplinary approach	If it [a pre-pregnancy clinic] was something that healthcare professionals would recommend... Whether it's a pharmacist, or doctor or diabetes educator or midwife... I think having that individual person or healthcare professional... would help facilitate and get them to the actual event or encourage them to go. (P5)	4.2a
	Involvement of diabetes educators	4.2b
	I think there's a really big role for credentialled diabetes educators as well because that's what they are qualified to do, and I know there's lots of different health professionals that can be accredited in that, but I know there's quite a few pharmacists as well as. Because I know I used to work in a pharmacy where they actually had a clinic, a diabetes clinic, and the pharmacist used to work in a room, so that would definitely be potential to do something like that. (P1)	4.2c
Effective awareness raising	Involvement of pharmacists	
	I would say we are pretty well placed to have those discussions, because of the frequency we are seeing the women... we already ask whether they are pregnant or breast feeding, so to open up the conversation further would be very easy now that I consider it. (P2)	4.3a
	If a woman is intending to fall pregnant, like what is her journey, where does she go, who does she visit... trying to look at being opportunistic. (P1)	4.3b
Educational resources available across multiple mediums, especially online	In the aisle where they've got pregnancy tests and all that kind of stuff... Visual aids would definitely help in that area... kind of identifying, 'Do you have diabetes?'; 'Are you planning your pregnancy?'; all those kinds of things, they're questions that might get things going for patients and then they can obviously come back and ask the pharmacist. (P6)	4.3c
	I am Indian by background and my parents are migrants... I would probably say looking at being opportunistic because I think with people who are from a refugee background, a migrant background, or a culturally or linguistically different background, looking at mothers groups... that might be more of a comfortable setting, and it would be a group of people... it might be a good way because a lot of women do have more than one child... That's kind of outside of the typical healthcare environment... looking at a different avenue or a different way of reaching an audience... trying to get the word out through word of mouth. (P1)	
	Something simple... a forum which they can, in their own time, go to and get answers and ask questions. (P5) I think also using social media to put that information out there. People are busy, they're not going to attend... if they think I could just read this information somewhere else... if you have a younger generation have an app or some kind of system that they're going to look at. (P8)	4.4a
Consistency and continuing communication with patients	I think you can get something new happen and in 5 years time no one is recommending to a centre anymore because there hasn't been that drive. (P3)	4.4b
	Part of the conversation the pharmacist has, just asking the question, is it ok if I check in with you next time you're in, see how you're going. Keep the conversation open. Rather than, alright, done that one. I've ticked off that patient..., you check in with them which doesn't happen because of time constraints or doesn't always happen, but just keeping the lines of communication open somehow. (P2)	4.5a
Minimising cost to the patient	These patients are already putting more money than the rest of us are into their health care, and if we're expecting them to pay more, it might just be financially prohibitive. (P2)	4.5b
Dynamic evaluation of the program	I guess in doing so, um, I guess while you are doing it it's just kind of like a learning experience, and just trying to look at, just noting why, how you roll it out and what has been successful and what has helped reach certain communities and certain groups of people. (P1)	4.6
		4.7

Table 3 Continued

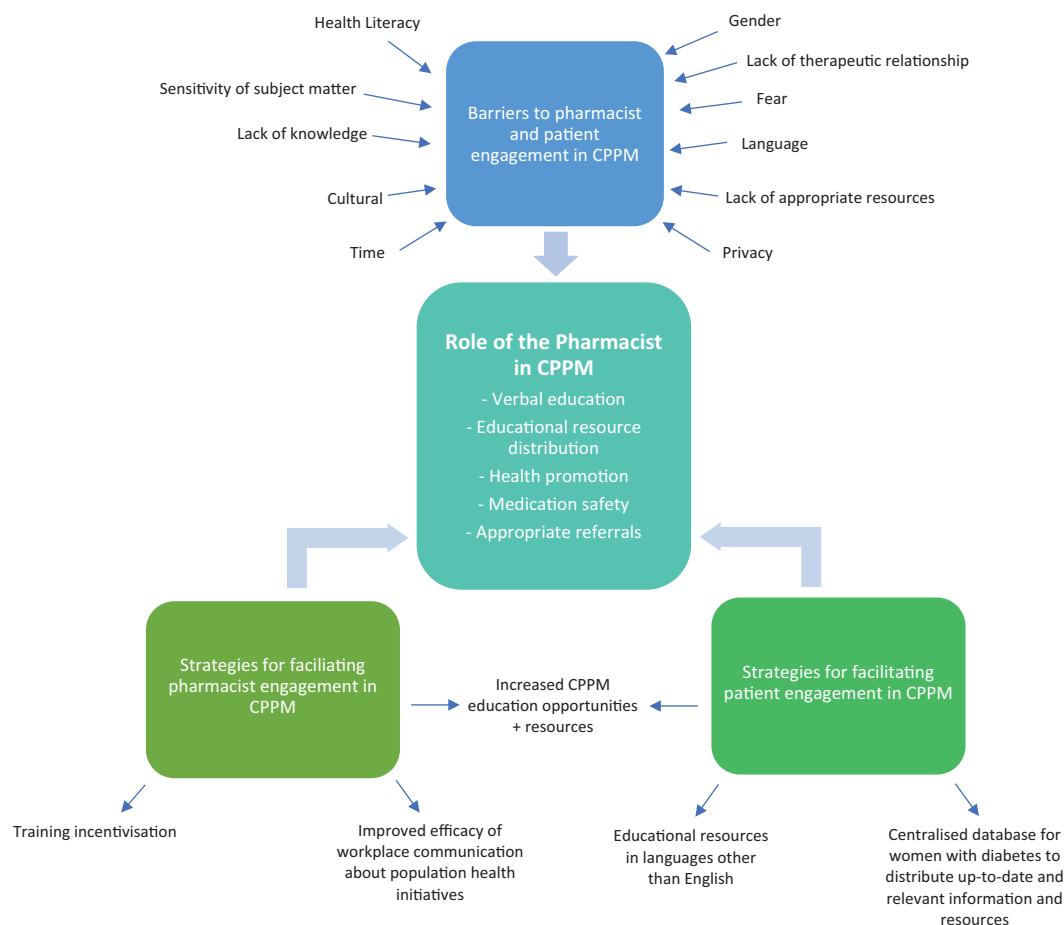
Subthemes	Example excerpt	Excerpt number in the text
Strengths of DCAPP Evidence based and addressing a recognised problem	<p>You catch the women before they fall pregnant, either than unplanned pregnancies or planned pregnancy if you're getting the contraception in there first... if you get women before they get pregnant, the chances of the congenital malformations and adverse pregnancy outcomes are reduced. (P2)</p> <p>I think it's very good because it sounds like it's evidence based and we are just bringing it over and adapting it. ...it sounds like there's been experience in the model in a different environment and it's being brought over, so rather than creating... re-inventing the wheel, just looking at what works and trying to implement it here. (P1)</p> <p>Making sure that it's a reliable source is really important, and the fact that you guys have a lot of evidence behind this, great! I think that's really important... that they know that the information they're getting is accurate and it's not just from a third-party kind of website. (P6)</p> <p>I like the way it actually has multiple avenues, so you were talking about social media platforms, you're talking about referrals from different points, you're talking about the clinics, so there's like, lots of different ways someone can be supported, and I think that's really good because it is recognising that for different women they might prefer face to face while others might be time poor and they might want to obtain information through a different way. (P1)</p> <p>And by having an online social media platform, even if they don't want to talk about it when they're there with you, it still gives them the opportunity to go out and explore what these options are in their own time which is great. (P6)</p>	5.1a 5.1b 5.1c
Educational resources that are accessible and varied	<p>I like the way it actually describes having the GP, and the pharmacists and the hospitals in clinic so it looks like there is an integrated care type of model. (P1)</p> <p>I think, as a pharmacist, it is a very important kind of role to play because we are, in some cases, the first point of call, and then in some cases the last. So it is very important that we do understand what is happening or be kept up to date with these guidelines because these patients need to know exactly how to manage their condition... So we do play a vital role, it is very, very crucial that we do understand what is exactly needed in maintaining these patients' health. (P6)</p> <p>The online modules for health care professionals... I think that's really important... I would love that because I've had to counsel women on, you know, contraceptive pills, whether it's the emergency contraceptive or the oral contraceptive pill and it's never been a thought until you actually brought it up to maybe discuss, 'Have you ever thought about falling pregnant. How is your diabetes, is this all controlled?' It helps them think about these kinds of things a little bit more... we can also go and learn a little bit more in our own time and help our patients that way. (P6)</p>	5.2a 5.2b
Integrated care model	<p>If it is kind of rooted and starting out in SWS and you are looking at trying to target the diverse population that exists in SWS... there is quite a high percentage of Indigenous people, there's a high CALD population, there's a lot of minorities and vulnerable populations here, so I think that I would say that if you were looking at trying to roll it out in SWS where there is such a diverse and complex mix of people it's... positioning you well to kind of go expand beyond that. (P1)</p>	5.3a 5.3b
Further education for pharmacists	<p>The online modules for health care professionals... I think that's really important... I would love that because I've had to counsel women on, you know, contraceptive pills, whether it's the emergency contraceptive or the oral contraceptive pill and it's never been a thought until you actually brought it up to maybe discuss, 'Have you ever thought about falling pregnant. How is your diabetes, is this all controlled?' It helps them think about these kinds of things a little bit more... we can also go and learn a little bit more in our own time and help our patients that way. (P6)</p>	5.4
Applicability beyond SWS	<p>If it is kind of rooted and starting out in SWS and you are looking at trying to target the diverse population that exists in SWS... there is quite a high percentage of Indigenous people, there's a high CALD population, there's a lot of minorities and vulnerable populations here, so I think that I would say that if you were looking at trying to roll it out in SWS where there is such a diverse and complex mix of people it's... positioning you well to kind of go expand beyond that. (P1)</p>	5.5a
Strategies to improve DCAPP Strategies to more effectively inform about and engage health care professionals in the program	<p>Incentivisation</p> <p>if you can look at how it can be incentivised in a way, because I think GPs and pharmacists and clinicians, they are all very busy and they also have a lot of other competing priorities, so it would just be to demonstrate why they should be engaging, and what is, what do they get out of it, or what kind of incentive do they get my participating in a project like this. (P1)</p>	6.1a 6.1b 6.1c 6.1d 6.1e 6.1f 6.1g 6.1h 6.1i

Table 3 Continued

Subthemes	Example excerpt	Excerpt number in the text
Addressing barriers to conversation initiation between pharmacists and patients about CPPM	I think encouraging some community pharmacy or even a hospital pharmacy dinner, where it's funded, you bring them in, people get to network with other pharmacists in the community, you talk.... I think maybe giving people a verbal run down of what you are trying to achieve, what the program entails, and a bit of information, brief information about what you are trying to achieve and what the problem is, and then maybe referring them to the online module for further information, so maybe that face to face contact will actually encourage greater uptake of your module. (P7)	
	Pharmacists are busy and peer to peer it might be a bit hard, but if you get the hype going by doing an incentive... if your whole store gets everyone to do training modules and use that... to show they are a diabetes friendly pharmacy it gets a pharmacy a name... So if you give us a reason for everyone to know about it, so it has to be everyone on your roster has done this training module, we are going to list you as a diabetic friendly or pregnancy friendly pharmacy... People want to differentiate from chemist warehouse so they would do that to differentiate. It won't survive if you're just dispensing medication, they are all looking for services. (P3)	
	Maybe if there were CPD points associated with it that might help them to participate... I guess if there was an advantage/something in it for the pharmacist, whether it be CPD points or I guess some sort of extra skill, then I guess more likely or not they would want to pass it onto other members of staff. (P5)	
	Workplace communication As far as having all the same pharmacists educated, that is a huge barrier, we can't all know everyone, but if you have that program in your pharmacy it's important that all your pharmacists are aware of it, so staff meetings or email or some form of communication so everyone is on the same page. (P2) In terms of dispersal of information you've got to go from the grassroots, instead of giving the information to the manager and he has to pass it on to locums or people that work and they have a roster and it gets lost, if you have an intern because usually intern pharmacists work there 5 days a week. If you start from the most junior, you might be able to actually have more consistency and more enthusiasm... They're new, training, and they are more likely to be there 5 days a week. (P8)	
	Far-reaching knowledge transmission The PBA and that's basically the main registration body that we have, there's webinars and conferences and symposiums, if they can integrate it into something that they have then you could capture a lot of pharmacists. (P8) The NPS would probably be a good place, it reaches a lot of people, and by putting the online module on there you would probably get more traction, people refer to that a little bit more than some of the others. (P7) We also have the Purple Pen podcast. A lot of people listen to that, about 2000 pharmacists you know follow that podcast ... if you have an expert ... they basically interview and question about his area of expertise ... they're usually about 20 minutes long ... it won't take a long time, so people are more likely to listen to that. (P8)	6.2a
	It's a barrier for pharmacists to bring it up with a woman who is diabetic and is of child bearing age but in the same respect, it may be a barrier for that woman to actually bring up a conversation, so you just have the resources there and at their leisure read through it, and you know, link in with people for support. (P1)	6.2b
	You ask a patient, 'Are you taking any other medications' and they say 'Oh no that's between me and my doctor', we need to make sure the community understands the role of the pharmacist so it's part of their expectation so that when they walk into a pharmacy, they are getting a complete health care solution there. It's no different to asking a patient whether or not they smoke cigarettes. That's another question where there's a lot of 'Ooh do I ask that question? Will the patient be offended?' It just has to be part of our role so that the community expects it and every pharmacist expect it and the GPs expect it, so it's all collaboration. (P2)	6.2c
		6.2d

Table 3 Continued

Subthemes	Example excerpt	Excerpt number in the text
	<p>I think that [regarding] online training if at all possible I'd have a role play there, a verbal, audible role play that participants can actually hear because then they can actually see these supposed awkward conversations playing out. Sometimes I think when we read things...you can think, 'I can't ask that. There's no time to ask that... how would you ask that question? Would you actually say it like that?' To actually have that audible conversation there, even a minute, can sometimes reduce that barrier to how awkward something might feel, because you've seen it or heard it. (P2)</p> <p>If they are out in primary care, say if it is a pharmacy or things like that there is counselling rooms and things. If they are booking a time and want to speak to a pharmacist about their medications about contraception options, yes that's fine. To facilitate that obviously the pharmacy that's planning it will need to draft a service plan, essentially on time, what time they can come in, who can provide the service. (P4)</p> <p>For a non-academic person it looks pretty academic... It's a lot of words... it's too much... for the public. (P3)</p> <p>The content of it, it is really good, maybe engaging with a different graphic designer and just making it a little bit more professional. (P1)</p> <p>Explain what the benefits of that control are. Effective contraception should be OK, but maybe planning pregnancy improves pregnancy outcomes. So again, just that reminder why are we making you do this, why are we making you plan 6-12 months in advance because that's actually a really long time... most people don't even know about folic acid. (P2)</p> <p>I think in terms of transferability... you would need to look at the leaflet or online aspect that I don't know would be as easily accessible to them [Aboriginal Torres Strait Islander population]. Also, if you were trying to encourage them to go to these meetings, I think a location could be difficult for them. I guess you would need to have a specific program tailored to that demographic then that could be beneficial for them. (P5)</p> <p>For community pharmacists, how would you educate... this stuff has to be incorporated into their university courses. Diabetes is such an issue now... they learn about the drugs but not the holistic approach. (P8)</p> <p>I think, we have, as pharmacists, we have conferences, and as part of these conferences there are a lot of educational programs. So, it actually allows us to talk to people as opposed to just doing an online module, so going out there and educating pharmacists at these kinds of events would be great. I mean I personally would probably learn a lot more by sitting in in like a seminar or something and going through a lot of these things as opposed to just doing it online. (P6)</p> <p>I think there's huge barriers to pharmacists being diabetes educators, and I also think pharmacists are the best placed to do it. That one I definitely, definitely think that the diabetes educators within pharmacies is crucial and should be... some of the barriers to becoming a diabetes educator need to be lowered a little bit. (P2)</p>	<p>6.3a</p> <p>6.3b</p> <p>6.3c</p> <p>6.3d</p> <p>6.4a</p> <p>6.4b</p> <p>6.4c</p>
Improvements to educational resources		
Increased training opportunities for HCP		



Abbreviations

CPPM= Contraception and Pre-Pregnancy Management

Figure 1 A tangible and useful role for pharmacists in CPPM was recognised by both women and pharmacists who participated in this study. This figure depicts the key themes that emerged regarding their role, as well as the existing barriers for both women and pharmacists that may prevent this role being undertaken. Key strategies that emerged in the study have also been presented to illustrate ways to facilitate pharmacist engagement in a CPPM program.

participants only engaged in discussions about CPPM for women with diabetes if they were checking the safety of a medication (excerpt 1.3) or if a patient presented for emergency contraception or a pregnancy test (excerpt 1.4).

Best-practice role of the pharmacist

Participants recognised the role of the pharmacist in ensuring medication safety, providing education, counselling and health promotion and recognising appropriate referral pathways.

Participants understood the importance of inquiring whether a woman adheres to pharmacological treatment for diabetes and checking if medications are safe during and before pregnancy (excerpt 2.1).

All participants mentioned their role included advocating for evidence-based practice by educating and counselling women of child-bearing age with diabetes (excerpt 2.2a). Most participants mentioned counselling regarding BGL control to prevent complications (excerpt 2.2b–c). Education about iron, high-dose folic acid and addressing diet and exercise were also important (excerpt 2.2d–e). A few pharmacists mentioned discussing contraception options if a woman did

not want pregnancy, was on teratogenic medications or had not optimised her health and glucose control sufficiently pre-pregnancy (excerpt 2.2f). One pharmacist indicated the role of the pharmacist could include BGL monitoring in pharmacies (excerpt 2.3). All participants recognised that whilst they have a role in CPPM, there is a need to refer patients to other HCPs for support (excerpt 2.4a–b).

Barriers to best-practice CPPM

All participants described barriers to best-practice CPPM in pharmacies: pharmacist-related and patient-related factors (Table 2). Being uninformed about the importance of CPPM for women with diabetes was a common barrier shared by pharmacists (excerpt 3.1a) and patients (excerpt 3.1b). Patient-related barriers mentioned included health literacy level regarding diabetes management (excerpt 3.2a) and fear (excerpt 3.3) preventing active CPPM engagement. Patient adherence with diabetes management and difficulty coping with a chronic illness may also interfere with the execution of best-practice CPPM (excerpt 3.4). A few pharmacists mentioned that whilst CPPM resources exist for women, they are often overwhelming, not digestible and difficult to navigate (excerpt 3.5).

Pharmacist-related factors included difficulty initiating conversations about CPPM, which are considered sensitive topic areas by patients and pharmacists (excerpt 3.6a–d), due to community stigma, cultural and gender-based barriers. Some pharmacists mentioned that CPPM was challenging when there was a limited therapeutic relationship or long-standing rapport between patient and pharmacist (excerpt 3.7s). The lack of privacy in a pharmacy was another barrier to meaningful counselling about CPPM with clients was mentioned by most participants (excerpt 3.8). Additional barriers to conversation initiation included language barriers and time constraints (excerpt 3.9a–b). These barriers could not be overcome unless continuing workplace support was provided (excerpt 3.10a–b).

Features of an ideal contraception and pre-pregnancy program

Participants noted the importance of a well-planned program, involving consultation with HCPs to overcome potential barriers (Table 3, excerpt 4.1). Pharmacists and diabetes educators (of which some have pharmacy accreditation) were recognised by a few participants as key professionals to involve (excerpt 4.2a–c).

The majority of participants spoke about effective awareness raising for the program (excerpt 4.3a–c), with the need for opportunistic awareness raising in places that women with diabetes of child-bearing age frequent (excerpt 4.3b–c). Some participants mentioned resources for patients should be distributed across multiple media, with an emphasis on online options (excerpt 4.4a–b). For program maintenance, participants noted the importance of a consistent approach and availability of service providers so women remain engaged (excerpt 4.5a–b). A few pharmacists highlighted the importance of low-cost or free services (excerpt 4.6). Constant evaluation and subsequent alterations in the model to maximise its efficacy were recommended (excerpt 4.7).

Strengths of DCAPP

Two participants had heard of DCAPP; one worked in a pharmacy participating in the program. All participants were provided with DCAPP information during discussions for feedback. Strengths that participants noted were the demand for the model (excerpt 5.1a–b) and the evidence-based resources it provides (excerpt 5.1c). Participants reacted positively to the implementation of various educational tools (excerpt 5.2a–b).

The DCAPP pamphlet and poster received varying responses. The text was thought to be informative, clear and logical. The integrated care model with referral pathways was also a strength (excerpt 5.3a), with most recognising the benefit of pharmacists as an accessible and early point of contact (excerpt 5.3b). All participants valued inclusion of further education for pharmacists, especially the opportunity for subsidised online education modules (excerpt 5.4). Most participants thought that DCAPP could be successfully applied elsewhere, especially considering the model already caters for a diverse population with resources for culturally and linguistically diverse (CALD) populations (excerpt 5.5a).

Strategies to improve DCAPP

Nearly all participants suggested strategies for HCPs to be more effectively informed and engaged in the program, including incentivisation of pharmacists' interest and continued engagement (excerpt 6.1a–b). One participant suggested training modules to be incentivised by introducing an accreditation for the pharmacy as a CPPM support service, which they could advertise to differentiate

themselves from other pharmacies (excerpt 6.1c). Nearly all participants suggested linking training modules to continuing professional development points, a compulsory part of pharmacy registration (excerpt 6.1d). To improve intra-workplace communication, participants suggested providing 'cheat sheets' to use at staff meetings or via email (excerpt 6.1e) and targeting workplace information dispersal to junior pharmacists who tend to work full-time, consistent hours (excerpt 6.1f). To increase reach, some pharmacists suggested the involvement of larger pharmacy-based organisations with popular media outlets such as the Pharmaceutical Board of Australia, the National Prescribing Service and the Purple Pen Podcast (excerpt 6.1g–i).

Easily visible media prompts, such as posters and pamphlets in pharmacies, were thought to potentially assist the instigation of CPPM counselling (excerpt 6.2a). A few pharmacists also suggested addressing community and other HCPs' understanding of a pharmacist's role beyond medication dispensing (excerpt 6.2b). Training modules were suggested to include recordings of conversation initiation to engender a change in mindset in pharmacists about CPPM being too difficult a conversation to broach (excerpt 6.2c). Many pharmacists suggested addressing privacy barriers by utilising private counselling areas with organised consultations (excerpt 6.2d).

Some thought the poster and pamphlet used complicated language and jargon, several mentioned they could be more graphically appealing and they needed reiteration of evidence of improved pregnancy outcomes with planning and supplementation (excerpt 6.3a–c). A few participants thought pamphlets were an ineffective educational tool. One pharmacist pointed out there may need to be targeted, Aboriginal and Torres Strait Islander specific educational tools (6.3d).

Many pharmacists discussed the potential for DCAPP to have increased training opportunities for pharmacists. Early teaching on CPPM was suggested to be included in university training (excerpt 6.4a), and training provided by clinicians at conference seminars (excerpt 6.4b). A few participants mentioned encouragement of diabetes educator training for pharmacists, including enhanced mentorship, would be beneficial (excerpt 6.4c).

Discussion

Figure 1 presents a summary of key findings. Both pharmacists and women with diabetes recognised an important but underutilised role for pharmacists in CPPM. Pharmacists felt they could expand their CPPM activities. Whilst patient and pharmacist perspectives overlapped, their unique ideas, especially about educational resources, highlight the importance of patient and provider consultation in guiding public health project implementation.

Pharmacists have more contact with women than any other HCP in pre-pregnancy and thereafter, exemplifying the potential for providing opportunistic health promotion.^[15] There is limited comparative literature analysing the role of pharmacists in CPPM for women with diabetes. This study fills a gap in the existing literature about CPPM of diabetes through qualitatively investigating the best-practice role of pharmacists, including enablers, barriers and benefits of pharmacist involvement, in an Australian context from pharmacist and patient perspectives.

Evidence suggests pharmacists are responsive and supportive of educational public health campaigns for women of child-bearing age. For example, an Australian study of a folic acid public health campaign detailed an increase in pharmacist knowledge and folic

acid sales.^[16] Similar to DCAPP, educational materials for HCPs and the broader community were distributed by project staff; this was undertaken at least monthly over 2 years and may indicate a need for continuing development of media that can be implemented easily in DCAPP.

Pharmacists have detailed pharmacotherapy knowledge and an understanding of managing chronic diseases and communicating about them.^[17] Their role is particularly recognised regarding medication safety,^[18] which we found in this study. Medication counselling by pharmacists improves patient adherence to treatments, which is integral to pharmacotherapeutic management of diabetes and glycaemic control optimization,^[19] a trend also found in other complex condition care including epilepsy management.^[17]

Community pharmacist roles are underutilised as an effective means of health promotion,^[15] due to pharmacist-, patient- and social determinant-related factors, many of which were identified in this study. Other studies found despite a recognised potential for pharmacists in CPPM, most female patients were not interested in receiving CPPM information.^[20] This may be due to limited patient CPPM knowledge and confusion around the terms ‘preconception’ or ‘pre-pregnancy’ care.^[20] There is potential for CPPM being embedded in well-women’s primary and preventative or chronic disease care; many pregnancies are unplanned and those who have planned pregnancies may not see the need for HCP involvement.^[21] Limited cultural considerations, including language-specific resources, are also recognised as barriers for engaging in pregnancy-related diabetes education and improving glycaemic control,^[22] particularly relevant in DCAPPs multi-ethnic target population. SWS has a higher percentage of Aboriginal and Torres Strait Islander peoples than NSW and Indigenous women are more likely to have T2D in pregnancy than non-Indigenous mothers,^[1] hence resources tailored to this group are particularly important. Poor communication with HCPs and excessive emphasis on ‘all the bad things that could happen’ are also barriers to women’s CPPM involvement,^[23] highlighting pharmacist CPPM training should emphasise the importance of encouraging compassionate communication.

Pharmacists are apprehensive about approaching women regarding contraception and pregnancy and proactively giving health promotion advice; further training should focus on self-efficacy.^[24] The DCAPP will soon include access to the Australian Cambridge Diabetes Education Program, an online diabetes competency-based training platform, for pharmacists working in SWS, which aims to empower pharmacists to more actively engage in diabetes CPPM management.^[25, 26] A study of weight-based recommendations across Australian community pharmacies, including pre-pregnancy weight management, assessed pharmacists’ behaviours and knowledge using case vignettes.^[27] This could be an effective way to thoroughly assess pharmacist CPPM knowledge and find deficits to include in further training. Despite time constraints and competing priorities, there is also support for health-promotion education within pharmacy university courses.^[28] Linking CPPM training to continuing professional development points emerged in this study as an incentive for training – a finding supported in other studies of health promotion education for pharmacists.^[15]

Participation of pharmacists in multidisciplinary care models has seen improvements in the health of patients with diabetes.^[29, 30] However, it is important that roles within multidisciplinary models are well understood, including communication of responsibilities, the scope of each other’s practice and patient’s perceptions of practitioners scope and role.^[24] With the increasing sharing of electronic patient medical records between HCPs, there is scope for more effective harnessing of technology to facilitate integrated approaches

like DCAPP. This could include documentation of chronic diseases and pregnancy status, including plans or intention, with the potential to flag records for specific groups of patients to trigger pharmacists to provide opportunistic advice and check medication safety when a prescription is presented.^[24, 28] This could assist pharmacists to instigate conversations, refer appropriately for further care and be more effectively involved in CPPM programmes.

Strengths and limitations

This study is unique as an investigation of the role of the pharmacist in diabetes CPPM, using multiple stages of data collection to strengthen the investigation and particularly in a population with substantial cultural and linguistic diversity, with previous work being largely monocultural.^[3]

Pharmacists were recruited from a range of SWS and diverse communities. Women with T1D and T2D completed surveys, however they were from one hospital thus demographics may not be representative of all SWS patients. Broad pharmacist perspectives were obtained with pharmacists from across Australia interviewed with and without DCAPP experience. Pharmacists were female and had been practicing for <15 years however, which is not representative of the Australian pharmacist workforce. Qualitative research is not primarily focused on generalisability – this study demonstrates insight into our target population’s needs from multiple perspectives.

Conclusion

Women with T1D and T2D and pharmacists see an important role for pharmacists to be involved in CPPM as accessible community health providers imparting knowledge, distributing resources and referring to appropriate services. However, limitations to their role must be considered, and practical strategies to address barriers to their involvement in CPPM should be considered. Further CPPM training for pharmacists and involvement of pharmacists and women in designing program components and resources were seen as important for ongoing DCAPP implementation.

Supplementary Material

Supplementary data are available at *Journal of Pharmaceutical Health Services Research* online.

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Authors Contributions

The primary researcher K.G. designed survey materials, collected and analysed the data, and interpreted the data. This was done with supervision and guidance primarily from D.S. and F.M., with qualitative data analysis support provided by experienced qualitative researchers (F.M. and T.D.). All authors read and approved the final manuscript

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Conflict of Interest

None declared.

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