

Patient perception of pre-pregnancy care and family planning among reproductive-age female diabetes mellitus patients in a primary care clinic in Penang, Malaysia

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Abstract

Introduction: Pre-pregnancy care (PPC) is an important part of diabetic care among females in the reproductive age group, as it improves fetomaternal outcomes.

Objective: We aimed to assess female diabetic patients' perception of PPC and family planning prior to PPC care.

Method: This was an observational, cross-sectional survey performed from June 2019 to September 2019, using universal sampling of registered female diabetic patients who fit the inclusion criteria prior to integrated PPC care. A self-administered questionnaire was used to assess patients' perception of PPC.

Results: A total of 67 patients were recruited for the study. Only 39.4% (n=26) of the patients had heard of PPC. In our study, Code 1 contraception included those methods with a Pearl index of ≤ 9 . Code 2 & 3 contraception included those methods with a Pearl index of > 9 . Only one-third of patients, 29.9% (n=20), were using Code 1 contraception, although the majority, 79.1% (n=53), felt that they had completed their family. 45 patients (68.2%) felt that they were at risk of developing complications if they were to become pregnant, and 46 patients (69.7%) felt that their health condition was not suitable for another pregnancy. However, only 31.1% (n=14) and 34.8% (n=16) of these patients were using Code 1 contraception, respectively. There were 30 patients (65.2%) who perceived that their health was not suitable for another pregnancy but were only using Code 2 or 3 contraception.

Conclusion: The patients' perception of PPC was poor. Patients had an inadequate knowledge of the effectiveness of their current contraceptive practice in relation to their intentions for further pregnancy and their self-perceived risk in case of future conception. We suggest that integration of PPC into routine follow-ups for other high-risk medical diseases, such as hypertension, heart disease, and epilepsy, be considered in future practice.

Introduction

Preconception care (PPC) is an important interventional approach to improve pregnancy outcomes and the health of future children through identification and modification of biomedical, behavioral and social risk to the mother's health. Based on systemic review and metanalysis, PPC among female diabetic patients has been shown to improve outcome (e.g., to reduce the rates of congenital malformation and of preterm delivery).¹ In Malaysia, Diabetes Mellitus (DM) is one of the commonest medical conditions affecting pregnancy², and is associated with adverse fetal, infant, and maternal outcomes.^{3,4} A Malaysian study has shown that DM is increasingly prevalent among females (9.1%)², and that only 23.8% of diabetic patients achieve a treatment target

of HbA1c $< 6.5\%$.² Taking this into account, a significant number of female DM patients in the reproductive age group will conceive in unplanned, suboptimal conditions.^{5,6} Thus, good preconception care prior to conception, coupled with the provision of effective contraception during the optimization of glycemic control, is a very important part of diabetic care for females of reproductive age.^{3,4}

To achieve good PPC care in Malaysia, the Malaysian Ministry of Health (MOH) has created several initiatives, such as integrating PPC care in maternal and child health clinics (MCHs) and outpatient departments (OPDs), and aiming to coordinate patient care for high-risk patients between primary health care clinics and tertiary hospitals.^{7,8} The MOH also provides cheap, affordable and easily

available contraceptive services in their MCHs. Unfortunately, despite efforts to promote contraceptive use in Malaysia, use has remained stagnant for 25 years,⁹ and the use of effective contraception among high-risk female patient stalled at only 38-54%.⁷ These figures are very low compared to neighboring countries (e.g., Thailand, at 72%).^{7,9} Based on qualitative studies performed locally and abroad, it appears that the reasons behind the low contraception adoption levels are multifactorial, encompassing not only factors involving not only the patient (knowledge, attitude, practice and sociocultural background) but also the healthcare provider and healthcare system.¹⁰⁻¹²

In order to further integrate and improve PPC care in our local setting, we set out to explore female DM patients' perception of their own need for contraception in relation to PPC, and also to design a new protocol to improve PPC care plans among our DM female patients of reproductive age. We developed an integrated system to ensure the continuity of PPC care from postnatal (MCH) to DM (OPD) follow up. We hope that with this integrated PPC care, the data collected from this study will provide health care providers (HCPs) insight into female DM patients' practice and perception of family planning and PPC.

Material and methods

Ethical approval for conducting this study was obtained from the Medical Research and Ethics Committee, Malaysian Ministry of Health (NMRR-18-3488-45517 (IIR)).

Study design & objective:

This was an observational, cross-sectional survey conducted from June 2019 to September 2019 among female patients with Type 2 Diabetes Mellitus in the reproductive age group who attended Jalan Perak Health Clinic in Penang, Malaysia. The study aims to assess patients' perception of PPC and family planning prior to PPC care being given. Our specific objectives were to determine the prevalence of the types of contraceptive method used by patients; and to determine patients' self-perception of their pregnancy risk, the effectiveness of the current contraceptive methods used, and the risks from unplanned pregnancy versus the risks of side effects from using contraception.

Definition:

Code 1 contraception was defined as

contraception with a Pearl index of ≤ 9 (e.g., sterilization, intrauterine device (IUD), Implanon, oral contraceptive pills (OCP)). Code 2 contraception was defined as contraception with a Pearl index of 10-32 (e.g., male condom or cervical cap). Code 3 contraception was defined as contraception with a Pearl index of ≥ 25 (e.g., calendar-rhythm method, lactation amenorrhea method or withdrawal method).⁷ Code 1 contraceptive methods were categorized as effective contraception, while Code 2 & 3 contraceptive methods were classified as less effective contraception.

The reproductive age group in our study was defined as age 18 to 45 years old, as, based on our local clinic data, there has been no pregnancy at advanced maternal age--above 45 years--for the past 2 years (2017-2018).

"Not sexually active" in our study was defined as a patient who stated, during data collection, not having had any form of sexual intercourse for the past one year.

"Active follow-up" in our study meant that the patient was regularly seen under our follow-up for Diabetes Mellitus care for the past one year during the data collection.

Inclusion and exclusion criteria:

The inclusion criteria included: all females with Diabetes Mellitus in the reproductive age group who were actively followed up in the clinic, based on the database we created.

The exclusion criteria excluded patients who: were not sexually active, had previously been sterilized, were menopausal, were not in active follow-up, or were unable to understand the questionnaire for any reason (e.g., mental retardation).

Sample size:

Using a universal sampling method, a total of 127 female DM patients who fit the inclusion criteria were identified during our study period. 50 patients were excluded based on the exclusion criteria. A total of 77 patients who fit our inclusion criteria were approached, of whom 71 consented to take part in the study. In our final analysis, 4 further cases were excluded in the final stage of data analysis due to missing data in the questionnaire (patients were not called back for completion of the questionnaire, as

their answers would have been biased after PPC counseling had been given). Thus, our final data set consisted of 67 patients.

Sampling method:

Prior to the study, a complete registration and database system for our diabetic patients was created, using Excel and bar-code identification. A universal sampling method was used. A PPC data collection sheet and a self-administered survey questionnaire were pre-inserted into the selected patients' DM record books, based on the data base. This was to help remind the healthcare providers (HCPs) to initiate PPC for those who were sexually active, regardless of their marital status. They were to be tagged, and continuous PPC to be provided in subsequent visits during their DM follow-ups.

Relevant information was collected by the treating doctor, using the Data Collection Sheet, after consent was obtained during the patients' routine DM follow-up sessions from 01/06/2019 to 30/9/2019. After data collection, PPC counseling was given to patients in the same clinic setting by the treating doctor. A one-hour presentation on how to counsel for PPC was given to all of our HCPs, prior to the initiation of our integrated PPC system, to ensure competency in managing this group of patients. Cases that need further attention will be referred to Family Medicine Specialists (FMS), as they play an important role in improving collaboration and the integration of PPC in primary care as well as with tertiary hospitals.

Questionnaire development:

A self-administered survey questionnaire (available in three languages: English, Malay, and Mandarin) was used. It required about 10 minutes to complete. The questionnaire included 4 domains:

- i) the patient's perception of pre-pregnancy care (8 questions, items 1 to 8);
- ii) the patient's sociodemographic background;
- iii) the patient's marital status and the family planning method(s) used;
- iv) the patient's medical data. The information

for sociodemographic background, marital status, family planning and medical data were taken from the patients' diabetes follow-up records and their PPC form.

To assess patients' perceptions, patients were required to answer "Yes," "No," or "Unsure" for each item. Answering "Yes" would mean a positive perception in all items except Item 3, in which a "No" answer was deemed a positive perception.

The questionnaire had face and content validation performed by one senior Family Medicine Specialist (FMS). Back-to-back translation was performed by two translators who were fluent in the 3 languages used in the questionnaire. A pilot test was performed with 12 patients (4 patients per language). The questionnaire was then finalized, with changes to make the sentences more understandable in laymen's terms. Reliability testing for perception of the questionnaire (Items 1 to 8) was performed, and the Cronbach alpha was 0.62.

Data analysis:

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS), Version 23. Descriptive analysis was used for variable analysis. Categorical data was described as frequency and percentage, while numerical data was described as median and interquartile range (IQR), as they were found to be non-normally distributed. The section on perception was analyzed descriptively, as validation was deemed inadequate.

Results

The demographic characteristics of patients are presented in **Table 1**. The patients' median age was 42 years old (IQR: 37-44) and their median HbA1C was 7.5% (IQR: 6.55-9.40). About half were Malay (55.2%), 26.9% were Chinese, 13.4% were Indian and 4.5% were of other races. The majority were married (98.5%), while 1.5% were single. Almost all the patients (91%, n=61) had DM-related complications or other comorbidities.

Table 1. Patient demographic data (total n=67)

Variables	Median (IQR)*	n (%)
Age (years)	42	(37-44)
Last Childbirth (years)	8	(0.79-14)
HbA1c (%)	7.5	(6.55-9.40)
Race		
Malay		37 (55.2)
Chinese		18 (26.9)
Indian		9 (13.4)
Other		3 (4.5)
Religion		
Muslim		38 (56.7)
Buddhist		17 (25.4)
Hindu		9 (13.4)
Christian		2 (3.0)
Others		1 (1.5)
Marital status		
Single		1 (1.5)
Married		66 (98.5)
Contraception method		
Code 1 contraception		20 (29.9)
Code 2 contraception		20 (29.9)
Code 3 contraception		27 (40.3)
Completed family?		
Yes		53 (79.1)
No		14 (20.9)
Diabetic status		
Diabetic		6 (9.0)
Diabetic with comorbidities		54 (80.6)
Diabetic with TOD/TOC**		7 (10.4)
Education		
Primary School		11 (16.4)
High School		45 (67.2)
Tertiary education		11 (16.4)

*IQR = interquartile range, **TOD/TOC = target organ damage / target organ complications

Patients' knowledge and perception of PPC and family planning are presented in **Table 2**. It was noted that patients' knowledge of PPC was poor. Only 38.8% (n=26) of the patients had heard of PPC.

Table 2: Patients' knowledge and perception of PPC and family planning (total n=67)

Item	Answer		
	No,n (%)	Unsure,n (%)	Yes,n (%)
1. Have you heard of pre-pregnancy care service?	30 (44.8)	11 (16.4)	26 (38.8)
2. Have you heard of family planning?	14 (20.9)	5 (7.5)	48 (71.6)
3. Do you think your current health condition is suitable for next pregnancy?	46 (68.7)	20 (29.9)	1 (1.5)
4. Do you think planned pregnancy have a better outcome for mother and baby?	10 (14.9)	14 (20.9)	43 (64.2)
5. If you are pregnant, do you think you are at risk of developing complication during pregnancy?	6 (9.0)	15 (22.4)	46 (68.7)
6. Do you think the current contraception method you are using is efficient in preventing pregnancy?	10 (14.9)	18 (26.9)	39 (58.2)
7. Do you think that, in patients with medical illness, the risk of using hormonal (eg. contraceptive pill, implanon) /mechanical (eg. condom, IUCD) contraception is lower than the risk of unplanned pregnancy ?	10 (14.9)	32 (47.8)	25 (37.3)
8. Do you think that hormonal or mechanical method of contraception is more effective in family planning compare to natural method (eg. withdrawal, menstrual calendar)?	11 (16.4)	36 (53.7)	20 (29.9)

Further analysis of the data revealed a discrepancy regarding the effectiveness of the current contraceptive methods being practiced by patients, in relation to their intentions regarding further pregnancy. Among the 53 patients who felt that they had completed their family, only a third (34%, n=18) of the patients were using Code 1 contraception (Table 3). Further examination of those who thought that their current method of contraception was effective (n= 39) revealed that only 46.2% (n=18) were using Code 1 contraception (Table 3). Less than a third of the patients (29.9 %, n=20) thought that Codes 1 and 2 contraceptive methods were more effective in family planning, compared to Code 3 contraceptive methods (Table 2, Item 8).

There was also a worrying discrepancy between the contraceptive practices being used by patients, in relation to patients' self-perceived risk regarding, or suitability for, conception and pregnancy. Among the 67 patients, about two-thirds (68.7%) felt that they were not medically healthy enough for pregnancy (Table 2). However, of those who thought that they would be at risk of developing complications during pregnancy and those who thought their health condition was unsuitable for another pregnancy, only 30.4% (n=14) and 34.8% (n=16) of the patients, respectively, were using Code 1 contraception (Table 3).

Table 3: Patient knowledge of contraception and their contraceptive practices

	Code 1	Code 2 or Code 3
Has completed family (n = 53)	18 (34%)	35 (66%)
Thinks current contraception is effective (n=39)	18 (46.2%)	21 (53.8%)
Thinks self not medically suitable for pregnancy (n=46)	16 (34.8%)	30 (65.2%)
Thinks self at risk of developing complications during pregnancy (n= 46)	14 (30.4%)	32 (69.6%)

Our study showed that there was a knowledge gap in patients' perceived effectiveness of their current contraception, in relation to their perceived risk of their own suitability for conception (Table 4). Of the 32 patients who perceived that they were at risk of developing complications during pregnancy, but were only using Code 2 or Code 3 contraception, 14 patients (43.8%) were of the opinion that their current contraception were effective, 6 patients (18.7%) thought that their current contraception was ineffective, and 12 patients (37.5%) were unsure of the effectiveness of their contraceptive methods. Almost the same finding was noted for the 30 patients who perceived their health as being unsuitable for another pregnancy but were only using Code 2 or Code 3 contraception. Almost half

of these (53.3%, n=16) thought that their current contraception method was effective, and only 20% (n= 6) felt their contraception method was not effective, while 26.7 % (n=8) were unsure of the effectiveness of their contraceptive methods.

Table 4. Patients' perception of their own health risk and of the effectiveness of their contraceptive practice

	Perceives current contraception method used to be effective	Unsure of the effectiveness of current contraception method used	Perceives current contraception method used not to be effective
Patient perceived that they were at risk of developing complications during pregnancy, but was only using Code 2 or 3 contraception (n=32)	14 (43.8%)	12 (37.5%)	6 (18.7%)
Patient perceived that health was not suitable for another pregnancy, but was only using Code 2 or 3 contraception (n=30)	16 (53.3%)	8 (26.7%)	6 (20%)

Discussion

Our study shows that most patients were aware of family planning, but had not known about PPC services. This could be because most of our patients had already completed their family (mean age 42 years, LCB 8 years) and were using some form of contraception for family planning, and hence were no longer interested in pre-pregnancy care services. The result was low compared to another study performed locally,¹³ where awareness of PPC was much higher at 82%. It was noted that the patient population in that study had a mean age of 32 years, which falls into a group that is more likely to bear further children and ergo need PPC services. Therefore, health care providers (HCPs) should be aware of patients' specific reproductive needs when engaging patients about the necessity of PPC.^{12,14}

We also noted that there was also an incorrect perception of the effectiveness of patients' current contraceptive practices in relation to the patients' intentions for further pregnancy and their self-perceived risk for future conception. This was similar to other findings from studies performed locally and abroad.¹³⁻¹⁶ Due to limitations in our questionnaire, multivariate analysis was not carried out in our study; however, review of other studies performed locally showed that more positive perception, greater knowledge and higher education level are associated with a greater chance of patients using PPC care services.¹³ Thus, poor perception coupled with

poor knowledge is likely to lead to a higher chance of patients having unplanned, high-risk pregnancies and lower PPC use, and should be addressed during PPC care.

Our study also showed a gap in perceived effectiveness of current contraception practice relative to the contraceptive methods that patients were actually using. We found that some patients assumed the contraceptive methods they were using (Codes 2 and 3) were effective in preventing pregnancy, when, in fact, they should consider using more effective Code 1 contraception. We also found that about 70% of patients perceived Code 1 contraception as not being better than Code 2 or 3 contraceptive methods. 62.7% of patients also deemed that the risks of unplanned pregnancy were lower than the risks of side effects from using Code 1 contraception. Such gaps in perception have not been previously elicited in other studies, and shed some light on the reasons behind poor PPC uptake and, perhaps, the high prevalence of unplanned pregnancy in our country.^{7,9}

In terms of managing high-risk patients, a qualitative study by Forde et al (2016) showed that HCPs and health care systems (HCSs) also play important roles in the utility of PPC in the primary-care setting (10). HCPs and HCSs should facilitate an integrated PPC in their routine DM care, in order to improve health outcomes for their female DM patients. We suggest creating a complete database of actively followed-up DM patients, and targeting all

female DM patients of reproductive age for further explanation and planning regarding PPC.

The limitations in our study were that it was single-centered, with an older-age-group population, and we explored only a single disease (DM). Thus, our study may not be fully representative of the general population. Our questionnaire did not achieve good validation and we were unable to proceed further with multivariate analysis. Despite these limitations, our study highlighted areas of gaps in perception among patients. This may help HCPs to understand what to focus on during management of such patients, and could be the focus for future research on this topic. In term of management, a similar strategy could be used to create a database for other high-risk medical diseases such as hypertension, heart disease, epilepsy and others, where PPC can be integrated during follow-up for the medical condition in the primary-care setting. We believe that this should be considered in future practice.

Conclusion

In this study, we observed that the perception of PPC and knowledge regarding effective contraception were both poor among the women in our local setting. In order to improve PPC uptake and knowledge among female DM patients, we suggest that good integrated PPC care should encompass not only patient

education, but also healthcare provider education and healthcare system change as well. We also suggest that integration of PPC into routine follow-up care for other high-risk medical diseases, such as hypertension, heart disease, epilepsy, and others, be considered in future practice.

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Declaration of Interest

The authors declared no conflict of interest in this study.

Contribution to authorship

SNL and TWS designed the study and analyzed the data. SNL and EWS collected the data. SNL, TWS, EWS and RPP were involved in the write-up, and read and approved the final manuscript prior to submission.

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How does this paper make a difference to general practice?

- Improves understanding of patients' perception of pre-pregnancy care (PPC) in the local population
- Will assist in targeting and improving PPC counseling in general practice
- Suggests specific ways to improve PPC services in general practice
- Suggest a system to integrate PPC care into existing DM follow-ups

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