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The relations between contraceptive use and GDM: A comparative study

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ABSTRACT

Background: Contraceptive effectiveness and safety have been questioned for decades. However, it is uncertain if hormonal contraceptives and (GDM) are linked.

Aims of the study: The study aimed to find out the relationships between the types of contraceptives used before pregnancy and GDM attended Sulaimani City Gestational Diabetes Mellitus Center.

Design of the study: This is a prospective comparative study.

Material and Methods: Direct interviews with study participants were used to obtain data. After gaining agreement, the researcher administered questionnaires to 602 pregnant women. This study enrolled 602 pregnant women, 300 pregnant women were enrolled in GDM groups and 302 for no -GDM, with a gestational age of 24–28weeks and a maternal age of 18 years or more who used hormonal contraception, including the tablet, intrauterine devices (IUD), contraceptive patches, cervical rings, and injections (administered monthly or every 3 months). Pregnant women below 18 years, with a history of taking drugs that affect glucose metabolisms such as corticosteroids, progesterone, and beta-agonists, and not using contraceptive methods were excluded from our study. The data were obtained via convenience sampling and a specialized questionnaire separated into three sections, including demographic techniques, obstetrics, and family planning from February 1, 2022, to May 15, 2022. The data was analyzed using SPSS version 21. The P-value and Chi-Square tests were performed to see if the variables have a significant association. Significant values are those that are less than 0.05.

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Results: According to the findings, 78.5-% of GDM respondents and 66.0-% of non-GDM respondents used hormonal contraception. This study discovered that there was a significant variation between the two groups with age, instruction levels, BMI, equality, contraceptive type, and term of contraception since the p-value was less than 0.0-5. Nevertheless, there were no changes to either residency or employment.

Conclusion: The findings imply a link between GDM and the contraceptive technique used. To affirm contraception as a conceivable chance calculation for GDM, more consideration is needed.

Keywords: *Contraceptive, gestational diabetes mellitus, comparative study*

INTRODUCTION

There are concerns about the potential connection between hormonal contraception and a number of chronic diseases, such as breast cancer, cardiovascular disease, and metabolic dysfunction. Nevertheless, nothing is clear about how using hormonal contraceptives affects the emergence of (GDM). Although research has found an association between oral hormonal contraceptive use with increased blood glucose, insulin, and changes in lipid profile,1,2 much of the research on the consequences throughout the time of birth control and the raised hazard of GD remains inconclusive.

Studies of the impacts of barrier methods on the metabolism of ladies have recognized that females who practice hormonal family planning have an expanded chance of having diabetes. Sugar levels are higher in these hormonal contraceptives users than in women who use non-hormonal contraceptives.3 Even so, no researchers have examined the impact of hormonal contraception use earlier than pregnancy on GDM hazard.

Diabetes during pregnancy is frequently diagnosed during 24–28 weeks of pregnancy and is defined as the absence of prior diabetes (category 1 or Category 2) and elevated glucose levels in the blood.4 Ignoring GDM can lead to big babies (Macrosomia), which can produce issues throughout delivery and force the mother to go for cesarean delivery.

There are lots of possible side effects from pregnancy, including preeclampsia, hypoglycemia, and jaundice in the newborn. This also increases the risk of developing type 2 diabetes in the mother and the baby later on.5

In spite of the fact that the recurrence of GDM has developed within the Joined together States since the late 1980s and has more than multiplied since 1990, it is anticipated to influence 2%-to 10% of all.6 As a result, it is basic to recognize and comprehend GDM chance factors in arrange to customize GDM anticipation and mediation techniques legitimately.

As a result, the objective of this study is to decide whether there is an interface between prophylactic utilization and the event of GDM. A noteworthy hazard of GDM related to prophylactic utilization might influence the by and large risk–benefit proportion, inciting doctors to endorse more secure strategies. Any abundant chance related to the utilization of any sort of contraceptive warrants measurement within the setting of comparative ponders and the legitimate arrangement for clinical choices. Our objective was to see the event that in women who took hormonal contraceptives recently, there was an increased chance that a woman's pregnancy would result in (GDM) if other factors were taken into account.

PATIENTS AND METHODS:

Design

A prospective comparative study was done to decide the relationship between contraceptive uses and GDM at Sulaimani City Gestational Diabetes Mellitus Center from February 1, 2022, to May 15, 2022.

Study sample

Non-probability 602 pregnant women throughout the research period were chosen using convenient sampling.

Data collection

Direct interviews with the participants were utilized to get information. The study's objective was clarified to each of the participants. After picking up the assertion, the analyst conveyed surveys to people utilizing comfort testing. A survey was organized for this reason after an intensive examination of the writing and taking after the study's objectives. This study enlisted 300 pregnant women with a gestational age of 24–28 weeks and a maternal age of 18 years. Participants who used hormonal contraception, such as the pill, infusions (every month or every three months), prophylactic patches, cervical rings, and intrauterine gadgets (IUD) were included in this study. Pregnant ladies under 18 years, with a history of taking drugs that influence glucose digestion systems such as corticosteroids, progesterone, and beta-agonists, and not utilizing prophylactic strategies were prohibited from our study, About 302 pregnant ladies were enlisted in the non-GDM group. Women within the study group were classified as GDM if they had hyperglycemia (diabetes) that started amid their current pregnancy and also used contraceptive hormones. On the other hand, the ladies within the control group were taking hormonal contraceptives and had no GDM.

The analyst conducted a coordinated meeting with all the cases; the survey was completed the same day. The survey incorporated the following: (1). Statistic information: age, home, instruction, and occupation; (2) obstetric, and (3), family–planning methods: sorts of contraceptives and for how long contraceptives were used.

A board of specialists assessed the legitimacy, and the unwavering quality of the substance was measured utilizing the relationship coefficient r88.4. (statistically sufficient).

Ethical considerations

The College of Nursing and Sciences at Sulaimani College's Scientific and Ethics Committee approved the study. Before the data collection, formal approvals from the government and health experts were obtained. The study sample also provided its informed consent prior to the information being gathered.

Data analysis

The data was analyzed using SPSS version 21 to see if there was a relationship between the variables. If there was a significant relationship, the P-value and chi-square test were used to determine if it was strong. If the relationship was found to be significant, it means that there is a significant difference between the groups studied.

RESULTS

There are 600 women in the study. Three hundred of them have GDM, and the other 302 women do not have GDM. Most of the people in the study were between the ages of 25 and 35. According to the baseline characteristics of the participants, most of the respondents in both groups had a university degree or higher and resided in the city. More than half of the participants in GDM groups were housewives, compared to almost half of the participants in the non-GDM group who were employed.

The study found that there was a connection between the case group and the control group in terms of socio-demographic factors. This was determined to be statistically significant by the calculated chi-square value.

It also discovered that there were a lot of differences between the two groups, based on factors like age, education level, and weight. No significant correlation was found between the occupation and type of residence in Table 1 because the P-value was higher than 0.05.

TABLE 1: The socio-demographic characteristics association between the GDM and the non-GDM

Variables	GDM		Non-GDM		Total	Significance test
	No.	%	No.	%		
Age (Years)						
< 25	54	18.0	90	29.8	144	χ^2 = 35.321
25–35	145	48.3	170	56.3	315	P= 0.000
More than 35	101	33.7	42	13.9	143	
Mean ± S.D	31.5~32 ± 6.6		28.58~29 ± 6.19			
Level of education						
Illiterate	19	6.3	6	2.0	25	$\chi^2 = 61.19$
Primary	60	20.0	11	3.6	71	P = 0.000
Secondary	78	26.0	60	19.9	138	
University and above	143	47.7	225	74.5	368	
Occupation						
Housewife	173	57.7	148	49.0	321	$\chi^2 = 4.705$
Employed	126	42.0	152	50.3	278	P = 0.095
Retired	1	0.3	2	0.7	3	
Residence						
Urban	248	82.7	264	87.4	512	$\chi^2 = 3.76$
Sub-urban	37	12.3	23	7.6	60	P = 0.153
Rural	15	5.0	15	5.0	30	
BMI						
Underweight	3	1.0	9	3.0	12	$\chi^2 = 68.936$
Normal Weight	67	22.3	126	41.7	193	P = 0.0000
Overweight	106	35.3	129	42.7	235	
Obese	124	41.3	38	12.6	162	
Mean ± S.D	28.55~29 ± 5.17		25.16~25 ± 4.07			
Total	300	100	302	100	602	

GDM, gestational diabetes mellitus; BMI, body mass index.

TABLE 2: Association between the case and the Control group in relation to the reproductive history

Variables	GDM		Non-GDM		Total	Significance test
	No.	%	No.	%		
Parity						
Nulliparous	27	9.0	89	29.4	116	$\chi^2 = 57.195$
Primipara	81	27.0	102	33.8	183	P = 0.000
Multipara	192	64.0	111	36.8	303	

GDM, gestational diabetes mellitus.

Both groups, with 64% in GDM groups and 36.8% in non-GDM groups, had high percentages of participants with multipara, as shown in Table 2. The information in this table also demonstrates a reproductive history connection between the GDM and non-GDM groups. The level of significance was lesser than the usual alpha of 0.05, which indicates that there was a statistically significant change in terms of parity in Table 3.

TABLE 3: Association between the case and the control group in relation to family planning.

Variables	GDM		Non-GDM		Total	Significance test
	No.	%	No.	%		
Types of contraceptive						
Pills	237	78.5	198	66.0	435	$\chi^2 = 25.034$
IUCD	62	20.7	57	18.9	119	P = 0.000
Injection	40	13.3	8	2.6	48	
Duration						
6 Month—1 year	82	27.3	149	49.3	231	$\chi^2 = 32.526$
1—3 years	75	25.0	63	20.9	138	P = 0.000
More than 3 years	143	47.7	90	29.8	233	

GDM, gestational diabetes mellitus.

As can be seen in Table (3), both groups of respondents most frequently used pills, which accounted for 78.5% of all respondents in the case group and 66.% of the entire sample in the control group. Then, in terms of duration, almost half of those in the GDM groups used contraception for more than 3 years, compared to 6 months to a year for those in non-GDM groups. In addition, there is a connection between family planning and GDM and non-GDM groups. There was a statistically significant association between the type of contraceptive used and the duration of contraceptive usage because the P-value was lower than the typical alpha 0.05.

Tables (4.1 and 4.2) use correlation matrix analysis and principal component analysis (PCA) among risk factors. According to the analysis, the following four of the seven items were dropped.

The first principal component has a variance value of (38.375%) and is made up of 4 danger issues: the BMI risk factor with a charging value of (0.774), the parity risk factor with a loading value of (0.592), the type of contraceptive with a loading value of (0.567), and the duration factor with a loading value of (0.742)

The second most frequent risk factor that affects (GDM) occupies a variance value of 16.568% of the entire cumulative variance (54.944%). Additionally, it has two risk factors: an age risk factor with a loading value of (0.552), a hazard issue for education with a loading value of (0.782), a risk factor for occupation with a loading value of (0.668), and a risk factor for residence with a loading value of (0.773).

TABLE 4: The variances and total variance of some variables of GDM.

Table (4.1) Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.070	38.375	38.375	3.070	38.375	38.375	2.234	27.919	27.919
2	1.325	16.568	54.944	1.325	16.568	54.944	2.162	27.025	54.944
3	0.892	11.156	66.100						
4	0.807	10.085	76.185						
5	0.567	7.087	83.272						
6	0.496	6.205	89.477						
7	0.475	5.942	95.419						
	0.366	4.581	100.000						

Extraction Method: Principal Component Analysis.

Table(4.2) Rotated component matrix

	Component	
	1	2
Age	0.524	0.552
Education	–0.242	–-0.782
Occupation	–0.266	–-0.668
Residence	–0.234	0.773
BMI	0.744	0.228
Parity	0.592	0.341
Type of contraceptive	0.567	–-0.130
for how long	0.742	0.133

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

DISCUSSION

This study's aim was to examine the relationship between GDM and hormonal contraceptives, and the results suggested that there might be a connection between hormonal contraception and GDM. Therefore, early detection of GDM is essential to helping women choose the best form of contraception to prevent GDM. Additionally, Atiya K. Mohammed's investigation into the relationship between age and contraceptive use in 2022 found that older mothers are less likely to use contraceptives than younger mothers.7

Maternal age (25–35) is recognized as a potential factor for GDM in this study, and the disagreement may be caused by participant age differences (31.5 vs. 28.58 years).

In addition, women over the age of 35 had a 145% higher probability of —diabetes during pregnancy, conferring to our research. This finding suggests that the occurrence of GDM rises with maternal age and that stage may be a contributing factor in the high frequency of GDM. Our results corroborated earlier studies by showing that gravidity is healthier prior to the age of 35 and that GDM screening procedures for pregnant women over the age of 35 need to be improved. Our results are comparable to those from Chinese studies.8,9

Our results demonstrate a strong association between education and GDM in both groups of highly educated women, regardless of their educational background. While other studies, including one by,10 revealed no connection between the prevalence of GDM and the level of education.

However, prior research,11–13 and (Janghorbani M, Stenhouse EA, Jones RB, 2006) have shown that women with less education are more likely to have GDM than women with higher education. At least some of the discrepancies may be explained by using different educational standards, sample sizes, and other aspects of study design. Additionally, our results are comparable to those of those who discovered how education affected GDM recurrence.9

In our study, there was no association between place of residence and occupation and GDM, but most of the participants lived in cities because our data were from urban areas. Our findings contradict those of,14 who came to the conclusion that many cities don't have the same healthy living options as rural areas do and that the urban population is significantly more obese and physically inactive, and diabetes is more likely if someone has a family history of it. Being overweight and obese are important modifiable risk factors for GDM.

There was a most important relationship between BMI and GDM in our study, with a greater percentage of GDM participants being obese, compared to almost half of non-GDM responders. Many women view increasing weight as an adverse impact of hormonal contraception and it is frequently mentioned to avoid or stop using contraception. In recent research, there was a very strong association between BMI and GDM, with a higher proportion of GDM participants being obese compared to almost half of non-GDM responders. Weight gain is frequently cited as a reason for avoiding or ceasing hormonal contraception by women because they see it as a concerning side effect of the method. Given that GDM is related to a developed BMI, women who have a history of the condition should be especially concerned about weight gain and postpartum weight loss.

Our study is consistent with those of a 2009 study15 which discovered a statistically significant correlation between BMI and the most popular forms of contraception. Both our research and other researchers support this consensus, recommending that intercession programs should proceed to target these demographic groups.

Between parity and GDM, both groups had a sizable proportion of multipara people. For a long time, researchers looked into the relationship between diabetes risk and parity, but the findings were mixed. Some experts contend that other factors like obesity or demographic traits may confuse or mediate the association between diabetes and parity incidence that has been shown in some studies.16 The results were consistent with a prior study17 that appeared equality, especially terrific multiparty (five or more live births), had a positive relationship with diabetes frequency.

A meta-analysis of prospective studies on this subject found that each baby had a 9% raised hazard of Type 2 DM.18 According to a different meta-analysis, the risk rose by 6% for every additional birth.19 Furthermore, in both met analyses, people with higher equality (at slightest 4 living births) had a 40% higher hazard of occurrence of Type 2 DM than those with lower equality.

The study was in line with another study that discovered a positive correlation between the incidence of diabetes and equality, mainly grand multiparty (five or more live births).17 Another study, however, contradicted our findings, finding no link between parity and an elevated risk of diabetes.20

Our results show that both groups' GDM was positively impacted by hormonal contraception before pregnancy. In both groups, the vast majority of participants used pills first, followed by an intrauterine device, and a much smaller proportion used injectable contraception.

There were no studies on the impacts of hormonal contraception practice prior to pregnancy on the danger of GDM in Kurdistan. Women who used hormonal birth control had an increased danger of Type 2 diabetes than women who utilized non-hormonal contraception, concurring to consider the impact of contraception on the digestion systems of ladies who had already been analyzed with GDM.21,22 Researchers looked into the utilization of hormonal and non-hormonal contraceptives by diabetic ladies and found that high-dose oral contraceptives were negative for glucose homeostasis. Diab and Zaki, who discovered that people who used hormonal and oral contraceptives that were injected every three months had higher fasting blood glucose levels, made similar findings.23

Another finding from our study was that while non-GDM groups only used contraception for six months to a year, GDM groups used hormonal contraception for more than three years. The likelihood of developing GDM and the type of contraception used prior to conception are being compared for the first time in this study. According to numerous studies, the hypothalamus-pituitary axis, cortisol, and glucose metabolism are just a few of the homeostatic systems that hormonal contraception has been found to have the potential to interfere. Burke proposed that cortisol homeostasis at the level of the hypothalamus was disturbed because chronic high-dose estrogen treatment was related to higher unbound cortisol stages.24 If left untreated, higher cortisol levels can lead to diabetes and other conditions like insulin resistance and glucose intolerance.25

The diversity of our study's participants and the high proportion of women who were asked questions are its other strong points. Additionally, we examined a range of ages, which could be regarded as an important issue to investigate. Access to publications and articles is restricted due to global challenges, even though survey researchers are typically restricted to using only one instrument to collect data.

CONCLUSION

The main finding of the study was a strong correlation between the use of hormonal birth control and an elevated hazard of GDM. The two groups also differed significantly in terms of age, education, BMI, parity, and the types and duration of contraception, but there were no differences in residence or employment. Because GDM is becoming more and more common throughout the world, thorough screening and preventative measures are required to avoid long-term complications. Our data indicate that there might be an underlying mechanism, even though there has not been any direct correlation between hormonal contraception and GDM demonstrated. To determine whether hormonal contraception poses a risk for GDM, more investigation is essential.

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CONFLICT OF INTEREST

None declared.

ETHICAL APPROVAL

The study received approval from the institutional ethics committee.

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