

PROSPECTIVE STUDY WITH OUTCOME ON GESTATIONAL DIABETES MELLITUS

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ABSTRACT: BACKGROUND: In India; the high rate of infant and maternal mortality, may be attributable to rising trend of GDM across Pregnant women. Therefore the study of management of GDM by existing health facilities and Community camps in government and private sector becomes crucial for managing such cases. The present study by prospective evaluation method sought to find out the management of GDM for implementing GDM screening in Kanpur.

METHODS: A prospective evaluation based study was done from October, 2012 to September, 2014 at 198 healthcare facilities and 454 screening camps in Kanpur Nagar on 57,018 pregnant women, who were screened between 24th- 28th weeks of pregnancy as per DIPSI & FOGSI guidelines.

RESULTS: The total pregnant women who were Diagnosed as GDM were 7641 (13.4%) and this prevalence of GDM was more in urban area(16%) as compared to rural area(9.8%). The health facilities in combined more were more efficient in diagnosing GDM(86%) as compared to Community camps(14%)($p < 0.0001$), but facilities were least interested in follow-up of Blood glucose Monitoring and further counselling (10%). In public health facilities however-21% Pregnant women attending OPD were under gone OGTT as compared to 7% in Private health facilities and they tested OGTT more than the private health facilities.

CONCLUSION: Public health system role in management of GDM is more significant as compared to Community level camps. There are potential benefits of actively involving Public health facilities in GDM Management among pregnant women, which needs to be taken care by Government on priority basis.

KEYWORDS: Pregnancy; Gestational Diabetes Mellitus, Health Facility, Management.

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INTRODUCTION: Gestational diabetes mellitus (GDM) is defined by American Diabetes Association(ADA) as glucose intolerance which begins and gets first detected during pregnancy.^[1-4] Even in Developed country such as USA- Gestational diabetes mellitus (GDM) is found to affect around 7% of all pregnancies and its detection is consequently important because of its associated higher risk of maternal and fetal complications as found in many recent studies.^[4,5]

It has recently been hypothesized that prevalence of Diabetes across the Globe can increase by 114%, out of which India will be a significant contributor in terms of 150% increase in next 20 years.^[6] The prevalence of Impaired Glucose Tolerance (IGT) in Indian Population in the age group of 20-29 years and 30-39 years has recently been found to be 12.2% and 15.3% respectively.^[6] and not only there is a large pool of subjects with impaired glucose tolerance at a high risk of conversion to diabetes in India.^[7] but it is also expected that there would be 77.2 million people with pre-diabetes.^[8] The Irony in Indian Scenario is that-the prevalence of GDM

in Indian context is quite closer to the prevalence rate of Impaired Glucose Tolerance(IGT) in our population. The study by Jain R et al (2014) on Indian Pregnant women had also found the significant prevalence of GDM in India as similar to IGT Prevalence in India.e 13.4%.^[6]

State Uttar Pradesh, which is not only largest in India, but it also has very high maternal mortality rate of 359 per lakh as compared to a Indian average of 212 and here the Infant Mortality rate here is also very high-53 as compared to a national average of 42.^[7,8] The reason for this might be due to the fact that-Uttar Pradesh with the largest population of 230 million and where 5.1 million women gets pregnant every year, many factors such as : lack of inadequate human resource, weak infrastructure in health system and under utilized money allotted under NRHM, aggravated further by lack of technical expertise resource personnel and trained health care professionals are existing. It has been found that nearly 67% deliveries are Institutional in Uttar Pradesh[2010(RHS)-SRS].^[9] out them 80% take place in public health facilities,therefor it is very essential to target Screening in Public health system and build capacity there in for detection and management of GDM.

It has been found that a number of barriers exist within the health system for which the Programmes need to overcome them in order to improve GDM care in Lower Middle Income Countries such as India.^[10] Study in Sweden also indicate that proper implementation of programmes for following up of women with GDM postpartum for early

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detection of diabetes and effective management can give fruitful results, as GDM is found to be associated with higher healthcare utilization postpartum for women.^[11] It has also come to the notice that Women with prior GDM who develop IGT are an identified high-risk group, already linked to the health care system, therefore the role of health system in follow up of GDM cases becomes very important.^[12]

Moreover an appropriate management of GDM can also provide an opportunity to improve both maternal and perinatal outcomes.^[6,13] So, it has now become important to undertake studies where health facilities and screening camps role for GDM services are elucidated in a proper way. Therefore it becomes essential to know the impact of the services of health facilities and community camps in reducing the prevalence of GDM in a state of Uttar Pradesh by way of a critical analysis approach. Hence this study was done as a part of of the Gestational Diabetes Prevention Control Project by the Jain Medical Centre Kanpur—with financial support from Ministry of health and family welfare, Government of India. Moreover this study is unique in its own kind in terms of health screening of such a large population base of Pregnant Women in India at both health facilities and community camps for GDM—as literature reveals only small sample size studies.

MATERIAL & METHODS: Institutional Ethics Board

Approval: The study was approved by Ministry of Health and family welfare as a Gestational Diabetes Prevention and Control Project (Project No: WDF12-678) and Jain Medical Centre, Kanpur.

Informed consent of Participants: This form was filled up not only from all Pregnant women for participation in this project, but also got approval from CMO- Kanpur as well as all private health facilities who gave their consent for participation in this study.

Research Question: What is the Impact of health facilities services and Screening Camps in reducing adverse outcome of pregnancy from GDM.

Study Objective: The present study sought to find out the management of GDM in health care facilities and screening camps by prospective evaluation method in the Government health care & Private health care system for implementing GDM screening in Kanpur.

Study Design: A prospective evaluation based study was done from September, 2012 to October, 2014 at 198 healthcare facilities & 454 Community Camps in Kanpur Nagar—both from Government and Private Sector in antenatal mothers' where 57,108 pregnant women were screened in their 24th to 28th weeks of pregnancy by impaired oral glucose test.

Methodology: In Kanpur Nagar with a Population of 5 million covering rural and urban areas, this study was done as part of a GDM Project. This GDM Project imparted technical knowledge and skills in the Government Public health care system & Private sector for developing capacity & technical

manpower for implementing GDM screening in Kanpur. A total of 57,018 Pregnant women were screened for GDM, Diagnosing around assuming (10% prevalence) GDM so, 57180 GDM women in Urban, Periurban and rural were further screened. These 5718 Pregnant women were Screened for GDM in Govt. PHC/CHC/Urban health center/Dist Hospital, Private health facilities to be routine part of ANC at 24-28 Weeks of gestation. An estimated 5718 women with GDM were treated and taught how to prevent subsequent type 2 diabetes for themselves as well as their families. 3000 women at risk of GDM were also taught on how to prevent subsequent diabetes for themselves as well as their families. An estimated 3000 health care Professionals, including doctors, nurses, Paramedics, dieticians and extension educators were also trained directly or indirectly on symptoms, treatment and preventive/control measures/Management of GDM. For measurement of GDM—Accu check Glucometer from Roche was used and 75gm Glucose Packets were distributed along with Glucometers and strips, lancets, glass, spoon etc to all 198 Reporting health facilities & 454 Community camps.

Inclusion criteria: All the Pregnant women in 24-28 wks of Gestation were taken and they were undergone 2 hr 75 gm post plasma glucose Test (OGTT) using Accucheck Performa (convert to Plasma Value) under non-fasting state and those have blood sugar ≥ 140 mg/dl (OGTT) were diagnosed as GDM as Per DIPSI Criteria*, which served both as screening and diagnostic test besides being a simple and economical one step procedure[* Diabetes in Pregnancy Study Group India (DIPSI) is a single test procedure to diagnose GDM in the community where measurement of only 2 hours post-glucose (75gm) > 140 mg/dl by GOD-POD method is done to screen positive for GDM].^[6,13] This single-step procedure has been approved by Ministry of Health, Government of India and also recommended by WHO.^[6] This single test was followed in all 198 health care facilities and 454 Community Camps.

Data Analysis: This was done by a GDM Software Provided under the GDM Project.

Results: Prevalence of GDM: Area wise

Total Pregnant women who underwent OGTT in 24-28 wks of Gestation in 198 Health care facilities in Public and private health care facilities and 454 screening camps—were : 57018 Pregnant women. The total Pregnant women who were diagnosed as GDM were 7641 (Prevalence-13.4%) and this prevalence of GDM(13.4%) was more in urban area(16%) as compared to rural area(9.8%). [Table no: 01]

Table:01:

Comparison of Health Facilities and Community Screening Camps in diagnosis of GDM: The health facilities in combined were significantly better in diagnosis of GDM as compared to Community screening camps(86% vs 14%, $p < 0.0001$) and the diagnostic efficacy was also significantly more in health facilities as compared to camps(13% vs 12%)[Table no: 02].

Table: 02

Facility wise role analysis: Out of the 198 health facilities selected randomly for OGTT– The majority of the tests were done in government health facilities including CHCs (Community Health center), PHCs (Primary health Center), UHP (Urban health Post), D-type center, UFWCs (Urban family Welfare Centres), District hospitals and other 4 major hospitals in Public health sector(64.7%,n=36526) as compared to private health facilities (35.3%, n=20,492) who gave final consent to participate in the study [Figure no: 01].

Figure.01: Although the Role of PHC as well Sub-district to District hospitals in OGTT testing was significant(PHC Level-56% vs Sub-district to district hospital-65.7%), rest health facilities on Government side were also sufficiently contributing.[Table No: 03].

[Table.03]: Comparative Analysis of Facilities in Motivating Women for OGTT. In Public health facilities 21% Pregnant women Attending OPD went under OGTT as compared to 7% in Private health facilities[Table No: 04].

Table.04: The health facilities were efficient in diagnosing GDM(86%) but they were least interested in follow-up Blood glucose Monitoring and further counselling (10%),although postpartum screening was not at a bad level(42%)[Table No: 05].

Table.05: Out of 7641 Pregnant women who were diagnosed with GDM,6657 Pregnant women were followed-up for Blood sugar Monitoring(87%) once and out of them 4327 GDM women were followed. Blood sugar values were considered as controlled when it was below 120 mg/dl, out of them 1996 had value 120-139mg/dl they were advised,Exercise,Diet and Insulin therapy. The 334 in GDM category who had value ≥ 140 mg/dl,were given Insulin therapy along with Exercise & Diet Control.

The 5742 women who were at risk of GDM–were taught how to prevent subsequent diabetes for themselves as well as their families.

Post Partum Blood plasma Post Prandial Glucose(2-hr PPG) Monitoring was also done for the 3249 Pregnant women 2hr after breakfast using Accucheck Performa(In bulid converted to plasma values) The following Criteria to Diagnose GDM were used : Diagnosed Diabetic if 2 hr Post Prandial Blood plasma glucose after breakfast was ≥ 200 mg/dl,Prediabetes were labelled if Blood Sugar is 140-199 mg/dl,out of them 648 had blood sugar value ≥ 200 mg/dl and thus diagnosed as Diabetes,remaining 1137 had blood sugar 140-<199mg/dl as Prediabetes,these women were given Treatment and advice for Exercise and Diet Control.

Some Critical Qualitative findings on Impact of GDM Project:

1. Government public health system response to this Project was slow at the start of Project-as Technically and Scientifically Public health care professional were poor in latest update on NCDs, as Govt rarely provided training to its HCPs but improved later on.
2. There was no health worker responsible for GDM Screening and Counselling at PHCs,CHCs and Subcenter

level at the begining of this Project, but this improved later on.

3. More and more Pregnant women know about OGTT in second year of Project, 47% women responded that they know about OGTT test during pregnancy is being done as as 18079 Pregnant women responded out of 38462 gone under OGTT.
4. At the end of Ist year of Project 6%(1113)Women responded out of 18556 undergone OGTT in first year of Project.
5. GDM Ist Follow-up of Pregnancy has increased to 87% compare to 47% in Non OGTT Group, as those diagnosed GDM were reminded by phone and SMS several times to come for the blood sugar Monitoring follow-up at Screening health facilities,this is the reason that IInd ANC Visit has increased in GDM Group.

DISCUSSION: In our present study, the less participation of private health facilities(35%) as compared to public health facilities in screening of GDM(65%), can be due to the fact that corporate hospital are often reluctant to involve in Non - Communicable Diseases(NCDs) programme due to their bread and butter earning from NCDS, despite having their most modern set up to tackle such cases. Moreover most Gynaecologists in Private sector in states such as Uttar Pradesh are often busy in making huge money from Deliveries via Cesarean sections rather than getting involved in Screening of GDM from their health set ups.

In our present study, the health facilities from rural & urban areas were significantly better in not only in terms of diagnosis of GDM; as compared to Community screening camps(86% vs 14%, $p < 0.0001$) but also, the diagnostic efficacy was significantly more in health facilities as compared to camps. This reveals an important point of the role of Public health facilities to be more efficient in introducing GDM Screening as compared to pure Community Screening camps approach & Private health facilities role and this finding is similar to the findings in study by Davey S et al (2015) which revealed the better primay health care efficiencies of public health system as compared to Private health care.^[14]

Although the Role of PHC as well Sub-District to District hospitals in OGTT testing in our study was in large numbers(56.2% at PHC level & SDH-DH level-65.7%), rest health facilities on Government side were also contributing in large nos and this was also important indication of the real power of our untapped Public health system. In public health care system even a very small investment we may bring changes not only in Diabetes Prevention & Control but also in other health care parameters,which may take time to improve hard health indicators.These are called as Quantum effects in whole health system i.e. Butterfly affect.

In our study the significant prevalence of GDM of around 13% (Higher in Urban areas-16% as compared to Rural areas-9.8%) can be explained due to the fact that–in a Largest state of India such as Uttar Pradesh, there is a huge population of women in reproductive age group, out of them a significant segment of women with abnormal glucose tolerance & Hyperglycemia during pregnancy exist as a significant cohort in urban areas-which appears like a tip of

an iceberg.^[6] Many studies have already reported that women in reproductive age group (15-49 years) in the the risk of diabetes and pregnancy, mirrors that of the underlying frequency of type 2 DM in the general population.^[1-8,15] It has also been seen from the study that Gestational diabetes is found to affect: 2 and 10 percent of women during pregnancy.^[16] and the gestational diabetes mellitus (GDM) prevalence has increased by ~10-100% in several race/ethnicity groups during the past 20 years across the globe.^[17] from which India has also got affected, as revealed also in other Study in past by Jain R et al (2014).^[6] as similar to the finding in our present study.

Although the prevalence in our study (13.4%) however; was in contrast to prevalence of GDM found in other countries (Sri Lanka as 5.5%).^[18] but our finding was similar to findings in other Indian study, which had found that the weighted prevalence of diabetes (both known and newly diagnosed) was found to vary from 5.3% to 13.6% in major cities of India and the prevalence's of pre-diabetes (IFG/IGT) were between 8.3% to 14.6% respectively in these states.^[8] In our present study, it emerged that the health facilities were efficient in diagnosing GDM (86%) but they were least interested in follow-up Blood glucose Monitoring and further counselling (10%). This fact has also been stressed upon in many studies across the globe. As studies in US also Indicate that there is a need for public health agencies to identify and address barriers that hinder comprehensive follow-up for women with prior GDM and there is a dire need for public health and primary health care to work together to improve identification and screening of women with prior GDM.^[19] which is just similar to findings of our present study. It has been further seen in developed country such as US that - the prevalence of GDM is increasing in the US, it is crucial to heighten postpartum vigilance for the development of T2DM through early postpartum and long-term screening for T2DM.^[20] which is also just similar to finding of our study.

Our study also found that public health care system needs to adopt higher gears for effective management of GDM. But the opportunity provided by GDM can be properly utilized only if optimal, effective and quality health care from health facility is provided to the antenatal mothers with GDM.^[21] The only problem in management of GDM remains controversial conflicting guidelines and treatment protocols for HCPs.^[22] which needs proper clarification especially in slow moving public health care system in India, which was addressed by this project. The effective communication between Medical Officers, patient and Health workers is also essential, as patients experience increased rates of GDM in subsequent pregnancies.^[22]

It has been found in a study that despite a close medical monitoring during pregnancy, the information about long term consequences of GDM for later type 2 diabetes mellitus development is poor among pregnant women.^[23] which was also seen in our present study. Even Study in south India also found that-only a small proportion of rural antenatal women had good knowledge about GDM in an area of PHC and Health facilities need to play a an active role in bringing about awareness about GDM among antenatal women.^[24] It has also been found from another study that Women with GDM monitored at a specialist maternity clinic believed-GDM to be

a transient condition during pregnancy only, whereas women monitored at a diabetes specialist clinic expressed fear about a future risk of developing type 2 diabetes.^[25] The other study also reveals that majority of women believe that managing their borderline GDM is important and they plan to improve their lifestyle provided they receive timely information from health facilities.^[26] It has been found from that-to help pregnant women with self-management of gestational diabetes, healthcare providers should pay greater attention to the adverse effects of GDM on women, including role expectations, cultural issues and financial barriers. Healthcare providers also need to focus on the positive effects and capitalize on women's motivation to make lifestyle changes to reduce their future risk for diabetes.^[27] These were similar issues found in Management of GDM from health facilities in our study.

What we gain from this study is that Screening can play an important role in management of GDM cases among women especially during First ANC Visit. Our this finding also matches with that ADA current recommendation of screening high-risk pregnant women especially those with obesity, personal history of GDM, glycosuria, and with a strong family history of diabetes at the first antenatal visit.^[28] Moreover selective screening although have high sensitivity with low specificity; but they offer no better advantage than universal screening, so universal screening can be a good option in management of GDM.^[29] It has also been seen from other study that management of GDM cases pose a cost to the public health system, but they also provide an opportunity for significant monetary savings in terms of costs linked to maternal and neonatal morbidity.^[30] which was also seen in our study.

Our study also revealed a felt need for early detection of Diabetes during Pregnancy among women, for prevent type II diabetes later on in children and mothers after pregnancy. So GDM can be considered as a window of opportunity, which needs to be tapped, for prevention of diabetes in later life by the primary prevention approach for decreasing the incidence of type 2 diabetes mellitus (DM) in future generations.

LIMITAIONS OF STUDY: For outcome measures in evaluation of management of GDM, only few crirtias were taken. The units were also screened as per the willingness of health facilities to participate in the project, so the possibility of missing complete picture of GDM screening despite huge sample size may be possible.

CONCLUSION: Gestational Diabetes is an emerging Public health Problem and our Project in Kanpur District reveals a positive impact of Management of GDM in Public health facilities. Most of the Antenatal Women visited Public health facilities and OGTT in this segment of Pregnant women helped to improve the Antenatal care, but there awareness regarding GDM were little. The diagnostic efficacy for GDM was also significantly more in health facilities as compared to Community screening camps. For this action- more active roles of Public health facilities, which are more receptive and efficient in introducing GDM Screening compared to Private facilities are required; as the the Public health facilities were

better in diagnosis of GDM as compared to screening Camps. Further there is a need to Integrate NCD clinics with GDM Screening at the primary health care level more vigorously. Such kind of OGTT and GDM Data from our project ; can also guide us in effective implementation of Govt of India NCD Programme, which can be further claified in future research studies in this field.

List of Abbreviations Used:

GDM: Gestational Diabetes Mellitus

OGTT: Oral Glucose Tolerance Test

DIPSI: Diabetes in Pregnancy Study Group India

FOGSI: Federation of Gynaecological Socieity of India

NCD: Non Communicable Disease

PHC: Primary Health centre

CHC: Community Health centre

HCP: Health Care Providers

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Table 1: Area wise Prevalence of GDM in Kanpur

S.No	No. & Prevalence of GDM (Urban Area)	No. & Prevalence of GDM (Rural Area)	Total Prevalence of GDM
1.	1,223(16%)	748(9.8%)	7641(100%)

Table 2: Comparison of Health Facilities and Screening Camps in Diagnosis of GDM

Sr. No.	Unit involved in GDM Testing	No & % of Pregnant women screened	No & % of GDM cases Diagnosed GDM	GDM Diagnostic Efficacy of a Health Unit
1	Health Facilities (n=194)	47,885(84)	6545(86)	13.6%
2	Health Camps (n=454)	9133(16)	1096 (14)	12%
3	Total	57,018	7641	13.4%

Chi-square test: $\chi^2= 14.05$, $df=1$, $p<0.0001$

Fig.1: Health Facilities Involved in screening of Pregnant Women via OGTT

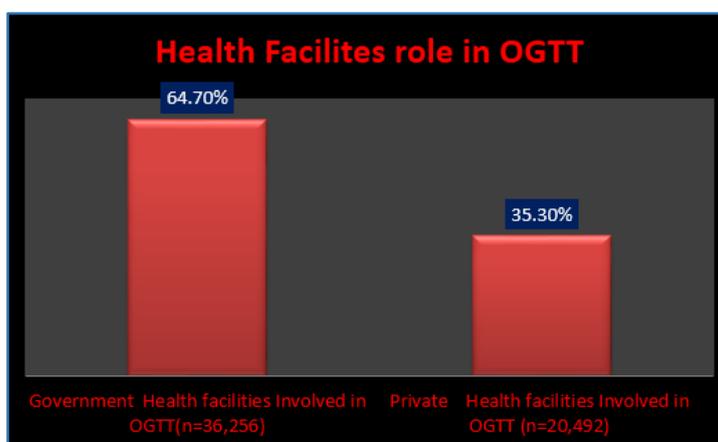


Table 3: Role of types of Health Facilities in OGTT Testing for GDM[n=57,018]

Rural Areas	
	No. & % of tests done
Types of Health Facility did OGTT	
PHC level	21,357 (56.2)
CHC	16,585 (43.8)
Total	37,942 (100)
Urban areas	
	No. of tests done
Types of Health Facility did OGTT	
Health Posts-D type	790(4.1)
Family Welfare Centres	571(3.0)
Medical College(GSVM)	4949(25.9)
Sub-District & District Hospital	12,539(65.7)
Allopathic Dispensary	143(0.8)
School Health Dispensary	84(0.5)
Total	19,076(100)

Table 4: Health Facilities role in motivating women for OGTT

Sr. No.	Public Health Facilities (n=59)	Private Health Facilities (n=139)
1	12(21%)	05 (7%)

Table 5: Combined role of Health Facilities In Management of GDM

Sr. No.	Health Facility wise services received	No & % (Prevalence)
1.	Total Cases of GDM Diagnosed	6657(87%)
2.	Follow up Monitoring of Postprandial 2 Hr Blood sugar in GDM received	66%
3.	Women who received follow-up Blood glucose Monitoring and further counselling in health care facilities[n=6657].	5742(10%)
4.	GDM Pregnant women received post partum Screening	3249(42%)
5.	Women after delivery who were diagnosed as Type II Diabetes.	519(16%)
6.	Pregnant women did not know about GDM	92214%

Table 6: Outcome of GDM Pregnant Women and Non GDM Pregnant Women in Prospective Study

		GDM (N=7641)	Non GDM(n=8000)	RR	95% CI	P Value
1	still birth	247(3.2%)	102(1.3%)	2.53	2.0-3.1	<0.0001
2	Neonatal death	128(1.7%)	56(0.7%)	2.39	1.75-3.27	<0.0001
3	Perinatal death	375(4.9%)	158(1.97%)	2.48	2.0-2.9	<0.0001
4	Congenital Mal	382(5%)	82(1.03%)	4.87	3.8-6.1	<0.0001
5	Cesarean S	2242(29.3%)	1814(22.67%)	1.21	1.2-1.3	<0.0001
6	PBU care	234(3.06%)	85(1.06%)	2.88	2.25-3.68	<0.0001
7	LGA	684(9%)	67(.83%)	10.6	8.3-13.7	<0.0001
8	LBW	863(11.3%)	758(9.4%)	1.19	1.1-1.3	<0.0002
9	PIH	686(9%)	483(6%)	1.83	1.6-2.0	<0.0001
10	Jaundice	382(5%)	84(1%)	4.76	3.7-6.0	<0.0001
11	Family H/O DM	1372(17.95%)	546(6.8%)	2.62	2.3-2.8	<0.0001
12	APH/PPH	64(.84%)	26(.32%)	2.57	1.6-4.0	<0.0001

Table 7: Maternal & Foetal outcome in GDM Versus Non GDM and its relationship with H/O previous birth complication

		GDM (N=7641)	Previous foetal loss	P value	Non GDM (N=8000)	Previous foetal loss	P value
		Present			Present		
1	Still birth	247(3.3%)	916(12%)	<0.0001	102(1.2%)	212(2.6%)	<0.0001
2	Neonatal death	128(1.6%)	156(2%)	<0.09	56(0.7%)	62(0.8%)	<0.58
3	Perinatal death	375(4.9%)	1072(14%)	<0.0001	158(1.9%)	274(3.4%)	<0.0001

Table 8**Perinatal Mortality as a function of blood sugar(mg/dl) value and its comparison**

with H/O of previous Perinatal loss

Total Pregnant Women undergone OGTT:57018

		N=57018				
		Present Perinatal Mortality	Present	Previous Perinatal mortality		
1	<100	n1=12560				
						P VALUE
2	100-119	n2=31075	776(2.4%)	768(2.5%)		<0.44
3	120-139	n3=5742	137(2.4%)	214(3.7%)		<0.0001
5	140-159	n4=3915	137(3.5%)	417(10%)		<0.0001
	160-179	n5=1451	65(4.4%)	176(12.1%)		<0.0001
	180=199	n6=940	54(5.7%)	168(17.8%)		<0.0001
	200 and >200 n7=1335		119(8.9%)	311(23.2%)		<0.0002

Table 9: Post Follow up complications of Gestational Diabetes Diagnosed(GDM) in Control and Non control Blood Sugar after Treatment

Post Prandial 2 hr Blood Glucose Controlled <140mg%				Post Prandial 2 hr Blood Glucose not Control =>140mg%			
	N=4589	GDM		n=454	GDM		
					RR	95% CI	P Value
1	still birth	64(1.4%)		15(3.3%)	0.42	2.0-3.1	<0.0023
2	Neonatal death	37(0.8%)		8(1.8%)	0.043	0.21-0.98	<0.043
3	Perinatal death	101(2.19%)		23(5.1%)	0.43	0.28-0.68	<0.0002
4	Congenital Mal	206(4.5%)		22(4.8%)	0.93	0.60-1.4	<0.73
5	Cesarean S	1101(24.0%)		163(35.9%)	0.67	0.58-0.76	<0.0001
6	PBU care	27(0.59%)		12(2.75%)	0.22	0.11-0.44	<0.0001
7	LGA	30(.65%)		34(7.5%)	0.087	.054-0.14	<0.0001
8	LBW	413(8.9%)		71(15.6%)	0.57	.46-.73	<0.0001
9	PIH	137(2.98%)		42(9.3%)	0.32	0.23-.45	<0.0001
10	Jaundice	26(0.56%)		24(5.2%)	0.11	.062-0.18	<0.0001
11	Family H/O DM	357(7.7%)		103(22.6%)	0.34	0.28-0.41	<0.0001
12	APH/PPH	11(0.23%)		4(0.88%)	0.27	.087-.85	<0.025
13	Insulin Use	298(6.4%)		5(1.1%)	5.89	2.4-14.1	<.0001