

Pregnancy Outcome of Diabetic Women: a cross sectional diabetic hospital based study

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Abstract:

Gestational diabetes recognized first during pregnancy, which is usually mild in nature but is associated with higher incidence of

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pregnancy complications and increases rate of perinatal mortality and morbidity than in previously developed diabetic women. The purpose of this study was to explore the pregnancy outcome of diabetic women. It was a descriptive cross sectional study. Data was collected using an interviewer administered questionnaire. That was thoroughly pre-tested. Modification was done after pre-test. This study included 103 diabetic mothers. Highest percentage 39 (37.9%) were in the age range of 30-34 years. Regarding mode of delivery, 29(28.2%) of the respondents delivered normally and 74(71.8%) delivered through lower uterine caesarean section (LUCS). The mean blood sugar (fasting) during pregnancy at the time of delivery and after delivery was 8.6 ± 1.4 (range 6-12mmol/L), 7.8 ± 1.5 (range 6-10.5mmol/L) and 6.8 ± 0.8 mmol/L (range 5-9.5mmol/L) respectively. Regarding postpartum complaints, 53(69.7%) of them had complaint of hypertension followed by 25(32.9%) excessive P/V bleeding, 21(27.6%) high fever and 2(2.6%) convulsion. The mean birth weight was 3.1 ± 0.8 kg ranging from 800.0-4200.0 gm. It was found that diabetic mother having gestational fasting blood sugar ≤ 6.7 mmol/L were completely recovered after delivery and was statistically significant ($p < 0.05$). Pregnant with diabetes remains an important medical disorder in pregnancy. Diabetes is no longer a barrier to pregnancy and a diabetic has a reasonable chance of delivering a healthy child. For that, all the pregnant mothers should test their blood sugar routinely to detect gestational diabetes, so that appropriate measure can be taken.

Key words: Pregnancy outcome, Diabetic mother

Introduction

Diabetes mellitus is a clinical syndrome characterized by hyperglycaemia due to absolute or relative lack of insulin, which affects the metabolism of carbohydrate, protein, fat, water and electrolytes. Morbidity and mortality may result from acute metabolic de-compensation while long standing metabolic derangement is frequently associated with permanent and irreversible functional and structural changes

in the cells of the body, those of the vascular being particularly susceptible[1]. Diabetes is the second commonest medical disorder (after hypertension 6%) complicating pregnancy with an incidence about 5 percent [2]. Diabetes pregnancies fall into two categories: some women already have diabetes (pre-gestational diabetes), while the remainders are diagnosed during pregnancy (gestational diabetes), while the remainders are diagnosed during pregnancy (gestational diabetes). Pre-gestational diabetes has an incidence about 2-4/1000 percent, most of whom have insulin dependent diabetes mellitus (IDDM). There are also small number of older women with non-insulin dependent diabetes mellitus (NIDDM) have the same mortality and morbidity rate as the babies of IDDM women [3]. Gestational diabetes is another type of diabetes or impaired glucose tolerance first diagnosed in pregnancy. The incidence of gestational diabetes mellitus (GDM) varies widely. In Caucasian it is 1-2 percent in Afro-Caribbean 2-3 percent and among Asian it is 4-5% and in USA it is 3-5 % [4]. A study on rural community of Bangladesh showed about 7% of all pregnancies are complicated by gestational diabetes mellitus [5]. The prevalence of GDM is certain high risk groups can be as higher as 14% [6].

Gestational diabetes generally develops in the last trimester of pregnancy. The hormones in the placenta create a resistance to the action of insulin and stress the pancreas, the organ that produces the insulin and needed by the body to process blood sugar. Most pregnant women can handle this increased load on the pancreas without problem, but a small minority is unable to produce enough insulin, resulting in gestational diabetes [7]. Insulin dependent diabetic women with early pregnancy loss are more likely to present to secondary care. Women with poor glycaemic control are reportedly at higher risk of spontaneous abortions. The magnitude of the increased risk of late fetal loss in this series was similar to

other recent reports, with a fourfold increase in perinatal death and a fivefold increase in stillbirths [8]. The major challenges of caring for diabetes in pregnancy are to adequately screened pregnant women to reduce the congenital malformation by enhancing pre-conceptional glucose control and to detail the full impact of mild glucose elevations not on material risk for developing diabetes but on its immediate and long term consequences to the foetus and neonates. Careful planning for pregnant women with diabetes ensures a happy outcome. Combined team approach by physician, obstetrician and pediatrician, the perinatal morbidity has been reduced from 20% to 4-6% in most specialized unit today [9]. In Bangladesh maternal mortality is 3/1000live birth and infant mortality rate is 57/1000live birth [10]. The rates are unacceptably high. Pregnancy with diabetes is over of the important risk factors for perinatal mortality, infant morbidity and mortality. Moreover, 50% of perinatal deaths occur in pregnancy with diabetic population [11]. No reliable statistical data are available as to the total number of diabetic patient in our country. So, the diabetic mothers have the right to claim extensive study for their welfare and better obstetric performance. This study will find out the outcome of pregnancies with diabetes.

Methodology

Type of study: It was a descriptive type of cross sectional study.

Study Population: Study population would be the women with diabetes and gestational diabetes at or after 28 weeks of gestation only singleton pregnancy and had delivered at obstetric department of BIRDEM Hospital irrespective of age, gravida, and those subjects willing to participate after taking informed verbal consent.

Study Area: This study would be conducted at Bangladesh Institute of Research and Rehabilitation in Diabetic, Endocrine and Metabolic Disorder (BIRDEM), Shahbag, Dhaka, Bangladesh

Study Period: Six months. Initial weeks were taken for selection of topics, objective setting and following weeks for review of literature, instrument development, data collection, analysis and report writing.

Sampling Technique: Sample was selected purposively to interview the study population considering the inclusion and exclusion criteria.

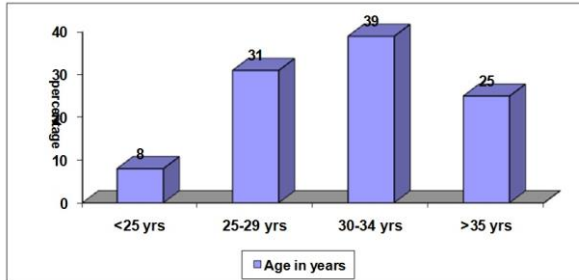
Sample size: Total sample was 103

Data Collection Instruments: Data were collected using an interviewer administered questionnaire. Questionnaire and checklist would be the research instruments of this study and all the steps in developing these would be carefully followed. Questionnaire and checklist would be framed by the guidance of objectives and variables considered for this study. Bengali version of the questionnaire was done. Those would be thoroughly pre-tested. Modification would be done after pre-test and thus those were developed.

Data Management and Analysis: After collection of data, all responses checked for their completeness, correctness and internal consistency in order to exclude missing or inconsistent data. Corrected data was entered into the computer. The data was analyzed by using the statistical software namely SPSS (Statistical Package for Social Science). Data analysis was done according to the objectives of the study. P-value more than 0.05 was considered insignificant.

Results

Figure 1: Age of the respondents (n=103)



It was found that highest percentage 39(37.9%) were in the age range of 30-34 years followed by 31(30.1%) in age group of 25-29years, 25(24.3%), 35years and above and 8(7.8%) below 25years.

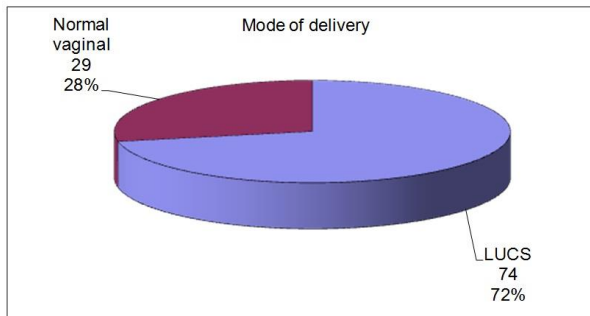
Table 1; Socio-demographic characteristics of the respondents (n=103)

Characteristics	Frequency	Percent
Level of education		
Primary/non-formal	10	9.7
Secondary	13	12.6
SSC	16	15.5
HSC	36	35.0
Graduate and above	28	27.2
Occupation		
Service holder	30	29.1
Housewife	59	57.3
Others	14	13.6
Residence		
Urban	59	57.3
Rural	44	42.7
Religion		
Muslim	88	85.4
Hinduism	11	10.7
Christianity	2	1.9
Buddhism	2	1.9

Regarding the level of education of the respondents, 36(35.0%) had HSC level of education followed by 28 (27.2) graduate and

above, 16(15.5%) SSC, 13(12.6%) secondary and 10(9.7%) primary or non-formal education including one non-formal education. More than half of the respondents were housewife 59(57.3%) followed by 30(29.1%) were service holder and 14(13.6%) were engaged in different types of work such students 9(8.7%), garment workers 5(4.9%). Out of 103 diabetic mother, 59(57.3%) of the respondents resided in Urban area and remaining 44(42.7%) in rural areas. Out of 103 respondents, 88 (85.4%) were Muslim and remaining 15 (14.6%) were non-Muslim which includes 11(10.7%) Hinduism, 2(1.9%) Christianity and 2 (1.9%) Buddhism.

Figure -2: Frequency distribution of respondents by mode of delivery (n=103)



Regarding mode of delivery, 29(28.2%) of the respondents delivered normally and 74(71.8%) delivered through lower uterine caesarean section (LUCS).

Table2. Distribution of respondents by glycaemic status (n=103)

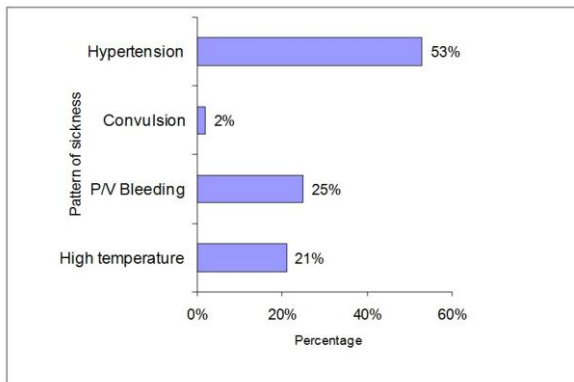
Variables	Frequency	Percent
Fasting blood sugar during gestation (Last trimester)(mmol/L)		
≤6.7	9	8.7
>6.7	94	91.3
Fasting blood Sugar at delivery(mmol/L)		
≤6.7	15	14.6
>6.7	88	85.4
Fasting blood Sugar after delivery(mmol/L)		

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≤6.7	51	49.5
>6.7	52	50.5
HbA1c status of mother		
<7	34	33.0
≥7	69	67.0

The mean blood sugar (fasting) during pregnancy at the time of delivery and after delivery was 8.6 ± 1.4 (range 6-12mmol/L), 7.8 ± 1.5 (range 6-10.5mmol/L) and 6.8 ± 0.8 mmol/L (range 5-9.5mmol/L) respectively. The mean HbA1c was $7.7 \pm 1.6\%$ (range 5.50-15.4%). It was found that 69 (67.0%) had HbA1c 7.0% and above and 34 (33.0%) had below 7% of HbA1c.

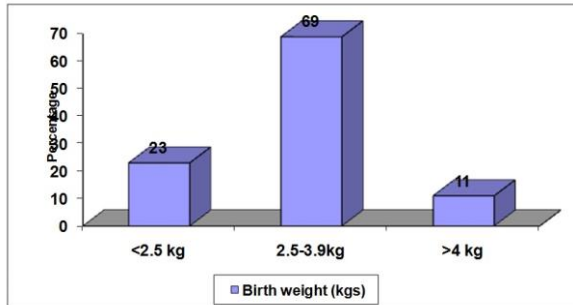
Figure -3: Distribution of respondents by pattern of sickness after delivery (n=103)



Regarding postpartum complaints, 53(69.7%) of them had complaint of hypertension followed by 25(32.9%) excessive P/V bleeding, 21(27.6%) high fever and 2(2.6%) convulsion.

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Figure -4: Frequency distribution of birth weight of newborn in kg (n=103)



The mean birth weight was 3.1 ± 0.8 kg ranging from 800.0-4200.0 gm. It was found that 23(22.3%) had birth weight less than 2.5kgs (low birth weight) and 69(67.0%) had birth weight 2.5-3.9 kg and 11(10.7%) had more than 4.0kg.

Table-3: Relationship of maternal outcome with characteristics of diabetic mother (n=103)

Variables	Maternal outcomes		Total (N=103)	p- value
	Recovery (n=27)	Sick (n=76)		
Fasting blood sugar at gestation				
≤6.7	5 (55.6)	4 (44.4)	09(100.0)	p=0.036
>6.7	22 (23.4)	72 (76.6)	94(100.0)	
Fasting blood sugar at delivery				
≤6.7	5 (33.3)	10 (66.7)	15(100.0)	p=0.498
>6.7	22(25.0)	66(75.0)	88(100.0)	
Fasting blood sugar after delivery				
≤6.7	16(31.4)	35(68.6)	51(100.0)	p=0.238
>6.7	11(21.2)	41(78.8)	52(100.0)	
Gestational age				
<37 wks	8 (26.7)	22(73.3)	30(100.0)	p=0.947
≥37 wks	20 (52.63)	54(74.0)	73(100.0)	
Mode of delivery				
Normal	9 (31.0)	20 (69.0)	29(100.0)	p=0.486
LUGS	18 (24.3)	56 (75.7)	74(100.0)	
F/H of GDM				
Yes	6(16.7)	30(83.3)	36(100.0)	p=0.106
No	21(31.3)	46(68.7)	67(100.0)	
F/H of DM				
Yes	22(23.7)	71(76.3)	93(100.0)	p=0.072

No	5 (50.0)	5 (50.0)	10(100.0)
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Table 3 shows the relationship of maternal outcome with selected characteristics of diabetic mother. It was found that diabetic mother having gestational fasting blood sugar ≤ 6.7 mmol/L were completely recovered after delivery and was statistically significant ($p < 0.05$). But no statistically significant difference was found with fasting blood sugar during delivery, after delivery, gestational age, mode of delivery, family history of diabetes and gestational diabetes ($p > 0.05$).

Discussion

The mean age of the respondents was 30.8 ± 4.7 years. It was found that highest percentage (39.9) were in the age range of 30-34 years followed by 30.1 percent in age group 25-29 years, 24.3 percent 35 years and above and 7.8 percent below 25 years diabetic mother tends to be older. A study Carley BM, et al, USA showed diabetic women are older. [12] Another study of X. Xiong, et.al., Canada, showed maternal age of GDM mother, less than or equal to 19 year was 2.6%, 20-34 year was 75% and 35 year and above was 10.3%. [13] Regarding the level of education of the respondents, 35.0% had HSC level of education followed by 27.2 percent graduate and above, 15.5% v SSC, 12.6% secondary and 9.7% primary or non-formal education. This picture does not correspond with national data where female enrolment up to secondary school is only 30.9%.¹⁹ Female literacy rate is 26.1%. [14] In this study, more than half of the respondents were housewife (57.3%) followed by 29.1% service holder and 13.6% engaged in different types of job such students, garment workers etc. But national data shows 78.3% women are unpaid family worker (housewife) and employees or service holders are only 7.6%. [15] Regarding residence, 57.3% residing in urban and 42.7% in rural which is due to situation

of the study place in Dhaka city. According to national data 85% population live in rural area. [15] In BIRDEM of the registered patients, the urban subjects are disproportionately higher than the rural subjects. [16] In this study, it was evident that more than one fourth (26.2%) respondents completely recovered after delivery whereas 73.8% had some complaints during postpartum period. Regarding postpartum complaints, 69.7% of them had complaints of hypertension followed by 32.9% had excessive p/v bleeding, 27.6% high fever and 2.6% had convulsion. Regarding mode of delivery, 28.2% of the respondents delivered normally and 71.8% delivered through lower uterine caesarean section (LUCS). In Bangladesh only 2% delivery is conducted by caesarian section. [14] The reason may be that most of the pregnancies were not allowed to continue beyond the Expected Date of Delivery (EDD) for fear of sudden intra uterine death which mostly occur in later part of pregnancy and some pregnancy had induction failure. Beside these, prolonged infertility, history of previous caesarian sections fetal distress, pre-eclamsia and placenta previa was present as predisposing factors in some cases. Diabetes itself is not the indication of abnormal delivery. A study of Begum Shamsun Nahar in 1987, also showed rate of LUCS 82%. [17] The study of Carley BM et al., 1997, USA, showed gestational diabetic women were significantly increase in these women compared with general obstetric population. [18] From this study it was evident that no statistically significant mean difference of fetal birth weight found in terms of blood sugar level during gestation, at the time of delivery, after delivery and HbA1c ($p > 0.05$), but weight of fetus was gradually increased with increased blood sugar and HbA1c. But a significant association was found with increased fetal birth weight and increased gestational age in weeks ($p < 0.001$). The mean gestational age was 36.8 ± 2.1 weeks. It was observed that 70.9% of the fetus had gestational age 37 weeks and above and 29.1%

below 37 weeks (preterm). The mean birth weight was 3.1 ± 0.8 kgs. It was found that 22.3% had birth weight less than 2.5 kgs (low birth weight) and 67.0% had birth weight 2.5-3.9 kg and 10.7% had more than 4.0 kg. Karim E et al in a study in Bangladesh found a mean birth weight of 3.8 kg among the babies of established diabetic mother. [17] It was found that no statistically significant difference was found in terms of foetal status and foetal birth weight with age at first marriage, age at first pregnancy, antenatal care use ($p > 0.05$). But it was observed that percentage of sick child was higher among the mother married aged 20 years and above, previous no history of contraceptive use, low frequency of antenatal care. But it was observed that fetal birth weight was higher among mother with first pregnancy at 25 years and above, and also mean no of antenatal care 7 and above. It was also found that no statistically significant difference was found with other reproductive events such as number of alive and dead child, history of stillbirth, abortion and menstrual regulation and also parity and total number of pregnancies ($p > 0.05$).

Conclusion:

Pregnant with diabetes remains an important medical disorder in pregnancy. Diabetes is no longer a barrier to pregnancy and a diabetic has a reasonable chance of delivering a healthy child. For that, all the pregnant mothers should test their blood sugar routinely to detect gestational diabetes, so that appropriate measure can be taken.

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