

*Research Article*

**Proportion of Gestational Diabetes among pregnant women attending hospitals and Immediate Complication of Neonate in River Nile State 2018.**

Alwathig Yahia, Fania Abd Alla, Mirna Nabel

Alsheik abdalla elbadri University-Faculty of medicine-Community medicine departmen

**Abstract:** There is international increasing of gestational diabetes, gestational diabetes is metabolic disorder during pregnancy and the main clinical feature is high level of serum glucose; that have adverse effect on the neonate. The aim of study is assessment of the prevalence of gestational diabetes, and the main immediate neonatal complication in River Nile State Sudan 2018.

**Methodology:** Hospital based cross-sectional study design, was conducted in River Nile State between March – August 2018. Four hospitals were selected randomly from 7 locality hospitals. Sample size was 384 women attended delivery room in hospitals. Data was entered and analysis by SPSS program.

**Result:** Sample consisted of 384 delivery women, the main women age was 21-30 years, and the prevalence of gestational diabetes was 8.07%. The commons immediate neonatal complication was jaundice 68.4% of neonate of gestational diabetes mother (p-value 0.01), hypoglycemia 4.4 % (p-value 0.01), and respiratory distress was 5.5% (p-value 0.01). Septicemia and congenital malformation were insignificant.

**Conclusion:** There was high prevalence of gestational diabetes in River Nile State. Gestational diabetes has significant immediate complications in neonate.

**Keywords:** (Gestational diabetes - neonate - jaundice - hypoglycemia - respiratory distress).

## **I. Introduction**

The Gestational diabetes mellitus is a relatively common medical condition that was described as early as the nineteenth century. The World Health Organization (WHO) define gestational diabetes as onset of glucose intolerance at varying degree or first diagnosed during pregnancy. Gestational diabetes is high blood sugar that develops during pregnancy and usually disappears after giving birth. It can occur at any stage of pregnancy, but is more common in the second half<sup>1,2</sup>.

Gestational Diabetes Mellitus (GDM) has adverse effect on the both mother and fetus, they are classified as fetal and maternal problem<sup>3</sup>. Globally prevalence of hyperglycemia in pregnancy in women 20–49 years was estimated to be 16.2% and affecting 21.4 million live births, in 2017, and more than 90% of cases are estimated to occur in low- and middle-income countries<sup>4,5,6</sup>. Prevalence of GDM in Africa was 13.61%, and in in the sub-Saharan the prevalence was estimated to be 14.28%, but the highest prevalence was found in central Africa 20.4%<sup>7</sup>. In Sudan there are scarce in evidence that estimate the country GDM as well as in Africa. As in Sudan there is a little information about prevalence of GDM in River Nile State<sup>8</sup>. In general, there is increase in prevalence of GDM, definitely it increases the neonatal complications<sup>7</sup>.

Gestational diabetes mellitus has serious mother and neonatal complications. The study aims to determine the prevalence of GDM and immediate neonatal complications. The prevalence of GDM has significantly increased in last decades. Neonates of diabetic mothers are

prone to various neonatal adverse outcomes including metabolic and hematological disorders, respiratory and cardiac disorders, neurological impairment premature birth and death. Macrosomia (birth weight greater than 4kg) is most common complication it has direct effect in neonatal birth trauma, and the most serious immediate neonatal complication is hypoglycemia, jaundice and respiratory distress<sup>9,10</sup>.

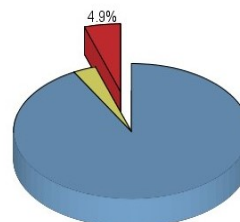
One of Sustainable Developmental Goals (SDG) is minimization of neonatal morbidity and mortality<sup>11</sup>. The results of such like this study it necessary to obstetric and pediatric care, as most of risk factors and complications are preventable, also the results of this study it may be important to local and national health system as ultimate goal is to minimize neonatal injury and death through the review and edit of neonatal care guidelines<sup>11</sup>.

## **II. Material AND METHODS**

A hospital based cross sectional study design was conducted in River Nile state in north of Sudan, during March -August 2018. Four hospitals (Atabara, Eldamar, Berber and Alsalam) were selected from seven locality hospitals randomly. Pregnant women who attended delivery room were approach to participate in the study through simple random sampling. Calculated sample size was 384 women and neonates, in case of twins one neonate was selected randomly. After signing an informed consent for her and her new baby, each delivered women was asked about her personal information and gestational diabetes. The neonate was examined by one registrar of pediatric and one well trained

■ not exist  
 ■ diabetes mellitus  
 ■ gestational diabetes mellitus

nurse through prepared checklist including pregnancy, weight, jaundice, septicemia, hypoglycemia, respiratory distress and congenital anomalies. Two of selected participants was refused to participate. Data were entered into SPSS program for windows version 18. Data were checked for normality. Tables were used for description of personal information of delivered women and distribution of immediate neonatal complication. This is study was approved by technical committee from Elsheikh Abdullah Elbadri university faculty health sciences and state Ministry of Health, the inform consent was obtain before data collection, and confidentiality was considered in all phases of data collection, management and analysis.



Health status	Number	Percentage
Free from any type of diabetes	353	91.93%
Diabetes mellitus	12	3.1%
Gestational diabetes	19	4.9%
Total participants	384	100%

### III.Results

The participated women described in table 1 based on personal information (age, educational level, occupation, family income).

Other tables were described the gestational diabetes prevalence, and neonatal complications.

Table (1) Background descriptions of mothers' participants:

Variable	Description	Frequency	Percent
Age	<20	31	28.7 %
	21-30	235	61.3 %
	>31	18	10 %
Educational Level	Illiterate	23	6 %
	Khalwa	7	1.8 %
	Primary school	103	26.8 %
	Secondary school	165	43 %
	University	80	20.8 %
Income	High	181	47.1 %
	Medium	184	47.9 %
	Low	19	4.9 %

Table (2) prevalence of gestational diabetes among participants

Table (3) immediate neonatal complication

no	Type of immediate complication	%	p-value	
1	Jaundice	Diabetes	68.4	0.01
		Free from diabetes	29.4	
2	Hypoglycemia	Diabetes	4.4	0.01
		Free from diabetes	1.1	
3	Respiratory distress	Diabetes	5.5	0.01
		Free from diabetes	1.2	
4	Septicemia	Diabetes	11.1	0.1
		Free from diabetes	10.9	
5	Congenital malformation	Diabetes	15.9	0.3
		Free from diabetes	3.1	

### IV.Discussion

Gestational Diabetes is one of major health problem issue, it can cause metabolic

dysfunction of the neonate and that may lead to serious complication<sup>11</sup>. However, gestational diabetes and neonatal complication can be preventable through appropriate curative care<sup>12,13</sup>. Concern background information of participants two third of participants in middle reproductive age, and the most common level of education among participating women were primary and secondary school. Fortunately, there is little participants who suffer from low income of their family; although the reproductive services are available and free the family income is important as control of gestational diabetes required especial manipulation in life style. The prevalence of gestational diabetes is increasing worldwide due to increase occurrence of risk factors particularly sedentary life style<sup>14</sup>. Substantially majority of participants women were free from diabetes and the current study showed the proportion of gestational diabetes (4.9%) in River Nile state hospital, this result was similar to global prevalence, In spite of higher prevalence of gestational diabetes in Africa the study found the gestational diabetes prevalence within the regional range, but higher than north African countries<sup>14,15</sup>.

In general, Neonatal complications among gestational diabetic mother is significant especially jaundice, hypoglycemia and respiratory distress, and the finding is like another studies<sup>16</sup>.

Jaundice or hyperbilirubinemia is more frequent observed among neonate of diabetic mother, in this study significant occurrence of jaundice was observed among new born of diabetic mother; however it is a serious complication in toxic level, but there is no report of toxic

level of hyperbilirubinemia<sup>13</sup>. The result of study was higher than other study which conclude that hyperbilirubinemia occur in about 25 to 35% on neonates of diabetic mother, the explanation of that variation it may be due to other risk factors like macrosomia and early gestational age<sup>17,18</sup>.

Association between gestational diabetes and increase the risk of hypoglycemia was previously demonstrated several studies, and was found to be significant in this study approximately double compared to those neonates of free mother from diabetes<sup>19</sup>. In general, neonatal hypoglycemia due to mother nutritional causes, and in neonate of gestational diabetic mother due to metabolic disorder<sup>19,20</sup>. After birth placenta supply is interrupted leading to decrease level of glucose in neonatal blood, so normally the neonate in first few hours of life are hypoglycemic, this normal physiological situation put the neonate of gestation mother in high risk of serious complication, the serum blood glucose falls below 30mg/dl, and it is one of serious neonatal complications that may occur in first 24 hours of life, and lead to permanent disability if not treated probably<sup>13,20</sup>. Several documentations suggest that early and frequent breast feeding, or administration of fluid containing glucose before delivery may prevent the neonate from serious complication of hypoglycemia<sup>21</sup>.

The second most common complication and most serious in this study is respiratory distress, and usually happen within first two hours of life<sup>12,21</sup>. The study found significant result (p-value 0.01) which is similar to other studies, that respiratory distress is one of immediate neonatal complication in mother with diabetes. Two

expected factors are commonly occurred in gestational diabetes; Hyperinsulinemia and immature gestational age delay production of surfactant required for lung maturation, so at the time of delivery the new born need urgent assist to breath until lung maturation. Still, in a diabetic pregnancy, the risk of respiratory distress may not pass until after 38.5 gestational weeks<sup>22</sup>.

## V.CONCLUSION

Within the rising of diabetes, the gestational diabetes will be increased, it expected that gestational diabetes will continue to be serious problem of pregnant ladies. In 2018 there was high prevalence of gestational diabetes in the state. Gestational diabetes has significant immediate serious complication in neonates. Instate of rising prevalence of gestational diabetes the complications will increase and the neonatal mortality will increase. The major question that remain when the pregnant discover that have gestational diabetes, what the intervention that should be done to protect her and her new baby. Urgency for the guideline of management of neonate require to be approve from local ministry of health.

## VI.acknowledgments

We grateful to the teaching staff of Elsheikh Abdallah Elbadri University – faculty of health sciences. We would like also to acknowledge curative medicine department in ministry of health in River Nile state for their unlimited support.

## VII.Conflict OF INTEREST

The authors declare that they have no conflict of interest.

## VIII.References

- [1] Jenum AK, Mørkrid K, Sletner L, Vange S, Torper JL, Nakstad B, Voldner N, Rognerud-Jensen OH, Berntsen S, Mosdøl A, Skriverhaug T. Impact of ethnicity on gestational diabetes identified with the WHO and the modified International Association of Diabetes and Pregnancy Study Groups criteria: a population-based cohort study. *European journal of endocrinology*. 2012 Feb;166(2):317.
- [2] Mulla WR, Henry TQ, Homko CJ. Gestational diabetes screening after HAPO: has anything changed?. *Current Diabetes Reports*. 2010 Jun 1;10(3):224-8.
- [3] Reece EA. The fetal and maternal consequences of gestational diabetes mellitus. *The journal of maternal-fetal & neonatal medicine*. 2010 Mar 1;23(3):199-203.
- [4] Guariguata L, Whiting DR, Hambleton I, Beagley J, Linnenkamp U, Shaw JE. Global estimates of diabetes prevalence for 2013 and projections for 2035. *Diabetes research and clinical practice*. 2014 Feb 1;103(2):137-49.
- [5] Goldenberg RL, McClure EM, Harrison MS, Miodovnik M. Diabetes during pregnancy in low-and middle-income countries. *American journal of perinatology*. 2016 Nov;33(13):1227-35.
- [6] Cho N, Shaw JE, Karuranga S, Huang Y, da Rocha Fernandes JD, Ohlrogge AW, Malanda B. IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. *Diabetes research and clinical practice*. 2018 Apr 1;138:271-81.

- [7] Muche AA, Olayemi OO, Gete YK. Prevalence and determinants of gestational diabetes mellitus in Africa based on the updated international diagnostic criteria: a systematic review and meta-analysis. *Archives of Public Health*. 2019 Dec 1;77(1):36.
- [8] Abdelgadir M, Elbagir M, Eltom A, Eltom M, Berne C. Factors affecting perinatal morbidity and mortality in pregnancies complicated by diabetes mellitus in Sudan. *Diabetes research and clinical practice*. 2003 Apr 1;60(1):41-7.
- [9] Ovesen PG, Jensen DM, Damm P, Rasmussen S, Kesmodel US. Maternal and neonatal outcomes in pregnancies complicated by gestational diabetes. A nation-wide study. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2015 Sep 22;28(14):1720-4.
- [10] Mitanchez D, Yzydorczyk C, Simeoni U. What neonatal complications should the pediatrician be aware of in case of maternal gestational diabetes?. *World journal of diabetes*. 2015 Jun 10;6(5):734.
- [11] World Health Organization. World health statistics 2016: monitoring health for the SDGs sustainable development goals. World Health Organization; 2016 Jun 8.M
- [12] McIntyre HD, Catalano P, Zhang C, Desoye G, Mathiesen ER, Damm P. Gestational diabetes mellitus. *Nature Reviews Disease Primers*. 2019 Jul 11;5(1):1-9.
- [13] Mwanri AW, Kinabo J, Ramaiya K, Feskens EJ. Gestational diabetes mellitus in sub-Saharan Africa: systematic review and meta-regression on prevalence and risk factors. *Tropical Medicine & International Health*. 2015 Aug;20(8):983-1002.
- [14] Persson B, Hanson U. Neonatal morbidities in gestational diabetes mellitus. *Diabetes care*. 1998 Aug 1;21:B79.
- [15] Kampmann U, Madsen LR, Skajaa GO, Iversen DS, Moeller N, Ovesen P. Gestational diabetes: a clinical update. *World journal of diabetes*. 2015 Jul
- [16] Hoirisch-Clapauch S, Porto MA, Nardi AE. May maternal lifestyle have an impact on neonatal glucose levels?. *Medical hypotheses*. 2016 Feb 1;87:80-6.
- [17] Alam M, Raza SJ, Sherali AR, Akhtar AS. Neonatal complications in infants born to diabetic mothers. *Journal of the College of Physicians and Surgeons--Pakistan: JCPSP*. 2006 Mar;16(3):212-5.
- [18] Nilofer AR, Raju VS, Dakshayini BR, Zaki SA. Screening in high-risk group of gestational diabetes mellitus with its maternal and fetal outcomes. *Indian journal of endocrinology and metabolism*. 2012 Mar;16(Suppl1):S74.
- [19] Bromiker R, Perry A, Kasirer Y, Einav S, Klinger G, Levy-Khademi F. Early neonatal hypoglycemia: incidence of and risk factors. A cohort study using universal point of care screening. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2019 Mar 4;32(5):786-92.
- [20] Palylyk-Colwell E, Campbell K. Oral Glucose Gel for Neonatal Hypoglycemia: A Review of Clinical Effectiveness, Cost-Effectiveness and Guidelines.

- [21] Mortier I, Blanc J, Tosello B, Gire C, Bretelle F, Carcopino X. Is gestational diabetes an independent risk factor of neonatal severe respiratory distress syndrome after 34 weeks of gestation? A prospective study. *Archives of gynecology and obstetrics*. 2017 Dec 1;296(6):1071-7.
- [22] Miakotina OL, Dekowski SA, Snyder JM. Insulin inhibits surfactant protein A and B gene expression in the H441 cell line. *Biochimica et Biophysica Acta (BBA)-Gene Structure and Expression*. 1998 Oct 23;1442(1):60-70. 25;6(8):1065.