



Increasing Trend of Gestational Diabetes Among Pregnant Females

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ABSTRACT

Introduction: Gestational Diabetes mellitus (GDM) incidence has risen in recent decades affecting nearly 15 percent of females who experience elevated blood sugar levels during their pregnancy.

Aims and Objectives: To assess the increasing trend of gestational diabetes among pregnant females visiting DHQ Hospital Narowal.

Place and Duration of study: Data was collected at DHQ Hospital Narowal during 2018 & 2023.

Material and Methods: The study was carried out at DHQ Hospital, Narowal. During study period, 3600 pregnant females aged between 18 to 45 years were enrolled and examined for gestational diabetes mellitus in each year 2018 & 2023. The collected data was entered and analyzed in computer software SPSS version 25.0. Data was presented in tables and graphs for both quantitative and qualitative variables. $p\text{-value} \leq 0.05$ was taken as significant.

Results: Among 3600 pregnant females in year 2018, 75.1% were 18-30 years old and 24.9% were 31-45 years old. Among pregnant females in year 2023, 89.0% were 18-30 years old and 11.0% were 31-45 years old. Among pregnant females, 15.9%, 42.4% and 41.7% had gestational age 0-12 weeks, 13-28 weeks and 29-40 weeks in 2018, respectively. In 2023, 29.6%, 22.1% and 48.3% females had gestational age 0-12 weeks, 13-28 weeks and 29-40 weeks, respectively. Among these pregnant females, 20.1% in 2018 and 35.0% in 2023 were diagnosed with gestational diabetes while the increasing trend was found to be 14.9%.

Conclusion: This study concluded that there was an increasing trend of gestational diabetes mellitus among pregnant females in Narowal.

Key Words: Increasing trend, gestational diabetes, pregnant, females.

INTRODUCTION

GDM (gestational diabetes mellitus) is characterized by the emergence or initial identification of glucose intolerance during 2nd or 3rd trimester of the pregnancy, without any pre-existing diabetes prior to gestation^{1,2}. GDM arises from an irregular glucose metabolism stemming from the destruction of β -cells. During pregnancy, insulin resistance emerges as a consequence of factors related to both the maternal condition and the pregnancy itself. During the 2nd and 3rd trimesters, placental hormones contribute to insulin desensitization. Additionally, the impact of elevated progesterone, growth hormone, cortisone and estrogen levels become evident, leading to an observable increase in insulin resistance in pregnancy³⁻⁵. The GDM is a global occurrence, affecting nearly 15 percent of females who

experience elevated blood sugar levels during their pregnancy^{6,7}. The GDM prevalence varies across regions, ranging from 25 percent in the South-East Asia to 17.5 percent in North Africa and Middle East, 12.6 percent in the Europe while 10.4 percent in the North America & Caribbean region⁸.

GDM incidence has risen over recent decades. A study carried out in United States revealed that the GDM incidence per 100 individuals enhanced from 4.6 during 2006 to 8.2 during 2016, reflecting a notable growth rate of 78 percent⁹. In 2020, the GDM overall rate among females giving birth was 7.8 / 100 births, marking a 30% increase from the 2016 figures¹⁰. The GDM incidence in Australia rose 2.7 times, escalating from 8.9 percent in 2011 to 23.7 percent in 2020, with an annual increase of 8.59 percent. Concurrently, the annual growth rate of T2DM reached 11.69%¹¹.

In a retrospective cohort study conducted in Korea, the prevalence of GDM was 7.5% during 2009–2011: 5.7% in 2009, 7.8% in 2010, and 9.5% in 2011¹². In Taiwan, the GDM annual incidence enhanced by 1.8-fold in twelve years between 2004 - 2015, with an important continuous rising trend (from 7.6 percent to 13.4 percent)¹. In China, the GDM prevalence enhanced significantly from 4

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percent during 2010 to 21 percent during 2020⁸. An Iranian study investigated 67320 pregnant females for GDM prevalence between 2008-2013. Over this 6 year period 5425 pregnant females were detected with GDM while 6-year prevalence was 8.6 percent. While the GDM annual incidence enhanced from 3.1 percent during 2008 to 18.9 percent during 2013¹³.

Gestational diabetes mellitus is also prevalent in Pakistan¹⁴. The GDM reported prevalence ranges from 4.2 percent to 26 percent. Within Pakistan, conflicting results exist, demonstrating diverse prevalence rates. For instance, rates as high as 26 percent have been reported in Peshawar, 4.2 percent to 8 percent in Karachi, less than one percent in Lahore, 22 percent in Balochistan and 14 percent in Bahawalpur while 14.8 percent in Hyderabad. The substantial variation can be attributed to differences in patient selection and the criteria utilized for the diagnosis of GDM, contributing to further confusion⁶. The increasing trend of GDM is also evident in Pakistan. The overall GDM prevalence was noticed as 3.45 percent in 2014 which has now enhanced to $\leq 10\%$ ³.

Gestational diabetes mellitus has been consistently linked to obstetric as well as neonatal complications¹⁵. Pregnancies affected by the GDM exhibit significant alterations in placental expression of the neo-angiogenesis as well as inflammation markers, potentially contributing to adversative perinatal outcomes^{16,17}. Elevated maternal blood sugar levels promote enhanced fetal growth, resulting in macrosomia and an increased likelihood of delivering a large-for-gestational-age infant. This condition is associated with a higher risk of cesarean section and various delivery complications, including uterine rupture, perineal laceration, brachial plexus harm, shoulder dystocia, perinatal asphyxia and fractures¹⁸. Additionally, the GDM elevates the chance of neonatal metabolic anomalies, including neonatal respiratory distress disorder, hyperbilirubinemia, polycythemia, neonatal hypoglycemia & hyperinsulinemia¹⁹. GDM is believed to be an independent risk determinant for hypertension, obesity, T2DM and metabolic disorder among postpartum females and their children²⁰. Additionally, GDM is highly acknowledged as an important risk factor regarding future cardiometabolic diseases in both mothers and their children²¹.

Over the course of more than a decade, the GDM prevalence has been on the rise. This underscores the imperative step to enhance the screening as well as management of the GDM, aiming to improve outcomes for mothers, fetuses, and neonates²².

Therefore, it was pertinent to conduct a study to assess the increasing trend of gestational diabetes among pregnant females visiting DHQ Hospital Narowal. This study aims to provide a comprehensive understanding of this often-overlooked issue. The valuable insights gained will contribute to subsequent research projects and aid in healthcare planning for the future. Therefore, this study has the potential to offer crucial information for comprehending, planning, and managing this complex healthcare challenge.

MATERIAL AND METHODS

The study was carried out at DHQ Hospital, Narowal. During study period, 3600 pregnant females aged between 18 to 45 years were enrolled and examined for GDM prevalence in 2018 and 2023. Data was collected using a structured questionnaire regarding age, gestational age, BMI and diagnosis of GDM. Pregnant women who suffered from other types of diabetes mellitus were excluded. From pregnant women informed consent was taken for 75gm glucose dissolved in 250ml of water. Venous plasma glucose was estimated after 2h of glucose ingestion (WHO criteria for diagnosis of GDM). A 2-hours plasma glucose with a cut off of ≥ 140 mg/dl was taken as diagnosis of GDM.

The collected data was entered in computer software SPSS (Statistical Package for Social Sciences) version 25.0. The data was statistically analyzed with same software. Data was presented in tables and graphs for both quantitative and qualitative variables. The increasing trend of gestational diabetes was evaluated.

RESULTS

Table-1: indicates that among 3600 pregnant females in 2018, 75.1% were 18-30 years old and 24.9% were 31-45 years old. Among 3600 pregnant females in 2023, 89.0% were 18-30 years old and 11.0% were 31-45 years old.

Table-2: highlights that among pregnant females, 15.9%, 42.4% and 41.7% had gestational age 0-12 weeks, 13-28 weeks and 29-40 weeks in 2018, respectively. In 2023, 29.6%, 22.1% and 48.3% females had gestational age 0-12 weeks, 13-28 weeks and 29-40 weeks, respectively.

Table-3: asserts that among pregnant females, 17.0%, 70.2% and 12.8% had BMI < 18.5 , 18.5–24.9 and 25–29.9 in 2018, respectively. In 2023, 19.5%, 63.9% and 16.6% pregnant females had BMI < 18.5 , 18.5–24.9 and 25–29.9, respectively.

Table-4: describes that among the pregnant females, 20.1% in 2018 and 35.0% in 2023 were diagnosed with gestational diabetes while the increasing trend was found to be 14.9%.

Age	2018		2023	
	Freq.	%	Freq.	%
18-30 years	2705	75.1	3205	89.0
31-45 years	895	24.9	395	11.0
Total	3600	100.0	3600	100.0

Table-1: Age of pregnant females

Gestational Age	2018		2023	
	Freq.	%	Freq.	%
0-12 weeks	571	15.9	1065	29.6
13-28 weeks	1526	42.4	796	22.1
29-40 weeks	1503	41.7	1739	48.3
Total	3600	100.0	3600	100.0

Table-2: Gestational age of pregnant females

BMI	2018		2023	
	Freq.	%	Freq.	%
<18.5	613	17.0	702	19.5
18.5–24.9	2528	70.2	2300	63.9
25–29.9	459	12.8	598	16.6
Total	3600	100.0	3600	100.0

Table-3: Body mass index of pregnant females

	2018		2023	
	Freq.	%	Freq.	%
Yes	722	20.1	1261	35.0
No	2878	79.9	2339	65.0
Total	3600	100.0	3600	100.0
Increasing Trend	14.9%			

Table-4: Diagnosis of gestational diabetes

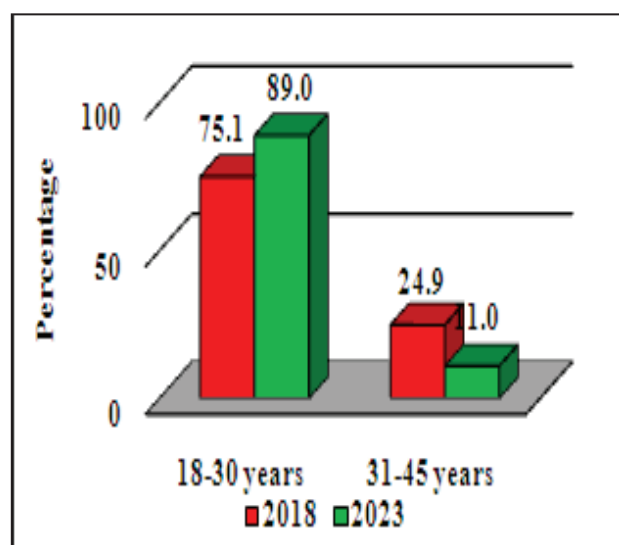


Fig-1: Age of pregnant females

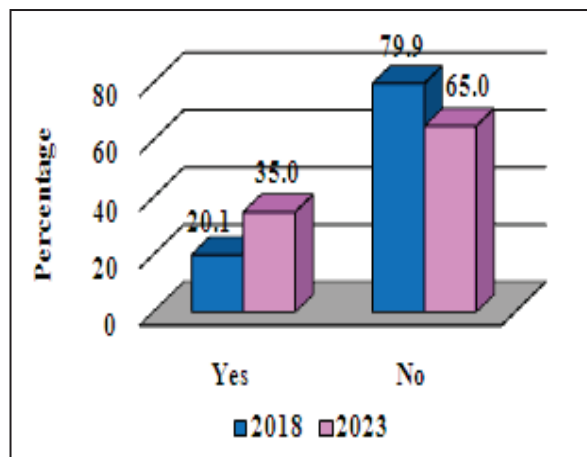


Fig-2: Diagnosis of gestational diabetes

DISCUSSION

Gestational diabetes incidence has risen in recent decades affecting nearly 15 percent of females who experience elevated blood sugar levels during their pregnancy. The current study was conducted to assess the increasing trend of gestational diabetes among pregnant females in Narowal. To obtain proper outcomes, pregnant females attending DHQ Hospital, Narowal were included in the study, and it was found that most of the pregnant females were 18-30 years old. In 2018, 75.1% and 24.9% while in 2023 89.0% and 11.0% were 18-30 years and 31-45 years old, respectively. A most recent study performed by Meng and coworkers (2023) also reported comparable results that mainstream of the pregnant females were 18-30 years old. The findings of this study corroborated that 68.78%, 63.87%, 59.73%, 60.68%, 60.98%, 56.46% and 55.36% pregnant females were 18-30 years old in 2015, 2016, 2017, 2018, 2019, 2020 and 2021, respectively¹⁵. It was found during study that majority of pregnant females had gestational age 13-28 weeks in 2018 while most of the pregnant females had gestational age 29-40 weeks in 2023. During study body mass index of the pregnant females was assessed. Study disclosed that majority of the pregnant females (70.2%) in 2018 had normal weight (BMI = 18.5–24.9), followed by underweight (17.0%) (BMI = <18.5) and overweight (12.8%) (BMI = 25–29.9). Similar trend was also observed in 2023 that mainstream of the pregnant females (63.9%) had normal weight, followed by underweight (19.5%) and overweight (16.6%). A similar study carried out by Zhou and associates (2022) reported that among pregnant females, 43.3% had normal weight in 2006 while in 2016 this figure was decreased to 37.8% while remaining proportion of pregnant females were

overweight/obese during these years⁹. When the diagnosis of gestational diabetes was made among pregnant females, study highlighted that 20.1% females in 2018 and 35.0% females in 2023 were diagnosed with gestational diabetes while the increasing trend was 14.9%. The findings of a study undertaken by Koo and collaborators (2016) demonstrated that 5.7%, 7.8% and 9.5% pregnant females were diagnosed with gestational diabetes in 2009, 2010 and 2011, respectively, while the increasing trend 3.8% from 2009 to 2011. A study done by Meng and coworkers (2023) reported that among pregnant females, the prevalence of GDM was 24.07%, 25.43%, 21.36%, 23.72%, 26.91%, 24.36%, 26.14% and 24.66% in 2015, 2016, 2017, 2018, 2019, 2020 and 2021, respectively, an increasing trend of 0.59% from 2015 to 2021¹⁵. A study done in Taiwan by Su and teammates (2021) reported that GDM annual prevalence increased by 1.8-fold during the 12 years from 2004 to 2015, with a significant continuous increasing trend from 7.6% to 13.4%)¹. The results of another study carried out in Iran by Hazar and comrades (2017) indicated that prevalence of GDM was 3.1%, 3.7%, 4.0%, 4.5%, 14.1% and 18.9% in 2008, 2009, 2010, 2011, 2012 and 2013, respectively. The increasing trend was 15.8% from 2008 to 2013¹³. A study performed in Pakistan by Sheikh and fellows (2020) observed a progressive increase in GDM prevalence from 2005 to 2018. In 2005 it was 6.3% and remained constant at around 8% from 2006 to 2010. Over the ensuing years a progressive rise was noticed. It was 9.86% in 2011 and during 2017 and 2018, it was about 19%. During initial 5 years, average prevalence was 8.09% (from 2005 to 2009) and during last five years (2014 to 2018) it was 17.8%²². The current study also shows a continuing incremental GDM trend which merits serious consideration by the health authorities.

CONCLUSION

Study concluded that there was an increasing trend of 14.9% gestational diabetes mellitus amongst pregnant females in Narowal. More studies are required to be conducted to assess the increasing trend of gestational diabetes amongst pregnant females.

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