

# Prevalence And Characteristics Of Gestational Diabetes Mellitus At X Hospital West Jakarta For The Period Of January 2021 - April 2022

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**ARTICLE INFO****Article history:**

Received Aug 20, 2012

Revised Aug 30, 2022

Accepted Sep 06, 2022

**Keywords:**

Gestational Diabetes Mellitus,  
Prevalence,  
Characteristics

**ABSTRACT**

Gestational diabetes mellitus that occurs in women during pregnancy is called gestational diabetes mellitus, or commonly abbreviated as DMG. DMG is very dangerous because it has the possibility of complications for pregnant women, such as high blood pressure, large babies born, and also delays in delivery. There is 1 out of 6 births affected by GDM. Meanwhile, according to the 2013 WHO, in Indonesia, around 1.9-3.6% of pregnant women suffer from DMG. The purpose of this study was to determine the prevalence of pregnant women with gestational diabetes mellitus at RS X West Jakarta in the period of January 2021-March 2022. This type of research used descriptive cross-sectional research design. The study was conducted at RS X West Jakarta with a total sample of 2236 mothers who gave birth and a total of 35 of them with gestational diabetes mellitus were selected by non-random Consecutive Sampling that are qualified in inclusion and exclusion criterias to support research related to the prevalence and characteristics of diabetes mellitus. gestational age at RS X West Jakarta. Data was extracted from the medical records of GDM patients who had given birth. There were 6 characteristics of GDM, namely: maternal age at delivery, with an average age of 32 years; gestational age, with an average of 27-30 weeks; the most widely used therapy was insulin (57.1%); the most widely used delivery method was sectio caesarea (80%); the baby's birth weight, with a mean of 3.47 kg; and with the value of the mother's body mass index, the mean value of which is 30.65 (obesity). Suggestions for further research include that research can be carried out with a larger number of subjects to obtain results of prevalence and characteristics that are more accurate.

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## INTRODUCTION

Generally, diabetes is defined as a chronic metabolic disease characterized by elevated blood glucose (or blood sugar) levels (Liu et al., 2021). Diabetes mellitus that occurs in pregnant women is called as Gestational Diabetes Mellitus or commonly abbreviated as GDM (Genova et al., 2018). Gestational Diabetes Mellitus occurs when the patient's body does not make enough insulin during pregnancy (Genova et al., 2018). This insulin hormone is a hormone produced by the pancreas and is involved in important for inserting blood sugar into body cells which will later be used as energy (Honardoost et al., 2021; Jerez Tirado & Porrás Ramírez, 2021). In 2019, according to The International Diabetes Federation, 223 million women (aged 20-79) suffered from diabetes (C. H. Kim et al., 2016; Wade et al., 2021). This figure is projected to increase to as many as 343 million sufferers by 2045. There are 20 million or 16% of live births who have some form of hyperglycemia, and are estimated 84% of the 20 million live births are caused by gestational diabetes mellitus (Lee et al., 2020). Most cases of hyperglycemia during pregnancy occur in low-and middle-income countries, where access to treatment centers is certainly limited. There are 1 of 6 births affected by Gestational Diabetes Mellitus. Meanwhile, according to the Ministry of Health, there are about 1,9-3,6% of pregnant women suffer from Gestational Diabetes Mellitus in Indonesia (Garg et al., 2020).

Gestational Diabetes Mellitus is very dangerous because it has the possibility with complications for pregnant women, such as high blood pressure, large babies, and also obstructed labour (Genova et al., 2018; Jerez Tirado & Porrás Ramírez, 2021). Approximately 50% of people with Gestational Diabetes Mellitus have a risk suffering type 2 diabetes mellitus within 5 to 10 years after giving birth (Pan et al., 2015). Other risks that can affect the baby are, being very large size (more than 9 pounds or 4,08 kg) which will affect on a more difficult birth process, being born early which can cause breathing problems and others, having low blood sugar, and will suffer from type 2 diabetes mellitus in the future (Noctor et al., 2016). Despite 50 years doing a research, there is still no agreement on the most optimal way to check for Gestational Diabetes Mellitus, because basically, gestational diabetes has no characteristic symptoms (Stanley et al., 2022).

Gestational Diabetes Mellitus has risk factors, such as age more than 25 years, excess weight, having a family with a history of type 2 diabetes mellitus, having given birth to a baby weighing more than 4,08 kg. Moreover, Gestational Diabetes Mellitus must also be assisted by insulin work very effectively to restore normal insulin work in the patient's body (Thomas et al., 2019). The majority of hyperglycemia events that are estimated is caused by Gestational Diabetes Mellitus also occur mostly in lower middle income countries due to difficult access for the treatment centers (Stanley et al., 2022).

Therefore, the researcher is interested to recognize the prevalence and characteristics of birth maternal age, gestational age, birth weight in infants, the percentage who use injection treatment; oral; and those who do not use any treatment, the method of delivery used, and also the nutritional status of patients with Gestational Diabetes Mellitus at X hospital in West Jakarta.

## RESEARCH METHOD

This research was an observational descriptive study and carried out with a cross-sectional design (Sugiyono, 2018, 2019). This was conducted on the patients who had a Gestational Diabetes Mellitus history registered in the medical record at X hospital located in West Jakarta for the period January 2021 - April 2022. Calculation of the sample size in this research used to examine the characteristics of Gestational Diabetes Mellitus used descriptive categorical sample formula with a sample size needed for this study was 35 subjects, while for the total subjects prevalence needed were all subjects who had given birth in X hospital West Jakarta with a total of 2238 subjects. Subject data were obtained from the medical records, which met with the inclusion criteria, that were the patients who had given birth and had a Gestational Diabetes Mellitus history and patients with a history of gestational diabetes mellitus only at X hospital in West Jakarta. Meanwhile, the exclusion criteria in this study were the patients with other types of diabetes mellitus. Data related to the prevalence and characteristics of the subjects were taken from January 2021 to March 2022. The reviewed characteristics were the mother's age at delivery, gestational age, birth weight of the baby, the percentage who used injection treatment; oral; and who did not use any treatment, the method of delivery used, and also the nutritional status of the research subjects. Each subject's data was recorded, converted into categorical-numerical, then analyzed using statistics (Hidayat, 2021; Sugiyono, 2017). This study has received an ethical permit from the Research and Community Service Unit (UPPM) of the Faculty of Medicine, Tarumanagara University, and has been approved by the X Hospital in West Jakarta for doing a research.

## RESULTS AND DISCUSSION

### Prevalence of Research Subjects

According to the research conducted at the X hospital in West Jakarta, it was obtained that there were 2238 mothers gave birth (Table 1). Of the 2238 mothers who gave birth, there were 35 (1.56%) mothers who suffered Gestational Diabetes Mellitus, while the remaining of 2203 (98.44%) mothers did not suffer Gestational Diabetes Mellitus.

This is in accordance with a survey conducted by Al-Daghri N et al. (2021), Khalli MM and Alzahra E, Khader YS et al. (2010), Clouse K et al. (2015), Jamali S et al. (2015) which took the results of several thousand research subjects, it was found that the prevalence of Gestational Diabetes Mellitus get a number below 1% - 2%.<sup>8</sup> However, this is slightly different from the survey conducted by Abedi P et al. (2014) whose prevalence is quite high at 6,1%, Vaezi A et al. (2012) whose prevalence reached 9,6%, Noughjah S. et al. (2016) whose prevalence touched the figure of 22%, even a survey conducted by Al-Rubeaan K et al (2009) could reach a very high figure of 36,6%, even though the subjects were taken equally without excluding any concomitant diseases.<sup>8</sup> However, it could be that this difference results occurred due to differences in the place of data collection, because the majority who got high prevalence results took the data in hospitals which were specifically affected by diabetes and for the pregnant and maternal women.

**Table 1.** Prevalence Of Research Subjects

	Amount(people)	Percentage
Diabetes Melitus Gestasional	35	1,56%
Non-Diabetes Melitus Gestasional	2203	98,44%
Total	2238	100%

### Characteristics of the Research Subject

In the research subjects that had examination data (Table 2), there were 35 (100%) study subjects suffered from Gestational Diabetes Mellitus. In the data of maternal age at birth with an average range of 32 years, obtained zero (0 %) subjects aged < 20 years (young age at birth), 21 (60%) subjects aged 20-35 years at birth, and 14 (40%) subjects aged > 35 years. Moreover, it was also found in the data that for gestational age which was in the average range of 34,63 weeks, there were 0 (0%) study subjects suffered Gestational Diabetes Mellitus at gestational age < 0-13 weeks (trimester 1). Four (11,4%) research subjects suffered Diabetes Mellitus at gestational age of 14-26 weeks (trimester 2), and 31 (88,6%) study subjects among them had Gestational Diabetes Mellitus at gestational age of 27-40 weeks (trimester 3). Regarding the available data on therapy, as many as 20 (57,1%) of research subjects used insulin as therapy, 10 (28,6%) research subjects used oral hypoglycemic therapy, zero (0%) research subjects used combination insulin and oral hypoglycemic therapy, and five (14,3%) study subjects did not use any pharmacological therapy. Related to the delivery method used by the research subjects, there were two (5,7%) research subjects used vaginal delivery method, five (14,3%) research subjects used vaginal delivery method with assistance, 28 (80%) research subject used caesarean section method, day 0 (0.0%) as the method of delivery used. Based on the birth weight data obtained with the average range was 3,58 kg, obtained babies born with a weight of < 2,5 kg (small birth) amounted to zero (0%), weighing 2,5 kg - 4,0 kg amounted to 34 babies (97,1%), and those born with macrosomia/birth weight > 4,0 kg is one (2,9%). According to the available data, related to the nutritional status/body mass index of research subjects with an average range of 30,65 kg / m<sup>2</sup>, there was one (2,9%) of research subjects with skinny nutritional status, one (2,9%) ps research subjects with normal nutritional status, three (8,6%) of research subjects with fat nutritional status, and 30 (85,7%) of research subjects among them with obese nutritional status.

Looking from the Gestational Diabetes Mellitus characteristics, which were divided by the age of the research subjects at delivery, gestational age, pharmacological therapy, method of delivery, birth weight of the baby, and nutritional status (BMI) (Table 4.2). At the age of the research subjects during childbirth, it was found that the most of research subjects (60%) gave birth at the ideal age which was in the range of 20-35 years which on average was at the age of 32 years.<sup>9</sup> This is directly proportional to the research conducted by Guoju Li et al. (2020) which stated that mothers aged 30 years will be more at risk for gestational diabetes mellitus than mothers aged 28 years or even younger.

**Table 2.** Characteristics Of Research Subjects

Parameter	Amount n=35 (%)	Mean	±	SD	Median (Min - Max)
Diagnosis of gestational melitus diabetes					
Yes	35 (100%)				
No	0 (0%)				
Age of mother during childbirth ( years )		32,34	±	5,886	32 (21 - 41)
< 20 (young age)	0 (0%)				
20 - 35 (ideal age)	21 (60%)				
> 35 (old age)	14 (40%)				
Age of pregnancy ( week )		34,63	±	6,791	37 (14 - 40)
0 - 13 (trimester 1)	0 (0,0%)				
14 - 26 (trimester 2)	4 (11,4%)				
27 - 40 (trimester 3)	31 (88,6%)				
Therapy					
Insulin	20 (57,1%)				
Therapy ipoglikemik oral	10 (28,6%)				
Combination of insulin and hypoglycemic therapy oral	0 (0,0%)				
Do not use farmako therapy	5 (14,3%)				
Childbirth Method					
Pervaginam	2 (5,7%)				
Pervaginam in help	5 (14,3%)				
Sectio caesarea	28 (80%)				
Pervaginam after sectio caesarea	(0,0%)				
Weight of Birth of a Baby (kg)		3,47	±	0,362	3,58 (3 - 4)
< 2,5	0 (0,0%)				
2,5 - 4,0	34 (97,1%)				
> 4,0	1 (2,9%)				
Nutrition Status (kg/m <sup>2</sup> )		30,65	±	5,18	30,49 (16 - 43)
Skinny	1 (2,9%)				
Normal	1 (2,9%)				
Fat	3 (8,6%)				
Obesity	30 (85,7%)				

In Table 2, it was obtained that gestational age when affected to Gestational Diabetes Mellitus mostly about 88,6% in weeks 27-40 or trimester 3, and the remaining of 11,4% in weeks 12-26 or trimester 2. Based on these data, none of the study subjects were affected in week 0 - 13 or trimester 1. This is in line with information provided by the CDC that usually Gestational Diabetes Mellitus will occur at the gestational age in trimester 2 - trimester 3. According to The University of California San Franciscogestational diabetes usually does not occur until the end of pregnancy or trimester 2 - trimester 3, when the placenta begins to produce more hormones that interfere with the mother's insulin (C. H. Kim et al., 2016). Screening for Gestational Diabetes Mellitus will usually be done between weeks 24 to 28, but women who are at high risk for developing this disease may be screened in the first trimester of pregnancy (Noctor et al., 2016; Stanley et al., 2022).

The most widely used therapy by study subjects in Table 2 data was insulin used by 57,1% of research subjects. This was accordance with the research conducted by Mikael S. Huhtala et al. (2020) which stated that those who used insulin were 54,2%, those who used metformin were 37,6%, and the rest who had not known therapeutic use were 8,2%.<sup>11</sup> In accordance with the theory given by The National Institute of Diabetes and Kidney Disease (NIDKD), that is insulin is widely used as a first-line treatment of Gestational Diabetes Mellitus because insulin does not harm the baby's health (Kleinwechter, 2021).

Based on Table 2, the childbirth method of sectio caesarea is the most widely used, even up to the 80%. This data is in line with the research conducted by Klaudia Grabowska et al. (2017) who get result that the user method of sectio caesarea childbirth method in his research affected by Gestational Diabetes Mellitus was more than 50%. In accordance with the theory of The National Institute for Health and Care Excellence (NICE) which explains that the best choice in the childbirth method in people affected by Gestational Diabetes Mellitus is the method of sectio caesarea (Kazmi et al., 2017).

The birth weight of babies obtained in Table 2 data is the majority of babies weighing between 2,5-4,0 kg with an average of 3,58 kg, although there was 1 baby born with macrosomia weight or which was more than

4,0 kg. This is in line with research conducted by Cuilin Zhang (2020), namely the average baby born to a mother who suffers from Gestational Diabetes Mellitus was more than 3 kg. This is also reinforced by the theory from the CDC that mothers who are suffering gestational diabetes have a high enough risk of giving birth to a large enough baby to even get macrosomia. Attached from Table 2, 85,7% of the research subjects who experienced Gestational Diabetes Mellitus had obese nutritional status with an average BMI of 30,49 kg/m<sup>2</sup>. In line with research conducted by Da Yao et al. (2020), they found that obesity in mothers was positively correlated with the incidence of Gestational Diabetes Mellitus. Who wrote that one of the high-risk factors for a mother affecting Gestational Diabetes Mellitus is obesity (C. W. Kim et al., 2017).

## CONCLUSION

Based on the research related to patients with Gestational Diabetes Mellitus at X hospital in West Jakarta from January 2021 - March 2022, from 2238 mothers who gave birth, there were 35 research subjects who experienced Gestational Diabetes Mellitus so that the prevalence of study subjects who had Gestational Diabetes Mellitus for that period was 1,56%. According to the research that has been conducted on 35 research subjects, it was obtained that the characteristics related to the age of research subjects were in the ideal age between 20-35 years, but with an average of 32 years. For gestational age when affected to Gestational Diabetes Mellitus mostly obtained in gestational age 27-40 weeks (trimester 3) and the rest at 14-26 weeks (trimester 2). The most widely used therapy was insulin and was used by 57,1% of the research subjects. Sectio caesarea is the most widely used method of delivery by the research subjects, as many as 80% used this method of child birth. The baby's birth weight was obtained on average of 3,58 kg. Nutritional status of the most widely found on the subjects of this research was obesity with a percentage of 85,7% and the BMI average value was 30,49 kg/m<sup>2</sup>.

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