International Journal of Science and Research (IJSR)
ISSN: 2319-7064

To Assess the Awareness and Knowledge of Gestational Diabetes in Antenatal Women of Pune

Prapti Nawarey[1], Kirti Thodge[2], Albin Jerome[3]

[1]Physiotherapist, St. Andrew's College of Physiotherapy, Pune, Maharasthra, India
Email: *pvn0017[at]gmail.com*

[2]Assistant Professor, St. Andrews College of Physiotherapy, Pune, Maharashtra, India
Email: *kirtithodge[at]gmail.com*

[3]Principal, St Andrews College of Physiotherapy, Pune, Maharashtra, India
Email: *albinjerome[at]gmail.com*

Abstract: ***According to the International Diabetes Federation, gestational diabetes causes serious and unrecognized health problems for both mother and fetus. Within one or two decades, the prevalence of gestational diabetes mellitus (GDM), one of the most frequent pregnancy problems, has climbed up by more than 30% in many nations, particularly developing nations. Our study included 380 pregnant women from Pune who were given a pretested questionnaire to measure their knowledge and understanding of gestational diabetes (GDM). This questionnaire consisted of 13 questions divided into three categories and were scored as: poor, average and good. In our study, out of 380 participants, 256 women (67.36%) got an average score of 5-8.78 women (20.52%) received good score of 9-13whereas, 46 women (12.1%) got poor scores between 0-4. Out of 380 participants, 73.95% had knowledge about GDM and its risk factors, 21.53% had awareness about screening and treatment for GDM, 4.50% awareness about GDM consequences. The major source of information in our research for women was from doctors and healthcare professionals thus the medical and para medical staff should be more involved and trained in providing information to people.***

Keywords: Gestational Diabetes Mellitus, Antenatal women, knowledge and awareness.

1. Introduction

"Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of variable severity with onset or first recognition during present pregnancy [1]".According to International Diabetes Federation, gestational diabetes mellitus (GDM), poses a serious and underappreciated risk to the health of both the mother and the unborn child [2].The etiology of diabetes is assumed to be multifactorial. Many individual-stage nonmodifiable danger elements like genetic, age, ethnicity, and own circle of relatives records were prospectively related to kind 2 diabetes, however the will increase in occurrence in maximum populations haveprobably been driven by a modifiable risk factors including sedentary lifestyle and/or lack of exercise, increasing prevalence of overweight/obesity, unhealthy diets and habits, exposure to environmental pollutants and mental health , short sleep duration, and the built environment [3].

Most sufferers with GDM might not have any signs on account of the GDM in keeping with se. Features such as polyuria and lethargy often associated with diabetes may be related to the pregnancy [4].GDM usually presents late in the second or during the third trimester [1].In normal pregnancy there is an increase in insulin resistance in order to make glucose, free fatty acids and amino acids available for the fetus [5].During pregnancy the insulin antagonism is due to the combined effect of human placental lactogen, estrogen, progesterone, free cortisol and degradation of the insulin by the placenta. The insulin requirement at some stage in being pregnant will increase as being pregnant advances.[1] Although insulin resistance increases during pregnancy, most women maintain normal blood sugar levels by improving insulin production and release from the pancreas. However, in women with GDM, pancreatic beta cell reserves decrease, and insulin production cannot meet the increased insulin demand, resulting in hyperglycemia.[5]

According to the World Health Organization, the number of people with diabetes is expected to increase by more than 120% by 2025, from 135 million in 1995 to approximately 300 million. Since the prevalence of gestational diabetes (GDM) increases with diabetes, physicians need to pay special attention to this population. Focusing on initial defense can hinder progress. [6] Pediatric care for GDM begins with being "informed" of the risks to the mother and fetus and providing information about the management and effectiveness of GDM services.[1]

The burden of gestational diabetes (GDM) is increasing worldwide, it affects the health of mothers and their babies for both parents and their unborn children.[7] Undiagnosed or inadequately treated GDM can cause serious problems for mother and child. Additionally, women affected by GDM, and their children are more likely to develop type 2 diabetes later in life. According to the National Health Mission, the most common causes of maternal deaths worldwide are the development of polyhydramnios, preeclampsia, prolonged labor, dystocia, cesarean section, uterine atony, postpartum hemorrhage, disease and retinopathy of GDM. Recurrent miscarriages, intrauterine death, stillbirth, stillbirth, pregnancy, shoulder dystocia, childbirth, diabetes in children and adolescents, and shortness of breath are some of the risks to the fetus. Short- and long-term treatment of GDM leads to an increase in the incidence of the disease in many countries.[8] Type 2 diabetes mellitus (T2DM) prevalence has been quickly rising and the age of onset is getting younger globally due to the epidemiologic transition of the

population towards aging and more sedentary lifestyle connected to urbanization during the past few decades. [9]

Moreover, in the last one or two decades, the occurrence of gestational diabetes (GDM), one of the most common pregnancy complications, has increased by more than 30% in many countries, especially developing countries, establishing an emerging global epidemic.[3] The 2019 estimate shows that 77 million people in India have diabetes; this number is expected to rise to over 134 million by 2045, with GDM accounting for most of the total. Southeast Asians have higher prevalence of GDM. The reasons behind racial/ethnic differences have not yet been elucidated, but growing evidence suggests that the mechanisms may be multifactorial and may include differences in body composition, lifestyle (diet and physical activity), acculturation, genetic susceptibility, and treatment and the practice of reporting. Specifically, although Asians have a lower body mass index (BMI) overall, at a given BMI they are more likely to store visceral fat and develop abdominal fat, which is related to insulin resistance and impaired β mobileular function. Genetic predispositions may also increase the risk of GDM in some high-risk groups/ethnicities. [10]. GDM may inevitably include undiagnosed pre-existing T2DM. Therefore, the increased GDM in the general population is thought to be associated with T2DM.On the other hand, women with a history of GDM may be seven times more likely to develop T2DM later in life. [3]

It is well known that diabetes is associated with many complications of diabetes, such as macrovascular and microvascular complications and the most feared, death. Diabetes has also recently been linked to negative health problems such as mental illness, cancer, disability and liver disease. [10] Approximately 7% of pregnancies are complicated by GDM, resulting in more than 200,000 cases per year. Prevalence ranges from 1% to 14% of all pregnancies, depending on the study population and diagnostic methods used. Risk assessment for GDM should be taken care at the first prenatal visit. If they are found not to have GDM at that initial screening, they should be retested between 24 to 28 weeks of gestation period. Women those who possess average risk should undergo testing at 24–28 weeks of gestation.[11]The possibilities for pregnant women with GDM are many for example, family history of diabetes, previous birth of a baby weighing 4 kg or more, previous birth with pancreatic islet hyperplasia found at autopsy, unexplained Perinatal loss, polyhydramnios or recurrent vaginal candidiasis in current pregnancy, persistent glycosuria, age over 30 years, obesity, ethnicity (EastAsian, Pacificislandancestry). [1]

The risk of developing GDM is less if appropriate precautions are taken before pregnancy and women participate in regular physical activity before pregnancy. Biopsychosocial factors such as genetics, age, lifestyle, personality, stress levels, social support, family relationships and religious beliefs play an important role in the management of GDM. [12]. Self-management of GDM is complicated by many challenges, including time constraints, physical and social limitations, lack of information necessary for effective management and a lackof understanding of what is necessary to execute a decent management. Researchers have noted Inconsistencies in a few knowledge-related dimensions. This risk is significant and Women who have GDM during pregnancy are at least 6 times more likely to develop type 2 diabetes in their lifetime. Gestational diabetes also exposes the fetus to hyperglycemia, which causes increased insulin production and increased fat in the uterus. These two factors predispose the fetus to obesity and type 2 diabetes in the future. [13]

In addition, GDM is also associated with cardiovascular risk, stillbirth, early obesity, and adverse maternal outcomes such as preeclampsia, cesarean section, and operative births. Recent studies have shown that fetal macrosomia and gestational hyperglycemia are risk factors for shoulder dystocia. Not only are there risks to the mother during pregnancy, but there are also long-term consequences for the fetus. Therefore, it is important to disseminate and use GDM education, especially for young women. The 5th International Workshop-Conference on GDM recommends early family counseling to prevent maternal and fetal complications. Guidelines recommend reducing fat and energy intake, maintaining regular physical activity, and regular medical care. [14]

2. Literature Survey

According to review of literature only factors such as age, number of pregnancies, months of pregnancy, trimesters, and previous history of diabetes contributed to the knowledge and awareness. In the present study, we (i) assessed the status of awareness of GDM among antenatal women, (ii) assessed awareness about screening and treatment of gestational diabetes (iii) assessed awareness about long term GDM consequences.

3. Material and Methodology

The study conducted was a Descriptive Cross- Sectional Study with Purposive sampling conducted on 380 antenatal women in ANC clinics and hospital in Pune region for duration of 6 months. Permission to conduct the study was granted by Institutional Ethical Committee. Sample size was calculated with the same population proportion formula, taking into account the required precision of 5% on both sides of the proportion, 0.5 of the population requires a proportion and a significant value (1.96) indicates reliability. Sample size calculation was as follows:

$$N = \frac{Z2p(1-p)}{d2}$$

where N is the minimum sample size, Z is the critical value for the 95% confidence interval (1.96), p is the expected population rate (0.5), d is the actual need of both sides of the rate (5%)), N = 384. Hence the above the minimum sample size calculated from the equation is as follows: Assume that the non-response rate is 5%. Therefore, final model sample size was 380. Antenatal women within 18-38 years of age, who were in first and second trimester were included. Participants who were already diagnoses with GDM or Type 1 or Type 2 Diabetes Mellitus and also the ones belonging to medical profession were excluded from the study. The

questionnaire consisted of 13 questions and divided into 3 components of which first part had 6-questions on knowledge about GDM and its risk factors, second part had 4-questions about GDM screening and treatment, and lastly-3 questions about the consequences of GDM. All participants who answered 'Yes' were be given score of 1. Those who answered 'No' were given a rating of 0.The average score of mothers on knowledge of GDM and its Risk factors, screening and treatment and awareness about GDM consequences was calculated.

Good	9-13
Average	5-8
Poor	0-4

4. Results

Table 1: Distribution of the participants depending on Age

Age (In years)	Number of participants	Percentage (%)
18-24	174	45.78
25-31	160	42.10
32-38	46	12.10

Table 2: Score of knowledge and awareness of GDM in antenatal women of Pune

Performance	Number of Participants	Percentage
Poor (0-4)	46	12.1
Average (5-8)	256	67.36
Good (9-13)	78	20.52

Table 3: Knowledge and awareness of GDM

3(a) Knowledge about GDM and its risk factors

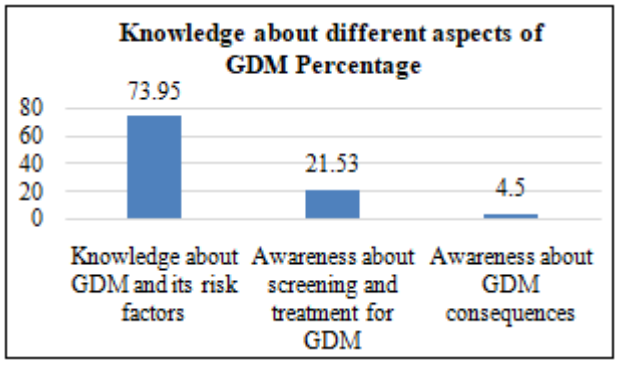
Knowledge about GDM and its risk factors		
Question	Number of participants who answered 'yes'	Percentage
Q1)Have you heard about diabetes mellitus?	373	98.15
Q2)Can diabetes occur for the first time in pregnancy?	363	95.52
Q3)Is family history of diabetes a risk factor for diabetes in pregnancy?	346	91.05
Q4)Is pre-pregnancy obesity a risk factor for diabetes in pregnancy?	324	85.26
Q5)Is diabetes in previous pregnancy a risk factor for diabetes in pregnancy?	302	79.47
Q6)Is rapid weight gain in pregnancy a risk factor for diabetes in pregnancy?	260	68.42
Average	328	86.31

3(b) Awareness about screening and treatment for GDM

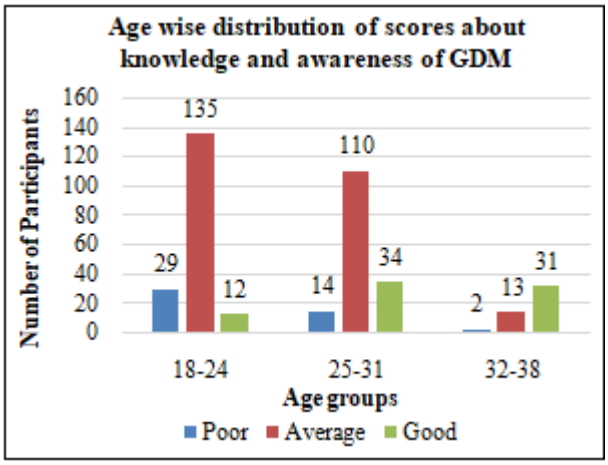
Awareness about screening and treatment for GDM		
Question	Number of participants who answered 'yes'	Percentage
Q7)Have you heard about Blood test for diabetes after glucose load?	223	58.68
Q8)Is testing for diabetes in pregnancy is necessary?	171	45
Q9)Even diet and exercises can treat GDM?	103	27.1
Q10)Insulin or drugs are required to treat GDM?	76	20
Average	143.25	37.69

3(c) Awareness about GDM consequences

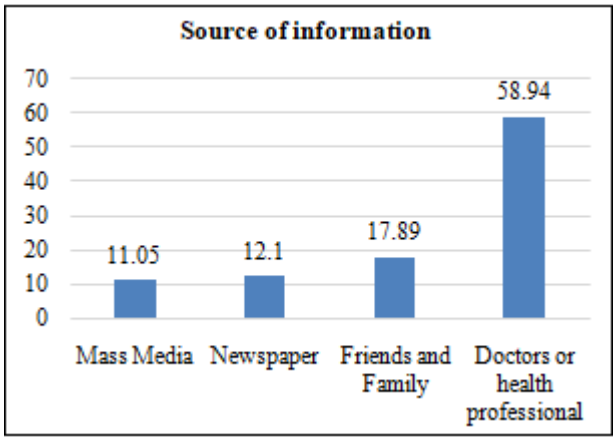
Awareness about GDM consequences		
Question	Number of participants who answered 'yes'	Percentage
Q11)Does GDM disappear after pregnancy?	58	15.26
Q12)Is baby at risk if GDM is not treated?	37	9.73
Q13)Mothers with GDM are at risk for overt diabetes?	25	6.57
Average	40	10.52



Graph 1: Knowledge and awareness about different aspects of GDM



Graph 2: Age-wise distribution of scores about knowledge and awareness of GDM.



Graph 3: Source of information on GDM

5. Discussion

The antenatal population of Pune city were categorized into 3 subgroups depending upon their age, wherein 45.78 % belonged to 18-24 age group, 42.1% belonged to 25-31 age group and 12.1% belonged to 32-38 age group. . In our study, out of 380 participants, 256 women (67.36%) got an average score of total. 78 women (20.52%) received good score of 9-13 whereas, 46 women (12.1%) got poor scores between 0-4. Participants had the maximum information about GDM and its risk factors but lack of knowledge was observed in the remaining 2 sets. Participants had an average awareness of GDM risk factors. There was a lack of knowledge on GDM screening, therapy, and side effects. This could be because GDM is not prioritized as one of the risk factors for poor pregnancy outcomes in our health care system. This difference in the knowledge and awareness could be attributed to the inclusion of both urban and rural population in our study. As in Pune city, the female literacy rate of urban areas was higher i.e. 86.12% as compared to the rural divisions which had 73.25%. Thus, the differences in the knowledge could be due to lower awareness programs conducted in rural areas. A study conducted by Sujinder Elamurugan showed similar results in which they concluded that the knowledge of antenatal women on GDM was just average in Pondicherry also, health awareness programs should be conducted to improve awareness of antenatal mothers for better utilization of health services.

Maximum (98.15 %) participant had the basic knowledge about GDM and were also aware about risk factors of GDM such as family history (91.05%), pre-pregnancy obesity (85.26%), diabetes in previous pregnancy (79.47%) However, participants had less awareness about rapid weight when compared to other risk factors. In our study only 68.42% of participants were aware about rapid weight gain in pregnancy as a risk factor of GDM. This could be because, normally women gain weight during pregnancy, as physiological changes occur to accommodate growing foetus . But the most common misconception found among pregnant women is that- “You can gain as much weight as you want during pregnancy”. According to Jamie Dawn Tucker (UC Davis health dietician) found that the most common pregnancy misconception is the impression that pregnant women are “eating for two.” On the contrary, Shriram et al., in south found that pregnant women were less aware of GDM, whereas in our study participants had awareness of GDM and its risk factors. This could be because we included women from Pune region which has a heterogenous population consisting of urban and rural population with varying degrees of educational qualification.

Particularly our participants had little awareness (58.68%) of the precise steps that should be taken to detect GDM but were unaware (45%) that testing for GDM is necessary during pregnancy. This could be because there is no mandated national screening or diagnostic program for GDM in India. A systematic review and meta-analysis about screening and diagnosis of gestational in India by Katherine T. LI stated that lack of consensus results in confusion and inconsistent screening and diagnosis of GDM. Also, there is a lack of consensus on the use of insulin glargine for the treatment of GDM. Also, only 27.1% of participants had awareness about the role of diet and exercise in treatment of GDM. The reason could be that there is lack of concern about women’s health – either because they feel healthy or because they have less time for self-care due to the demands of the baby or other responsibilities – as a barrier to GDM management or postpartum follow-ups. [20] Our study showed significant low knowledge (4.5%) about consequences of GDM. About 15.26% of the participant were not aware that GDM can disappear after pregnancy, lack of knowledge of effect of GDM on growing fetus was seen in about 9.73% of the population and the participant had least knowledge that mother with GDM are at risk for over diabetes (6.57%). The reason behind this could be that most of the cases of GDM is almost asymptomatic and only few develop symptoms. During pregnancy, some of the symptoms are common and not necessarily a sign of GDM. Hence many women are not able to understand the effects that GDM can cause to the mother and foetus.

When the scores were compared with the age groups, the ANC participants from 18-24 age group had poor knowledge and awareness about GDM as compared to other two groups. Also, the age group 18-24 years showed maximum average score. Out of the three age groups participants belonging to 32-38 years had the maximum score which denotes that they had good knowledge and awareness about GDM as compared to other two groups. Score. The reason could be because the participants be getting experiences from multiple pregnancy/previous pregnancies might have become a resource in attaining better health information. Choi, Oh and Park (2001), and Gastrich and colleagues (2013), found similar results and stated that older women have better awareness about GDM when compared to younger population.

Most of the participants (58.94%) sought information from doctors or health professionals. Clearly the part played by them here is more as women do go for routine check-ups and doctors make them aware about GDM. Even after seeking information from health care workers it was seen that women had less knowledge on screening, treatment and side effects which shows that the health-care providers have failed to impart adequate knowledge to the mothers. Minimum information 25 is obtained from mass media, such as TV channels and radio as only 11.05% of the total women got information from this source. This should have been more as people watch a lot of TV and to some extent radio as well. But mass media does not provide much information on gestational diabetes hence the information obtained from this source is limited. It is important to note that the percentages of friends and family are still relatively high (17.89%) followed by newspaper and magazines, indicating that friends and newspapers do play a role in providing information about pregnancy to some extent. It is possible that mothers may turn to friends for advice and information due to their personal experiences with pregnancy, which can provide a valuable source of support and guidance. However, it is important to acknowledge that friends and newspapers may not always provide accurate or reliable information about pregnancy. Information obtained through these sources should be cross-checked with information provided by healthcare professionals to ensure that it is evidence-based and safe. By doing so, mothers can make

informed decisions about their pregnancy and ensure the best possible outcomes for themselves and their babies. In the study done by Sujindra Elamurugan the main source of information for the mothers was through doctors or health professionals as 52% of total mothers got the information through doctors or health professionals, 18.5% of mother received the knowledge from friends and family. Here as well the share of mass media to contribute in spreading awareness was less, which was about 13.5%.

Every paramedical staff have to be informed about incorporating the GDM awareness in their treatment setup. Also, doctors and other healthcare professionals should take responsibility for raising awareness among expectant moms. Emphasis should be made specifically on educating about GDM screening, treatment and consequences. GDM has to be included in regular health education programs designed for expectant mothers. As awareness and knowledge are one of the component of primary health, it is the most inclusive, equitable, cost-effective and efficient approach to enhance people's physical and mental health, as well as social well-being. Hence, an appeal to the government to spend more on GDM awareness should be made because of the overall benefit. Uchenna Cosmas Ugwu and Osmond Chukwuemeka Ene, in their study found that educational programs are effective tools to combat and reduce health problems that threaten mothers and new-borns during pregnancy. As healthcare professionals we can set a standardized educational program to spread the knowledge about GDM. This would help to improve the overall health of women and children.

In conclusion, the average level of GDM awareness among antenatal mothers is generally low, highlighting the need for increased efforts to improve education and awareness about this condition. By increasing GDM awareness among antenatal mothers, healthcare professionals, and the general public, we can work towards improving health outcomes for both mother and baby.

6. Conclusion

The awareness and knowledge of gestational diabetes in Antenatal women in Pune showed average results. Health awareness programs should be conducted to improve awareness of antenatal mothers in Pune, for better utilization of health services and thus preventing the increasing prevalence of GDM and to tackle short term and long-term consequences of it.

7. Future scope

This study included antenatal women of Pune, the number of participants could be increased to get a wide range of data that would help us to interpret the information in a greater scale for example state level. This study included only pregnant women, further studies can be done including non-pregnant women who are married and also non-married women who are in the marriage age group. We can also find the correlation between age group and awareness about GDM.

References

[1] Dutta D, Konar H. DC Dutta's textbook of obstetrics. 9th ed; 2019
[2] Farrar D, Simmonds M, Bryant M, Sheldon TA, Tuffnell D, Golder S, Dunne F, Lawlor DA. Hyperglycaemia and risk of adverse perinatal outcomes: systematic review and meta-analysis. doi: 10.1136/bmj.i4694. BMJ. 2016 Sep 13;354:i4694.
[3] Zhu Y, Zhang C. Prevalence of Gestational Diabetes and Risk of Progression to Type 2 Diabetes: a Global Perspective. Curr Diab Rep. doi: 10.1007/s11892-015-0699-x. 2016 Jan;16;(1):7.
[4] Mumtaz M. Gestational diabetes mellitus. The Malaysian journal of medical sciences: MJMS. 2000 Jan;7(1):4.
[5] Panaitescu AM, Peltecu g. Gestational diabetes. Obstetrical perspective. Acta Endocrinol (Buchar). 2016 Jul-Sep;12(3):331-334. doi: 10.4183/aeb.2016.331. PMID: 31149109; PMCID: PMC6535277
[6] Elamurugan S, Arounassalame B, What do Mothers know about gestational diabetes: knowledge and awareness. Indian J Obstet Gynecol Res. 2016;3(4):393-396, https://www.ijogr.org/article-details/3121
[7] Byakwaga E, Sekikubo M, Nakimuli A. Level of and factors associated with awareness of gestational diabetes mellitus among pregnant women attending antenatal care at Kawempe National Referral Hospital: A Cross Sectional Study - BMC pregnancy and childbirth [Internet]. BioMed Central. BioMed Central; 2021. https://doi.org/10.1186/s12884-021-03927-x
[8] Government of India. Maternal and Health Division, Diagnosis and Management of Gestational Diabetes Mellitus: Technical and Operational Guidelines. New Delhi, India: Ministry of Health & Family Welfare, New Concept Information Systems; 2018
[9] Chen L, Magliano DJ, Zimmet PZ. The worldwide epidemiology of type 2 diabetes mellitus-- present and future perspectives. doi: 10.1038/nrendo.2011.183. Nat Rev Endocrinol; 2011 Nov 8;8(4):228-36
[10] Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. Indian J opthalmol. 2021;69(11):2932-2938. doi:10.4103/ijo.IJO_1627_21.
[11] 11.American Diabetes Association; Gestational Diabetes Mellitus. Diabetes Care 1 J; https://doi.org/10.2337/diacare.26.2007.S103.January 2003:26 (suppl_1): s103–s105 31
[12] Thomas, Sangeetha & Pienyu, Ruopfuvinuo & Rajan, Santhosh. Awareness and Knowledge About Gestational Diabetes Mellitus Among Antenatal Women. Psychology, Community & Health. 2020;8. 237-248, 10.5964/pch.v8i1.287
[13] Carolan, M., Gill, G.K. & Steele, C. Women's experiences of factors that facilitate or inhibit gestational diabetes self-management. BMC Pregnancy Childbirth 12, 99 (2012). https://doi.org/10.1186/1471-2393-12-99.
[14] Seshiah V, Balaji V, Balaji MS, Paneerselvam A, Kapur A. Pregnancy and diabetes scenario around the world: India. doi: 10.1016/j.ijgo.2008.11.035. Int J Gynaecol Obstet. 2009 Mar;104 Suppl 1:S35-8

[15] He, Qiong & Zhang, Mengyuan & Wang, Yongle & Zhang, Jin & Zhang, Yi & Han, Minmin & Yang, Jing & Liu, Yunfeng. Lower Income Levels Correlate With Increased Prevalence of Gestational Diabetes Mellitus: A Systematic Review and Network Meta-Analysis. 10.21203/rs.3.rs-139122/v1. December 2020.
[16] Bailey , S. C. , Brega , A. G. , Crutchfield , T. M. , Elasy , T. , Herr , H. , Kaphingst , K. , Karter , A. J. , Moreland-Russell , S. , Osborn , C. Y. , Pignone , M. , Rothman , R. , & Schillinger , D. (2014.). Update on health literacy and diabetes . The Diabetes Educator , 40 (5), 581 – 604 . 10.1177/0145721714540220
[17] Essel, J K. "Awareness and knowledge of gestational diabetes mellitus among pregnant women at the Tema General Hospital, Ghana." (2018).
[18] Li, Katherine T et al. "Screening and diagnosis of gestational diabetes in India: a systematic review and meta-analysis." Acta diabetologica vol. doi:10.1007/s00592-018-1131-1. 55,6 (2018): 613-625.
[19] Msollo, Safiness Simon et al. "Simple method for identification of women at risk of gestational diabetes mellitus in Arusha urban, Tanzania." BMC pregnancy and childbirth vol. doi:10.1186/s12884-022-04838-1. 22,1 545. 6 Jul. 2022
[20] Nielsen, K.K., de Courten, M. & Kapur, A. Health system and societal barriers for gestational diabetes mellitus (GDM) services - lessons from World Diabetes Foundation supported GDM projects. BMC Int Health Hum Rights 12, https://doi.org/10.1186/1472-698X-12-33. 33 (2012)