



Awareness regarding Anaemia, Gestational diabetes mellitus, and hypertensive disorders of pregnancy among antenatal mothers of Rural Puducherry -A Community based Cross-sectional study

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Abstract

Introduction: Awareness and training programs ensure that the patient understands their role, their responsibilities, and how those roles and responsibilities related to the national policies in reducing the mortality and morbidity rates in India. As reported by WHO, almost 15% of pregnancies are at risk of developing complications and among several risk factors associated with a complicated pregnancy, severe anaemia, gestational diabetes mellitus, and high blood pressure (pre-eclamptic condition), are the most common and critical ones. This study aims to assess the awareness regarding anaemia, gestational diabetes mellitus, and hypertensive disorders of pregnancy among pregnant mothers of rural Puducherry.

Method: This descriptive cross-sectional study was conducted in the field practice area of a private medical college in Puducherry which includes 4 villages Koodapakkam, Kumarapalayam, Katterikuppam, and Sethurapet. The study was conducted from March 2021 to December 2021. After obtaining informed consent from 171 antenatal mothers, a pretested structured questionnaire was used to assess the awareness of anaemia, GDM, hypertensive disorders during pregnancy.

Result: Among 171 pregnant mothers, the majority of the participants were in the age group of 20-25 years (60.2%), 49% belonged to the lower class according to modified BG Prasad classification, 53.2% were primigravida and 50.8% had completed primary school. 53.8% had good knowledge of anaemia, 56% of antenatal mothers had a fair knowledge of GDM, and 63% had fair knowledge of hypertensive disorders of pregnancy.

Conclusion: The study findings indicate a low level of awareness regarding GDM and hypertensive disorders during pregnancy compared to anaemia among antenatal women.

Keywords: Awareness, Pregnant woman, anaemia, Gestational diabetes mellitus, hypertensive disorders of pregnancy, Rural

Introduction

Antenatal care is important for protecting the health of the pregnant woman and their unborn children. Through antenatal care, pregnant women can also access micronutrient supplementation, treatment of

certain complications if they were aware of the complications.

Anaemia

Maternal mortality is one of the important indicators of the quality of health services in a country and

anaemia during pregnancy is one of the important causes of maternal mortality. In India, the prevalence of anemia in pregnant women who are the most vulnerable group in society was 58.7% [1]. 40 percent of maternal deaths are caused by anaemia. MMR is increased 8 to 10 times when the Hb falls below 5 g/dl. Early detection and effective management of anaemia in pregnancy can substantially reduce maternal mortality [2]. Anaemia is the late manifestation of deficiency of nutrient(s) needed for hemoglobin synthesis. Most of the anaemias are due to an inadequate supply of nutrients like iron, folic acid, and vitamin B12, proteins, amino acids, vitamins A, C, and other vitamins of the B-complex group *i.e.*, niacin and pantothenic acid are also involved in the maintenance of hemoglobin level [3]. In India according to the National Health Survey 4 the prevalence of anaemia among children 6-59 months – is 58%, Adolescent girls 15-19 yrs. - 54%, Adolescent boys 15-19 yrs. - 29%, Women of reproductive age - 53% Pregnant women - 50%, Lactating women - 58%. Anaemia during pregnancy is one of the important risk factors associated with several maternal and fetal complications like IUGR (Intrauterine growth restriction), LBW (Low birth weight), and maternal and infant mortality. The target for 2022 is to reduce the prevalence from 50% to 32% through the Anaemia Mukh Bharat mission [4].

Gestational Diabetes Mellitus

It is now advised by the American Diabetes Association (ADA), the World Health Organization (WHO), the International Federation of Gynaecology and Obstetrics, and the Endocrine Society, that the International Association of Diabetes and Pregnancy Study Group (IADPSG) criteria be used in the diagnosis of GDM [5]. The IADPSG, therefore, recommends that all women undergo a fasting plasma glucose (FPG) test at their first prenatal visit (where a reading of 92 mg/dL is indicative of GDM) and that women with FPG <92 mg/dL undergo a 2-h 75 g oral glucose tolerance test (OGTT) between 24 and 28 weeks gestation [6].

GDM Pregnant women should be managed by Medical Nutrition Therapy (MNT), and insulin therapy/metformin as required. In the postpartum period, OGTT should be repeated at 6 weeks after delivery, if blood sugar is <140 mg/dL, then women

should be referred to the NCD clinic for Post Prandial Blood Sugar (PPBS) testing annually. Worldwide one in 10 pregnancies is associated with diabetes, 90% of which are GDM. In Tamilnadu, a field study performed under the “Diabetes in Pregnancy”-Awareness and Prevention project, of the 4151, 3960, and 3945 pregnant women screened in urban, semi-urban, and rural areas respectively the prevalence of GDM was 17.8% in the urban, 13.8% in the semi-urban and 9.9% in the rural areas [7]. Maternal risks of GDM include polyhydramnios, pre-eclampsia, prolonged labor, obstructed labor, cesarean section, uterine atony, postpartum hemorrhage, infection, and progression of retinopathy. Fetal risks include spontaneous abortion, intrauterine death, stillbirth, congenital malformation, shoulder dystocia, birth injuries, neonatal hypoglycemia, and infant respiratory distress syndrome [8].

Hypertensive disorders of pregnancy

Hypertensive disorders of pregnancy represent a group of conditions characterized by high blood pressure during pregnancy, proteinuria, and rarely convulsions. Hypertensive disorders complicate 5-10% of all pregnancies and together form the deadly triad- along with hemorrhage and heart disease that contribute greatly to maternal morbidity and mortality [9]. WHO reported 14% of maternal death attributed to hypertensive disorders during pregnancy [10]. Globally, it is estimated that almost 10% of pregnancies are complicated by hypertension [11,12]. The most recent revised classification for hypertensive disorders in pregnancy is by the International Society for the Study of Hypertension in Pregnancy (ISSHP) in 2014 [13]: 1. Chronic hypertension 2. Gestational hypertension 3. Pre-eclampsia – newly diagnosed or superimposed on chronic hypertension 4. Whitecoat hypertension. Pre-eclampsia: The minimum criteria for diagnosis of pre-eclampsia are blood pressure (BP) $\geq 140/90$ mmHg after 20 weeks gestation and proteinuria ≥ 300 mg/24h or $\geq 1+$ with the dipstick. There is an increased certainty of pre-eclampsia if the following clinical and laboratory findings are reported: a BP $\geq 160/110$ mmHg, proteinuria 2.0g/24h or $\geq 2+$ dipstick, serum creatinine >1.2 mg/dl unless known to be previously elevated; platelets $<100,000$ /mm³; micro-angiopathic hemolysis (increased lactate dehydrogenase [LDH]); elevated Alanine Aminotransferase (ALT) or Aspartate

Aminotransferase (AST); persistent headache or other cerebral or visual disturbance and persistent epigastric pain. Eclampsia: Pre-eclampsia with the onset of convulsions is called eclampsia[14]. Hypertensive disorders of pregnancy cause intrauterine growth retardation, premature delivery, intrauterine death of the fetus, abruption of the placenta[15].

Objectives:

To assess the awareness regarding anaemia, gestational diabetes mellitus, and hypertensive disorders of pregnancy among pregnant mothers of rural Puducherry and its association with education, gravida, and socio-economic status of the antenatal mothers.

Materials And Methods:

Study setting: The data for this cross-sectional study were collected from the rural field practicing area of a private medical college in Puducherry. The villages included Koodapakkam, Kumarapalayam, Katterikuppam, and Sethurapet. A total of 256 antenatal mothers were identified from the records of ANM from the concerned primary health centers and 171 antenatal mothers were selected using simple random sampling.

Study design: This study was a community based cross sectional study.

Study population: Antenatal mothers residing in the field practice area of a private medical college in Puducherry

Study period: The data for the study was collected from March 2021 to December 2021

Sample size estimation: Based on Meera George et al → reported awareness about anaemia at 48.7%, the sample size was calculated using Cochran's formula and the minimum sample size obtained was 114[16].

Inclusion criteria:

Antenatal mothers residing in the study area for at least one year preceding the date of the survey and antenatal mothers who gave consent to participate in the study

Exclusion criteria:

Study subjects who were not available in the field area even after 3 visits and those who are

psychologically affected and unable to co-operate for the study.

Study procedure:

A Pilot study was carried out among 35 antenatal mothers in Kumarapalayam village using a predesigned and structured questionnaire. Certain structural changes were made and a few questions were modified based on the pilot study. Informed consent in the form of a signature or if illiterate thumbprint was obtained after thoroughly explaining the study objectives to the participants. The study participants were then interviewed on their doorstep. The data regarding their age, gender, marital status, religion, educational qualification, living arrangements were asked and recorded. During the study 171 antenatal mothers were interviewed. There were 10 questions regarding anaemia, 10 for GDM, and 10 for hypertensive disorders of pregnancy. Scoring was categorized as poor knowledge: <50th percentile, 50-75th percentile: fair knowledge, and >75th percentile were considered as good knowledge.

Data Analysis :

Data were analyzed using IBM SPSS 21.0. all the data were coded in SPSS and invalid data were removed. We run descriptive statistics, frequency, proportion distribution for information.

Result :

About 171 antenatal women belonging to different gestational ages were interviewed about their awareness regarding anaemia, gestational diabetes mellitus, and hypertensive disorders of pregnancy. The majority of the participants were in the age group of 20-25years (60.2%), 49% belonged to the lower class according to modified BG Prasad classification, 53.2% were primigravida and 50.8 % had gone to primary school. Table 1,2,3 describes the socio-demographic characteristics and awareness of anaemia, GDM, and Hypertensive disorders of pregnancy.

Discussion :

This study aimed to assess the awareness regarding anaemia, GDM, and hypertensive disorders of pregnancy and the findings of the study indicated several factors of concern regarding awareness.

Anaemia

Among 171 antenatal mothers, 53.8 % had good knowledge, 32.2 % had fair knowledge and 14% had poor knowledge. They seemed to have good knowledge about the importance of iron and green leafy vegetables for maintaining hemoglobin levels in pregnancy. The second and third gravida antenatal mothers had better knowledge as compared to primigravida. The findings of our study are consistent with a study done by *Nivedita K et al* which revealed that 53.8% of the participants accepted that pregnant women were more vulnerable to anemia and 66.1% responded correctly that the fetus will be affected by severe anemia. Only 32.6% gave the correct response that pregnant women should take iron supplementation despite taking a healthy diet and 44.62% of the participants were aware of their hemoglobin level[1]. Auxiliary nurse-midwives and Anganwadi workers play a vital role in creating awareness of the importance of foods rich in iron and iron tablets. Awareness is an important step that is expected to influence change, cognizant of the fact that not all knowledge leads to appropriate behavioral changes. While these results would be encouraging to policymakers and program managers, an effort should be made to maintain high levels of awareness.

Gestational Diabetes Mellites

This study shows that only a small proportion of rural antenatal mothers 12% had good knowledge about GDM, 56% of antenatal mothers had fair knowledge and 32% had poor knowledge. The present study is consistent with a study done by *Garima Meena et al* which assessed the level of glycemic control among mothers with GDM at a public tertiary care center in South India and also examined factors associated with poor glycemic control(8). They found more than one-third of mothers had poor glycemic control and multigravida mothers had a higher level of poor glycemic control.

Hypertensive Disorders of Pregnancy(HDPs)

There are widespread knowledge gaps regarding hypertensive disorders among pregnant women, recently pregnant women, and women who may become pregnant. The confusion of the HDPs was related to the complexity and unpredictable nature of the conditions, as well as the quality of the information provided. Only 12% of the rural antenatal mothers had good knowledge of hypertensive 63% had fair knowledge and 25% had

poor knowledge. These findings are consistent with the results of a study conducted in a tertiary care hospital in Chattisgarh done by *Symborian Anita et al* which revealed that about 14% of pregnant women had good knowledge, 55% had fair knowledge, and 31% had poor knowledge regarding hypertensive disorders of pregnancy(15).

Conclusion :

Pregnant women fall within the national reproductive age group and on fair, they have three successful births with normal birth intervals. The majority of the participants show high anaemia awareness levels and were able to define the disease and also identify some causes and effects as well. It is necessary to improve awareness about GDM and its control measures among the medical fraternity, patients, and their family members. As the majority of pregnant women as seeking antenatal care from primary care centers, this study highlights the importance of primary care physicians to screen pregnant women for GDM and check their control status at regular intervals. It is also important to suggest lifestyle modifications and other control measures to tackle GDM at the primary care level. This study identifies a wide range of knowledge gaps regarding HDPs. These findings suggest a need for targeted community-based efforts to improve awareness and understanding of the HDPs. Antenatal education should be delivered in the community and not restricted to facility-based care. The present study highlights the important role of the family on perceptions of health and illness. This emphasizes the need to incorporate these influential decision-makers in antenatal activities; husbands, mothers-in-law, and religious leaders where possible. Continuous education and sensitization on locally available and low-cost nutritious food, avoiding parasitic infections, and discouraging undue food restrictions from beliefs are highly recommended.

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Table.1 Awareness scores of anaemia and demographic variables

	ANAEMIA			
	POOR	FAIR	GOOD	TOTAL
Age				
<19	1 (0.5%)	6 (3.5%)	5 (2.9%)	12 (7.01%)
20-25	5 (2.9%)	43 (25.1%)	55 (32.1)	103 (60.2%)
26-30	3 (1.7%)	13 (7.6%)	21 (12.2%)	37 (18.12%)

>30	1 (0.5%)	7 (4%)	11 (6.4%)	19 (11.11%)
Education				
Primary school	13 (7.6%)	27 (15.8%)	47 (27.4%)	87 (50.8%)
PUC	6 (3.6%)	9 (5.2%)	11 (6.4%)	26 (15%)
DEGREE	5 (3%)	19 (11.1%)	34 (19.8%)	58 (33.9%)
Gravida				
Primi	11 (6.4%)	38 (22.2%)	42 (24.5%)	91 (53.2%)
Second	9 (5.2%)	13 (7.6%)	38 (22.2%)	60 (35%)
Third & above	4 (2%)	4 (2%)	12 (7%)	20 (11.6%)
Socio economic status				
Upper class	3 (1.7%)	8 (4.6%)	9 (5.2%)	20 (11.6%)
Upper Middle class	3 (1.7%)	21 (12.2%)	10 (5.8%)	34 (31%)
Middle class	4 (2%)	8 (4.6%)	8 (4.6%)	20 (11.6%)
Lower Middle class	4 (2%)	16 (9.3%)	12 (7%)	32 (18.7%)
Lower class	10 (5.8%)	39 (4.6%)	16 (9.3%)	65 (49.1%)

Table.2 Awareness scores of GDM and demographic variables

	GDM			
	POOR	FAIR	GOOD	TOTAL
Age				
<19	6 (3.5%)	4 (2%)	2 (1.1%)	12 (7%)
20-25	31 (18.1)	61 (35.6%)	11 (6.4%)	103 (60.2%)
26-30	8 (4.6%)	23 (13.4%)	6 (3.5%)	37 (18.1%)
>30	4 (2%)	14 (8.1%)	1 (0.5%)	19 (11.1%)

Education				
Primary school	28 (16.3%)	49 (28.6%)	10 (5.8%)	87 (50.8%)
PUC	8 (4.6%)	16 (9.3%)	2 (1.1%)	26 (15%)
Degree	17 (9.9%)	33 (19.2%)	8 (4.6%)	58 (33.9%)
Gravida				
Primi	34 (18.8%)	49 (28.6%)	8 (4.6%)	91 (53.2%)
Second	13 (7.6%)	38 (22.2%)	9 (5.2%)	60 (35%)
Third & above	6 (3.5%)	9 (5.2%)	3 (1.7%)	20 (11.6%)
Socio economic status				
Upper class	12 (7%)	1 (0.5%)	7 (4%)	20 (11.6%)
Upper Middle class	10 (5.8%)	15 (8.7%)	9 (5.2%)	34 (31%)
Middle class	5 (2.9%)	3 (1.7%)	12 (7%)	20 (11.6%)
Lower Middle class	16 (9.3%)	4 (2%)	12 (7%)	32 (18.7%)
Lower class	34 (31%)	7 (4%)	24 (14%)	65 (49.1%)

Table.3 Awareness scores of hypertensive disorders of pregnancy and demographic variables

	Hypertensive disorders of pregnancy			
	POOR	FAIR	GOOD	TOTAL
Age				
<19	6 (3.5%)	1 (0.5%)	5 (2.9%)	12 (7.01%)
20-25	41 (23.9%)	9 (5.2%)	53 (31%)	103 (60.2%)
26-30	13 (7.6%)	5 (2.9%)	19 (11.1%)	37 (18.1%)
>30	8 (4.6%)	2 (1.1%)	9 (5.2%)	19 (11.1%)
Education				

Primary school	39 (4.6%)	42 (24.5%)	6 (3.5%)	87 (50%)
PUC	12 (7%)	13 (7.6%)	1 (0.5%)	26 (15.2%)
DEGREE	17 (9.9%)	31 (18.1%)	9 (5.2%)	57 (33.3%)
Gravida				
Primi	41 (23.9%)	43 (25.1%)	7 (4%)	91 (53.2%)
Second	19 (11.1%)	35 (20.4%)	6 (3%)	60 (35%)
Third & above	4 (2%)	4 (2%)	12 (7%)	20 (11.6%)
Socio economic status				
Upper class	6 (3.5%)	11 (6.4%)	3 (1.7%)	20 (11.6%)
Upper Middle class	10 (5.8%)	7 (4%)	17 (9.9%)	34 (31%)
Middle class	10 (5.8%)	4 (2.3%)	6 (3.5%)	20 (11.6%)
Lower Middle class	17 (9.9%)	6 (3.5%)	9 (5.2%)	32 (18.7%)
Lower class	35 (20.4%)	7 (4%)	23 (13.4%)	65 (49.1%)

Table .4 Awareness of anaemia

Q.NO	QUESTIONS	Yes	No	Don't know
1	Will iron deficiency cause anaemia?	153 (89.4%)	7 (4%)	11 (6.4%)
2	Anaemia diagnosed with Hb level	156 (91.2%)	9 (5.2%)	6 (3.5%)
3	Is taking iron tablets necessary?	160 (93.5%)	6 (3.5%)	5 (2.9%)
4	Iron content is more in meat fish & green leafy vegetables	139 (81.2%)	25 (14.6%)	7 (4%)
5	Can we take iron tablets along with tea/coffee?	58 (33.9%)	93 (54.4%)	20 (11.7%)
6	Is taking iron tablets along with a normal diet is necessary?	123 (71.9%)	3 (17.5%)	18 (10.5%)
7	Is taking antihelminthic is necessary during pregnancy?	116 (67.8%)	46 (26.9%)	9 (5.2%)
8	What is the appropriate Birth spacing?			
	i) Six months			- 26 (11.6%)
	ii) Two to three years			- 135 (78.9%)

	iii) No need	- 10 (5.8%)
9	Why are folic acid tablets taken during pregnancy?	
	i) Baby's neurodevelopment	- 108 (63.1%)
	ii) Increase baby's weight	- 43 (26.1%)
	iii) Don't know	- 20 (11.6%)
10	How many times Hb should be checked during pregnancy?	
	i) Once	- 38 (22.2%)
	ii) Four times	- 120 (70.1%)
	iii) Don't know	- 13 (7.6%)

Table .5 Awareness of GDM

Q.NO	QUESTIONS	Yes	No	Don't know
1	Can diabetes occur during pregnancy?	109 (63.7%)	35 (20.5%)	27 (15.7%)
2	Does the family history of GDM have an impact on pregnancy?	84 (49.1%)	60 (35.1%)	27 (15.7%)
3	Rapid weight gain during pregnancy is a good sign?	50 (29.2%)	96(56.1%)	25 (14.6%)
4	Any previous history of GDM?	24 (14%)	138 (80.7)	9 (5.3%)
5	Any family history of GDM?	32 (18.7%)	130 (76%)	9 (5.3%)
6	Can GDM continue after pregnancy?	54 (31.6%)	77(45%)	40 (23.4%)
7	How will you diagnose GDM during pregnancy?			
	i) Urine test		- 50 (29.2%)	
	ii) Glucose tolerant test		- 106 (61.9%)	
	iii) Don't know		- 15 (8.7%)	
8	When will you check for GDM during pregnancy?			
	i) From first antenatal visit		- 111 (64.9%)	
	ii) Before delivery		- 44 (25.7%)	
	iii) Don't know		- 16 (9.3%)	
9	How many times blood sugar levels should be checked during pregnancy?			
	i) Once		- 45 (26.3%)	
	ii) Four times		- 103 (60.2%)	
	iii) Don't know		- 23 (13.4%)	
10	Treatment of GDM?			
	i) Insulin / Tablets		- 47 (27.5%)	
	ii) Regular exercise and Diet		- 34 (19.9%)	

	iii) Both	-	28 (16.4%)
	iv) Don't know	-	62 (36.2%)

Table .6 Awareness of Hypertensive disorders during pregnancy

Q.NO	QUESTIONS	Yes	No	Don't know
1	Can hypertension occur during pregnancy?	124 (72.5%)	31(18.1%)	16(9.4%)
2	Are hypertensive disorders of pregnancy treatable?	139 (81.3%)	16(9.4%)	16(9.4%)
3	Not treating hypertensive disorders affect mother and child?	130 (76%)	19(11.1%)	22 (12.8%)
4	Any previous history of hypertensive disorders during pregnancy?	12 (7%)	158(92.4%)	1(0.5%)
5	Any family history of hypertensive disorders during pregnancy?	21 (12.3%)	145(84.8%)	5(2.9%)
6	Regular antenatal visits are necessary to prevent hypertensive disorders during pregnancy??	127 (74.2%)	31(18.1%)	13 (7.6%)
7	We can prevent hypertensive disorders of pregnancy during pregnancy through health education?	143 (83.6%)	17(9.9%)	11(6.4%)
8	Symptoms of hypertensive disorders of pregnancy? i) Headache, Blurring of vision, Seizure & Swelling of legs ii) Weight gain iii) Don't know			111 (64.9%) - 33 (19.3%) - 27 (15.8%)
9	How many times BP should be checked during pregnancy? i) During all antenatal visits ii) Before delivery iii) Don't know			- 142 (83%) - 11 (6.4%) - 18 (10.5%)
10	Complications of hypertensive disorders of pregnancy?? i) Preterm birth, abortion, seizure, stroke ii) None iii) Don't know			- 119 (69.5%) - 40 (23.3%) - 12 (7%)

Figure.1 Awareness of Anaemia, GDM, and Hypertensive disorders of pregnancy

