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A MULTI CENTRE STUDY : ANALYSIS OF PRESCRIPTION PATTERN AND RATIONAL USE OF DRUGS IN PREGNANCY

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KEYWORDS

Comorbidity rate, Category drugs, Class of drug, abortion rate, anemia

ABSTRACT

Background: Pregnancy presents a complex situation characterized by numerous physical and psychological changes experienced by women gestation and so assessing the prescription pattern and rational use of medicines in pregnancy is pivotal for enhance maternal & fetal health and for reducing teratogenic effects and birth defects by identifying situations where potentially harmful medications are being prescribed.
Results: Over the last four decades, there has been a 70% increase in the use of three or more prescribed medications during the first and second trimesters of pregnancy. Additionally, there has been a 35% increase in the intake of prescribed medications compared to supplements. Among over 225 pregnant women studied, there is a 16% abortion rate in multigravida patients, while the comorbidity rate is 40% in both primigravida and multigravida patients, with a notably higher rate observed in multigravida patients. Healthcare providers demonstrate a meticulous approach, carefully balancing efficacy and potential risks in pharmacotherapy, ensuring that none of the prescribed drugs fall into category X in terms of safety during pregnancy.
Conclusion: The prescription pattern reflects a nuanced comprehension of the complexities surrounding medication use during pregnancy. Upon thorough analysis of prescription trends in pregnancy, healthcare providers demonstrate a meticulous strategy by prioritizing medications with established safety records and taking into account individual patient nuances.

BACKGROUND:

Pregnancy constitutes a unique and complex period in a women's journey, characterized by profound changes across the biological, psychological, and social empires. The progression of psychological well-being from conception to postpartum encompasses discernible transformations in physical appearance, femininity, emotional connections, sexuality and so assessing the prescription pattern and rational use of medicines in pregnancy is pivotal for enhance maternal &

fetal health and for reducing teratogenic effects and birth defects by identifying situations where potentially harmful medications are being prescribed [1] .

Pregnancy and motherhood, while generally positive, pose significant risks, with a daily global toll of 830 preventable maternal deaths reported by WHO. Developing countries including India face challenges with a mortality rate and mortality rate is decreasing from 212 to 167 per 1 lakh live births between 2007 and 2013 [2] .

Annually, over 200 million pregnancies occur worldwide, with notable 40% categorized a unintended, yet not necessarily unwanted. Over the last three decades, first trimester prescription medications use has surged by over 60%, with a threefold increase in the use of four or more medications [3] . By 2008, around half of women disclosed taking at least one medication during this period. Specific medications have exhibited significant fluctuations, with some experiencing marked decreases or increases. There has been a substantial 68% rise in average no. of medications used by pregnant women, increasing from 2.6 in 1976-1978 to 4.2 in 2006-2008. Presently, nearly half of pregnant women engage in the usage of four or more drugs at various points during their pregnancy [4] .

A substantial 96.9% of pregnant individuals utilized medication during gestation. Excluding prenatal vitamins and iron supplements, 76.5% engaged with additional medicines, 62.8% used over-the-counter drugs, and 4.1% opted for herbal or alternative remedies [5]. Excluding vitamins, supplements, and vaccines, 73.4% of women reported using at least one medication during pregnancy; notably, 55.1% acknowledged taking medication during the first trimester. This period is crucial for fetal development, emphasizing the significance of understanding medication patterns and their potential implications during the early stages of pregnancy [6] .

Physiological and psychological alterations during pregnancy are common across several organ systems in women's gestation including Cardiovascular, Renal, Respiratory, Gastrointestinal, Endocrinological, Hematological systems. These alterations lead to a 20-40% elevation in cardiac output [7], a 40-50% increase in renal blood flow and glomerular filtration rate [8], a 20% increase in progesterone and estrogen levels resulting in overproduction of melanin [9] and delayed gastric emptying time [10], elevated levels of thyroid-stimulated hormone [11], a 50% increase in tidal volume, and increased clotting factors alongside a decrease in plasma volume [12]. These functional changes contribute to comorbid conditions such as Anemia, GDM, GHTN, Hyperthyroidism and Hypothyroidism among others.

METHODS:

This study aims to assessing the prescription pattern and the rational use of medicines during pregnancy. It was conducted across three private hospitals in Salem, namely Sisu hospital, SKS hospital, Divine hospital, over period of five months. The sample size for this study was determined to be 225 patients.

Inclusion criteria: The study will include pregnant women in various stages of pregnancy(1^{st}, 2^{nd}, 3^{rd} trimesters), with a specific emphasis on those who have been prescribed medications for any medical condition during their pregnancy. Additionally, the focus will extend to patients presenting with one or more comorbid conditions, such as GDM, GHTN, or any other mental disorders.

Note: In this study, cases involving multiple pregnancies (e.g., twins, triplets) are excluded due to potential variations in prescribed medications.

RESULTS:

Table 1. Analyzing data from 225 patients likely related to pregnancy outcomes reveals several key insights. Most patients (60%) fall within the 21-25 age range, and nearly half (59%) have

previously been pregnant. Notably, over a third (36.4%) of pregnancies were in the first trimester, while the second and third trimesters each saw similar proportions (around 34.3% and 29.3%, respectively).

While the abortion rate is relatively low (16%), pre-existing medical conditions (comorbidities) are present in 40% of patients. Among those with comorbidities, the most prevalent single conditions are anemia (30%), gestational hypertension (GHTN) (27%), and gestational diabetes mellitus (GDM) (20%). Interestingly, a small portion (8.9%) of patients present with multiple comorbidities, often involving combinations of GHTN, hypothyroidism, and other conditions.

CATEGORY	SUB-CATEGORY	NO. OF PATIENTS
AGE (N=225)	18-20	13 (5.7%)
	21-25	135 (60%)
	26-30	66 (29.3%)
	31-35	8 (3.6%)
	36-40	3 (1.3%)
GESTATIONAL AGE (N=225)	Upto 12 weeks	82 (36.4%)
	13-27 weeks	77 (34.3%)
	28-40 weeks	66 (29.3%)
GRAVIDA(N=225)	Primigravida	93 (41%)
	Multigravida	132 (59%)
ABORTION(N=225)	Abortion	35 (16%)
	Non-abortion	190 (84%)
COMORBIDITY(N=225)	With	90 (40%)
	Without	135 (60%)
WITH COMORBIDITY(N=90)	Single	82 (91.1%)
	Multi	8 (8.9%)
SINGLE COMORBIDITY(N=82)	Anemia	25 (30%)
	UTI	2 (2%)
	GHTN	22 (27%)
	GDM	16 (20%)
	Hypothyroidism	8 (10%)
	Hyperthyroidism	1 (1%)
	COPD	3 (4%)
	Hyperlipidemia	5 (6%)
MULTI COMORBIDITY(N=8)	GDM+ GHTN	1 (12.5%)
	Hypothyroidism + GHTN	2 (25%)
	GHTN + PCOS	1 (12.5%)
	Hypothyroidism + Rheumatic heart disease	2 (25%)
	GDM+ cough & cold	1 (12.5%)
	Hypothyroidism + PCOS	1 (12.5%)

TABLE-1: Distribution of patients

Table 2 analyzes the number of drugs prescribed to patients across their trimesters. It reveals interesting trends in medication use during pregnancy The distribution of patients across trimesters is relatively even, with the first trimester having 82 patients (36.4%), the second with 77 patients (34.3%), and the third with 66 patients (29.3%). Overall, the most common number of drugs prescribed across all trimesters is two drugs (33%), followed by three drugs (31.7%). This suggests that a significant portion of patients require some level of medication during pregnancy, but typically not an extensive amount. Notably, the first trimester has the lowest proportion of patients prescribed no drugs (14.7%) compared to the second and third trimesters. This may be due to the crucial development stage in the first trimester, potentially requiring more cautious use of medications. The second trimester sees a slight increase in patients prescribed two drugs (38.97%) compared to the first and third trimesters. This could be due to various factors such as prenatal testing results or addressing specific pregnancy-related symptoms. Interestingly, the third trimester has the highest proportion of patients prescribed three drugs (41%) compared to other trimesters. This could be related to preparing for childbirth, managing potential complications, or addressing any emerging pregnancy-related conditions, while less common, the table also shows a small percentage of patients requiring four to six drugs across all trimesters. These cases likely involve patients with pre-existing medical conditions or complex pregnancy situations requiring specialized management.

CATEGORY	SUB-CATEGORY	NUMBER OF PATIENTS		
		TRIMESTERS		
		1st N=82	2nd N=77	3rd N=66
NO. OF DRUGS PRESCRIBED FOR PATIENTS	1 DRUG	12 (14.7%)	-	-
	2 DRUGS	27 (33%)	30 (38.97%)	25 (38%)
	3 DRUGS	26 (31.7%)	28 (36.36%)	27 (41%)
	4 DRUGS	12 (14.7%)	16 (20.77%)	12 (18%)
	5 DRUGS	2 (2.3%)	3 (3.9%)	1 (1.5%)
	6 DRUGS	3 (3.6%)	-	1 (1.5%)

TABLE-2 Distribution of patients according to number of drugs prescribed.

Table 3. Analyzing medication use during pregnancy reveals interesting patterns across trimesters, pregnancy categories, and drug classes. While the sample size is smaller than previously analyzed data (21, 24, and 18 patients in first, second, and third trimesters, respectively), it still offers valuable insights. Safer options seem to be prioritized throughout pregnancy. Category A drugs, considered the safest, are consistently used by around 43% to 55% of patients across trimesters. Medications with varying degrees of risk (Categories B, C, and D) are used less frequently, typically by less than 25% of patients, with slight fluctuations across trimesters. Notably, Category D drugs, carrying the highest potential risk, are used in very limited amounts (around 5% or less) across all stages, reflecting cautious prescribing practices. Among specific drug classes, supplements are the most commonly prescribed, with 38% to 62% of patients using them across trimesters. Hormonal preparations show a decreasing trend, with 19% of patients in the first trimester and 5.5% in the third, possibly reflecting hormonal changes. Other drug classes, including those for allergies, diabetes, blood pressure, and others, are used in relatively small

proportions (around 4% to 5%) and appear consistently across trimesters. It's important to remember that the table doesn't provide details about the specific conditions requiring these medications, nor does it offer information on dosage, treatment duration, or potential side effects. The analysis suggests potential trends in medication use during pregnancy, with a focus on prioritizing safer options (Category A drugs) and cautiously using higher-risk medications. The varying proportions of different drug classes across trimesters might suggest specific needs and considerations at each stage.

CATEGORY	SUB-CATEGORY TRIMESTERS	NUMBER OF DRUGS		
		TRIMESTERS		
		1st N=21	2nd N=24	3rd N=18
PREGNANCY CATEGORY DRUGS	A	9 (43%)	13 (54.2%)	10 (55%)
	B	4 (19%)	4 (16.7%)	3 (16.7%)
	C	4 (19%)	5 (20.8%)	4 (22.3%)
	D	4 (19%)	2 (8.3%)	1 (5.5%)
	X	-	-	-
CLASS OF DRUG	Anti-histamines	-	-	1 (5.55%)
	Supplements	8 (38.1%)	15 (62.5%)	10 (55.5%)
	Hormonal preparations	4 (19.04%)	3 (12.5%)	1 (5.55%)
	Anti-diabetic	1 (4.76%)	1 (4.15%)	1 (5.55%)
	Anti-hyperlipidemic	1 (4.76%)	1 (4.15%)	1 (5.55%)
	Bronchodilators	1 (4.76%)	1 (4.15%)	1 (5.55%)
	Antibiotics	1 (4.76%)	1 (4.15%)	1 (5.55%)
	Anti-hypertensive	3 (14.3%)	2 (8.4%)	2 (11.2%)
	Anti-emetics	1 (4.76%)	-	-
	corticosteroids	1 (4.76%)	-	-

DISSCUSION:

Studies of prescription pattern and rational medication use in pregnancy provide provides valuable insights into medication trends among pregnant women. The findings reveal a substantial increase in the use of prescribed medications during the first and second trimesters of pregnancy over the last four decades, with a notable rise in the intake of prescribed medications compared to supplements [13,14] and among the pregnant women studied, there is a significant comorbidity rate of 40% in both primigravida and multigravida patients, with a higher rate observed in multigravida patients. Additionally, there is a 16% abortion rate in multigravida patients[15], with healthcare professionals demonstrating a careful approach to balancing and safety The study highlights the importance of medications with safety records a emphasis is intended to prioritize and avoid potentially harmful chemicals (Category X drugs)[16]. By carefully analyzing prescriptions and considering the nuances of individual patients reflect nuanced understandings of complex drugs in the setting, health care providers can make maternal and fetal health outcomes greater, and reduce the risks associated with drug use Studies emphasize the need for a comprehensive health care system that pregnant physiologically addresses psychosocial factors to ensure safe medications contains and reasonably first suits the needs of individual patients, and it is important to recognize specific limitations of our study that may not be entirely representative of a diverse population of

pregnant women, which may limit the generalizability of the findings demographic and broader health care oral policies and no longer reports long-term outcomes or follow-up data.

CONCLUSION:

This study highlights the prevalence of comorbidities, abortions, and prescriptions for pregnant women, similar to those found in existing literature The study also highlights the need for comprehensive health care is developed with emphasis on the physical, psychological, and social aspects of pregnancy. Examples of prescriptions reflect nuanced understanding of complex pregnancy medicines, ensuring safe health care. Consistent with best maternal health principles, the observed practices reinforce the commitment to promote safe and rational medical practice by striking a prudent balance between benefit and risk emphasizing the possible variety in effective pharmacotherapy during pregnancy. By carefully examining prescribing practices in pregnancy, health care providers should prioritize drugs with established safety records and take into account the nuances of individual patients.

ABBREVIATION:

- **WHO (** World Health Organization**)**
- **GDM (** Gestational Diabetes Mellitus**)**
- **GHTN (** Gestational Hypertension**)**
- **COPD (** Chronic Obstructive Pulmonary Disorder**)**
- **PCOS (** Polycystic Ovary Syndrome**)**
- **UTI (** Urinary Tract Infection**)**

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