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Pregnancy and commonly usage hematological medications in Sudan

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***Abstract*---**Background: When a woman with hematological issues considers pregnancy, she may need to take drugs. Objectives: This research looked into the use of hematological drugs to treat illnesses like anemia. Methods: This is a descriptive retrospective cross-sectional hospital-based study which carried out in Military Hospitals and Khartoum Teaching Hospital (Sudan) from Jan 2014 - Jan 2015. Data collection form was used to extract the

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information from 650 pregnant patient files. The information recorded included: age, trimester, medical history and hematological drugs. Results and Discussion: Four hundred & forty two (*N*=442=68%) of the women had normal (75-90%) hemoglobin, and 208 (32%) were below normal (40-70%) hemoglobin. Four hundred & thirty one (66.3%) of the pregnant women were dispensed hematological medications and the consumption was significantly higher in the third trimester (7-9 months) 89.6% of women (*N* = 386) than the second trimester (4-6 months) 10% of women (*N* = 43) and the first trimester (1-3 months) 0.46% of women (*N* = 2). The most common hematological drugs dispensed during pregnancy were Ferrous sulfate + Folic acid (*N* = 262; 40.3%), Fefol + Multivitamin (Pregnacare) (*N* =30; 4.7%), Calcium + Mineral (Osteocare) (*N* = 22; 3.3%), Multivitamin (Vitaferrol) (*N* = 17; 2.61%). Fefol + Pregnacare + Osteocare (No= 13; 0.2%). Conclusions: Pregnant women's medication responses are similar to non-pregnant women. However, alterations in pharmacokinetics and pharmacodynamics affect medication absorption, distribution, metabolism, excretion, and clinical response. The fetus has its own pharmacokinetic quirks. Pregnancy medications should only be provided if the predicted benefit to the mother outweighs the risk to the fetus.

***Keywords*---**Pregnant women, Medications, Hematological Drugs, Trimester, Folic Acid, Ferrous Sulphate.

Introduction

Pregnancy is the process of carrying one or more offspring, referred to as a fetus or embryo, inside a female's womb. Multiple gestations are possible during pregnancy, as in the case of twins or triplets. Pregnancy in humans is the most well researched of all mammalian pregnancies[1]. Childbirth occurs approximately 38 weeks after conception. This is around 40 weeks from the last normal menstrual period in women who have a four-week menstrual cycle (LNMP). The World Health Organization classifies delivery as occurring between 37 and 42 weeks[2]

Most existing data on medication pharmacokinetics during pregnancy comes from animal trials and cannot be directly applied to people in vivo. Although pregnant women's drug responses are quantitatively similar to those of non-pregnant women, certain quantitative differences do not occur as a result of physiological changes, and the resulting pharmacokinetic changes result in the noted changes in drug absorption, distribution, metabolism, and excretion. Additionally, the fetus has unique pharmacokinetic characteristics[3-4].

Human pregnancy is arbitrarily divided into three trimester periods in many societies' medical and legal definitions in order to simplify reference to the various stages of prenatal development. The risk of miscarriage is greatest during the first trimester (natural death of embryo or fetus)[5]. The development of the fetus can

be more easily tracked and diagnosed during the second trimester. The beginning of the third trimester frequently approximates the moment of viability, or the fetus' ability to survive outside the uterus, with or without medical assistance[6] During pregnancy, medications are frequently self-administered or recommended by a physician. For a variety of reasons, there are few research on their proper use during human pregnancy, and medicines are frequently prescribed arbitrarily rather than sensibly throughout pregnancy[7]. To use medications intelligently during pregnancy, the physician must place the pregnant mother in the role of therapeutic system. It must be borne in mind that the majority of medications prescribed during pregnancy are for the mother's health, and that we must provide her with proper therapy for what constitutes a serious sickness. Along with the medicines, the pregnant mother is likely to be exposed to a number of environmental, medicinal, and illicit chemicals that may have an adverse effect on the fetus's health[8]

Mineral and vitamin supplements have been widely administered to pregnant women for years as a standard component of prenatal care. These supplements are frequently given in the form of formulations containing 25–65 mg of elemental iron, as well as other minerals and vitamins (e.g., calcium, zinc, magnesium, and copper). Nevertheless, few research have studied the therapeutic efficacy of prenatal vitamin formulations together [9]

During pregnancy, both anemia and relative iron shortage are frequent. Low hemoglobin levels are a natural physiological reaction to the plasma volume increase that happens during pregnancy[5]. Hemoglobin concentrations typically decrease by around 20 g/L during pregnancy, reaching a low in the second trimester, and then returning to near pre-pregnancy levels by term. Pregnant women are deemed anemic when their hematologic indices fall two or more standard deviations below "normal" values, but the definition of "normal" varies[10].

Anemia in pregnancy is defined by a hemoglobin concentration (Hgb) of less than 110 g/L in the first and third trimesters and less than 105 g/L in the second trimester, or a hematocrit of less than 32%. Women require more iron during pregnancy owing to an increased red blood cell volume, the demands of the fetus and placenta, and blood loss after delivery. Additionally, supplementation with folic acid-fortified multivitamins has long been associated with a decreased incidence of neural tube abnormalities [10-11]

Materials and Methods

This is a descriptive retrospective cross-sectional design was utilized to fit the aim of the current study. The study was held Military Hospitals and Khartoum Teaching Hospital (Sudan) from Jan 2014 - Jan 2015. Convenient sample of 650 pregnant women file was included in the study from Jan 2014 - Jan 2015. Data collection form was used to extract the information from 650 pregnant patients' files. The information recorded included: age, trimester, medical history, hemoglobin, and hematological drugs.

Statistical analysis: Data was analyzed using SPSS16 software on the Microsoft Windows 7 Professional Operating System, with $p < 0.05$ considered statically significant, using Chi square test.

Results

We determined that 256 (39.38%) of the pregnant women in this study were between the ages of 15 and 25, 310 (47.7%) were between the ages of 26 and 35, and 84 (13%) were between the ages of 26 and 35. (Age 36-45), Trimester per trimester, 9 (1.38%) were in the first trimester (1-3 months), 78 (12%) in the second trimester (4-6 months), and 563 (86.62%) in the third trimester (7-9 months). Primigravida accounted for 210 (32%) of the total, while multigravida accounted for the remaining 440. (67.7%). According to Table 1, 442 (68%) of the women had normal (75-90%) hemoglobin and 208 (32% had below normal (40-70%) hemoglobin.

Hematological Drugs:
Four hundred & thirty-one (66.3%) of the pregnant women were on hematological drugs, this is shown in table 2

Age versus Hematological Drugs:
We discovered that 113 (26.2 percent) of pregnant women in the average age (15-25 years) used Ferrous sulfate + Folic acid (Fefol), 119 (27.6 percent) were in the age (26-35 years), and 30 (7 percent) were in the age (26-35 years) (36-45 years) This is shown in the table (3)

Trimester versus Hematological Drugs:
Two (0.46%) of pregnant women used hematological drugs in the first trimester (1-3 months), 43 (10%) used in the second trimester (4-6 months) and 386(89.6%) used in the third trimester (6-9 months), this is shown in table (4) very significant with $p < 0.0001$ at 95% confidence interval.

Discussion

Drugs should be provided during pregnancy only if the potential benefit to the mother outweighs the danger to the fetus, and all drugs should be avoided during the first trimester if feasible. Drugs that have been extensively used in pregnancy and are safe should be prescribed over new or untested drugs, and the smallest effective dose should be utilized. Few things have been proven to be teratogenic in man, but no medicine is without a doubt safe in early pregnancy[13].

Where there is a known risk of certain malformations, screening measures are available. The absence of a medicine from a list does not imply that it is safe. Because the list may not cover all pharmaceuticals documented to be harmful during pregnancy, vigilance should be always maintained while prescribing in pregnancy[14]

During pregnancy, pharmacokinetics includes medication absorption, distribution, metabolism, and excretion. The effects of a medicine on pregnancy are determined by four primary stages: pre-implantation, organogenesis, the

second and third trimesters, and a short delivery stage[15]. During pregnancy, the mother and fetus create a functioning unit that cannot be separated. Drugs can be detrimental to the fetus at any point during pregnancy. It is critical to keep this in mind when administering medication to women of childbearing age. Women should be counseled prior to a planned pregnancy, including a discussion of the risks associated with treatment drugs. Medication is extremely crucial during pregnancy, thus pregnant women should be prescribed with extreme caution [16]

In this study, we discovered that out of a total of 650 pregnant women, 256 (39.38 percent) were between the ages of 15 and 25, 310 (47.7 percent) were between the ages of 26 and 35, and 84 (13 percent) were between the ages of 26 and 35. (36-45 years). 9 (1.38%) were in the first trimester (1-3 months), 78 (12%) were in the second trimester (4-6 months), and 563 (86.62%) were in the third trimester (7-9 months). On the other hand, 442 (68%) of the women had normal (75-90%) hemoglobin, whereas 208 (32%) had below normal (40-70%) hemoglobin, which might be attributed to effective health care consulting.

Haemoglobin levels fluctuate during pregnancy, with a normal decrease at the start and a little increase near the end. During pregnancy, both red cell mass and plasma volume increase to meet the needs of the expanding uterus and fetus. Despite a rise in the overall number of red cells, plasma volume increases faster than red cell mass, resulting in a decrease in haemoglobin concentration in the blood. This fall in haemoglobin content reduces blood viscosity, which is expected to improve placental perfusion and provide improved maternal-fetal gas and nutrition exchange

Four hundred and thirty-one (66.3 percent) of the pregnant women in this study were taking hematological medications; this outcome could be attributed to 1) drug expense. 2) Pregnant women have a low level of education. 3) A decrease in the number of health-care facilities.

We discovered that two (0.46 percent) of pregnant women used hematological drugs in the first trimester (1-3 months), 43 (10 percent) used them in the second trimester (4-6 months), and 386 (89.6 percent) used them in the third trimester (6-9 months), which is very significant with p 0.0001 at the 95 percent confidence interval. On the other hand, 113 (26.2%) of pregnant women of average age (15-25 years) used Ferrous sulfate + Folic acid (Fefol), 119 (27.6%) were of age (26-35 years), and 30 (7%) were of age (26-35 years) (36-45 years). This finding is consistent with the findings of Dr. Biswadeep Das, who discovered that 30.2 percent of prescriptions were non-drug prescriptions, 24.5 percent of prescriptions were only folic acid (to reduce the risk of neural tube defects), and 20.5 percent of prescriptions were folic acid and antibiotics in the study[20]–[22].

Conclusion

In terms of medication responsiveness, pregnant women do not differ quantitatively from non-pregnant women. Because of physiological and psychological changes, pharmacokinetics and pharmacodynamics fluctuate, resulting in variations in medication absorption, distribution, metabolism,

excretion, and clinical response. Furthermore, the fetus has its unique pharmacokinetic characteristics. Drugs should be provided during pregnancy only if the potential benefit to the mother outweighs the danger to the fetus, and all drugs should be avoided during the first trimester if feasible.

As a result, in general, these medications should be recommended by a consulting physician and reviewed by a clinical pharmacist for appropriateness of treatment and to avoid drug-related complications (DRPs).
Mineral and vitamin supplements are commonly administered to pregnant women as part of conventional prenatal care. Mineral and vitamin supplements are commonly administered to pregnant women as part of conventional prenatal care.

Recommondation

If possible, women should be counseled prior to a planned pregnancy, including a discussion of the hazards associated with certain medicinal agents, traditional medicines, and substance addiction such as smoking and drinking. Folic acid supplements should be administered during pregnancy planning because folic acid use throughout pregnancy lowers neural tube abnormalities. Single-component medications that are well-known should be favored over multi-component drugs. Certain vaccines should not be administered to pregnant women. These vaccines are referred to as "live vaccines": While the MMR vaccine protects mothers from rubella infection, injecting the inactivated rubella virus may harm the developing fetus.

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Table 1. Demographic and health data of the study

	Variables	Frequency (%)
Age	15-25 years	256(39.38)
	26-35 years	310(47.69)
	36-45 years	84(12.92)
Trimester	First	9(1.38)
	Second	78(12.0)
	Third	563(86.62)
Parity	1 parity	210(32.3)
	2 parities	126(19.38)
	3 parities	143(22.0)
	<4 parities	170(26.3)
Hemoglobin	40-50	4(0.61)
	51-60	8(1.23)
	61-70	120(18.46)
	71-80	340(52.3)
	81-90	170(26.2)
	91-100	8(1.23)

Table 2. Study of Hematological drugs

Hematological drugs	Frequency (%)
Ferrous sulfate + Folic acid (Fefol)	262(40.3)
Fefol + Multivitamin (Pregnacare)	30(4.7)
Calcium + Mineral (Osteocare)	22(3.38)
Pregnacare	22(3.38)
Multivitamin (Vitaferrol)	17(2.7)
Fefol + Pregnacare + Osteocare	13(2.0)
Fefol + Ferrous sulfate	2(0.3)
Fefol + Osteocare	9(1.38)
Pregnacare + Osteocare	9(1.38)
Multivitamin(Heamaton)	9(1.38)
Folic acid	9(1.38)
Fefol + Vitaferrol	7(1.0)
Fefol + Supral	4(0.62)
Pregnacare + Vitaferrol	4(0.62)
Heamaton + Osteocare	4(0.62)
Multivitamin(V2)	2(0.3)
Multivitamin(Supral)	2(0.3)
Fefol + Heamaton	2(0.3)
Fefol + Multivitamin(V2)	2(0.3)
Missing System	219(33.7)
Total	650(100.0)

Table 3. Age versus Hematological Drugs

Hematological drugs	Age			Total
	15-25 years	26-35 years	36-45 years	
Ferrous sulfate + Folic acid(Fefol)	113	119	30	262
Fefol + Multivitamin (Pregnacare)	13	17	0	30
Calcium + Mineral (Osteocare)	2	13	7	22
Pregnacare	5	15	2	22
Multivitamin(Vitaferrol)	9	8	0	17
Fefol + Pregnacare + Osteocare	2	9	2	13
Fefol + Ferrous sulfate	0	0	2	2
Fefol + Osteocare	9	0	0	9
Pregnacare + Osteocare	5	4	0	9
Multivitamin(Heamaton)	7	2	0	9
Folic acid	5	2	2	9
Fefol + Vitaferrol	5	2	0	7
Fefol + Supral	0	4	0	4
Pregnacare + Vitaferrol	2	2	0	4
Heamaton + Osteocare	4	0	0	4
Multivitamin(V2)	2	2	0	2
Multivitamin(Supral)	2	0	0	2
Fefol + Heamaton	0	0	2	2
Fefol + Multivitamin(V2)	0	0	2	2
Total	185	199	49	431

Table 4. Trimester versus Hematological Drugs

Hematological drugs	Age			Total
	(1-3 months)	(4-6 months)	(6-9 months)	
Ferrous sulfate + Folic acid(Fefol)	2	26	234	262
Fefol + Multivitamin (Pregnacare)	0	2	28	30
Calcium + Mineral (Osteocare)	0	2	20	22
Pregnacare	0	0	22	22
Multivitamin(Vitaferrol)	0	2	15	17
Fefol + Pregnacare + Osteocare	0	2	11	13
Fefol + Ferrous sulfate	0	0	2	2
Fefol + Osteocare	0	0	9	9
Pregnacare + Osteocare	0	0	9	9
Multivitamin(Heamaton)	0	0	9	9
Folic acid	0	4	5	9
Fefol + Vitaferrol	0	2	5	7
Fefol + Supral	0	0	4	4
Pregnacare + Vitaferrol	0	2	2	4
Heamaton + Osteocare	0	0	4	4
Multivitamin(V2)	0	0	2	2
Multivitamin(Supral)	0	0	2	2
1Fefol + Heamaton	0	0	2	2
F1efol + Multivitamin(V2)	0	0	2	2
To1tal	2	43	386	**431**