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# First Line Anti-tuberculosis Medication for Pregnant Women

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**To cite this article:**

Gudisa Bereda. First Line Anti-tuberculosis Medication for Pregnant Women. *International Journal of Pharmacy and Chemistry*. Vol. 8, No. 2, 2022, pp. 20-23. doi: 10.11648/j.ijpc.20220802.11

**Received:** December 31, 2021; **Accepted:** January 22, 2022; **Published:** April 14, 2022

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**Abstract:** Tuberculosis is more sophisticated to diagnose in pregnant women contract the diseases because tuberculosis clinical manifestations suchlike tiredness, difficulty of breathing, sweating, weakness, coughing, and rare body temperature that is higher than normal are identical to the physiology of pregnant women changed during pregnancy. According to the United States food and drug administration risk classification of medicines among pregnancy; the four first line anti-tuberculosis medications are classified as category B and category C. The 1<sup>st</sup> line regimen management for pulmonary and extrapulmonary tuberculosis does not distinctive during pregnant and nonpregnant women. The WHO recommends 8 weeks of isoniazid, rifampicin, pyrazinamide, and ethambutol for intensive phase, followed by 16 weeks of isoniazid and rifampicin for continuation phase. This regimen is safe to use during pregnancy. Rifampicin is a category C medicine. Bleeding differentiated to hypoprothrombinemia has been reported in child less than 1 year and mother following the usage of rifampicin in pregnancy period begins at 28 weeks until birth. The usage of rifampicin is recommended for pregnant women with vitamin K for management tuberculosis, should be given to the breastfeeding women and the child less than 1 year postnatal if rifampicin is given to the pregnant mother in the last few weeks. Ethambutol is pregnancy class B medicine. Ethambutol highly concentrated in fetus plasma concentration which can be as high as thirty percent of the plasma concentration of drugs in mother because ethambutol easily crosses the placental barrier. Ethambutol freely crosses the placenta with a cord to maternal serum ratio of 0.75.

**Keywords:** Anti-tuberculosis Medication, First Line, Pregnant Women

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## 1. Introduction

Tuberculosis not only responsible for an important percentage of the over the broad load of disease, it is also an important contributor to maternal mortality, with the disease being among the 3 leading causes of death amid women aged 15–45 yrs [1, 2]. When pregnant women contract tuberculosis, the disease is further sophisticated to diagnose because TB symptoms such as fatigue, shortness of breath, sweating, tiredness, cough, and mild fever are identical to physiological symptoms of pregnancy. Unmanaged tuberculosis or tuberculosis managed late perhaps influence to serious outcomes leading both mother and children. Pregnant women with PTB who are managed accordingly do not have escalated rates of maternal or neonatal complications, while without management; tuberculosis can influence to escalated neonatal morbidity, LBW, prematurity,

and escalated pregnancy complications, involving 4 times escalates in maternal morbidity owing to greater rates of abortion, postpartum haemorrhage, labour difficulties, and pre-eclampsia [3-5]. The consequences of tuberculosis on pregnancy perhaps be affected by multiple factors, like severity of the disease, how developed the pregnancy has gone at the time of diagnosis, the presence of extrapulmonary spread, and human immuno virus coinfection and the management instituted. The pulmonary and extrapulmonary forms of tuberculosis effects pregnant women in the identical path as the nonpregnant ones. If ATT is launched early in pregnancy, the consequences is identical as that in nonpregnant patients, whereas late diagnosis and care are associated with four-times escalate in obstetric morbidity and nine times escalate in pre-term labor [6]. The escalated vulnerability to tuberculosis may be due to immunological changes in pregnancy. Pregnancy partially inhibits the T-

helper 1 (Th1) cell mediated immunity, in favours of the antibody response (Th2 mediated), maybe to keep the fetus from immunological rejection. Cell-mediated immunity has the preeminent function in safeguard against MTB and active TB is associated with a greatest Th2 immune response [7, 8]. According to the USFDA risk classification of medicines among pregnancy the four first line anti-tuberculosis medications are classified as category B and category C. Solely ethambutol is category B, the left three (rifampicin, isoniazid, and pyrazinamide) are category C. The medication currently phase-out from market streptomycin is category D. It has been confirmed to be potentially teratogenic throughout pregnancy. It causes fetal deformity and 8<sup>th</sup>-nerve paralysis, with deficits scaling from mild hearing loss to bilateral deafness. Explanation of category B and C is illustrated below. Category B (no confirmation of pitfall in humans): Either animal-reproduction studies have not substantiated a fetal peril but there are no restrained studies in pregnant women or animal-reproduction studies have reveal an adverse reaction (other than a de-escalate in fertility) that was not inveterate in restrained studies in women in the first trimester (and there is no confirmation of a pitfall in later trimesters) or there is survey in animal that revealed the medication is safe in pregnant animal, but there is no fetal pitfall confirmation in pregnant women. Medications in this class are typically thought-out safe [9-14]. Category C (pitfall can't be ruled out): Either studies in animals have displayed adverse effects on the fetus (teratogenic or embryocidal, or other) and there are no restrained studies in women or studies in women and animals are not avail. Medications should be accustomed only if the potential advantage maintains the potential peril to the fetus or the survey in animal model displayed slight pitfall to the pregnant animal, but there is no confirmation in fetal peril of human survey in pregnant women [15-17]. The intentions of this review article is to distinguish safety and United States food and drug administration pregnancy category of first line anti-tuberculosis medication utilization during pregnancy by pregnant women with tuberculosis infections and also its risks on fetus if crosses placental barriers.

## 2. Regimens and Category of Anti-tuberculosis Medication Is Pregnant Mother

All four first line anti-tuberculosis medications have good safety documentation in pregnancy and are not associated with human fetal deformity. The 1<sup>st</sup> line management for pulmonary and extrapulmonary TB does not distinctive during pregnant and nonpregnant women. The World Health Organization recommends 8 weeks of isoniazid, rifampicin, pyrazinamide, and ethambutol (2RHZE) in intensive phase, followed by 16 weeks of isoniazid, and rifampicin (4RH). This regimen is safe to usage during pregnancy [7, 18]. Rifampicin is a category C medicine. Bleeding characterized to hypoprothrominemia has been reported in child less than 1

year and mothers following the usage of rifampicin in late pregnancy. The usage of rifampicin is described in pregnant women with tuberculosis, with the recommendation that vitamin K be given to both the mother and the child less than 1 year postpartum if rifampicin is used in the last few weeks of pregnancy [7, 19]. Isoniazid is a category C Medicine. Isoniazid usage during pregnancy is thought out as safe. Isoniazid has the ability to highly soluble in lipid, a LMW, and crosses the placenta easily to reach fetal levels identical to those of the mother [7]. However, there is a peril of advancing hepatitis in the postpartum period. The WHO recommends that entire pregnant women taking isoniazid also receive pyridoxine (25-50 mg/day) because isoniazid raises excretion of pyridoxine which reduced by administration of pyridoxine (vitamin B6). Neonates born to mothers who have been under management with isoniazid are at pitfall of advancing convulsive seizures because pyridoxine deficiency perhaps causes seizures in the newborn [20-22]. Ethambutol is a category B medicine. Ethambutol crosses the PB, and the plasma concentration of E in the fetus can be as much as 30% of the plasma concentration of the medicine in the mother. Ethambutol freely crosses the placenta with a cord to maternal serum ratio of 0.75 [23]. The World Health Organization thought out it safe to use ethambutol amid pregnancy without any particular cautions. High therapeutic doses of ethambutol in child less 28 days or child less than 1 year if totally discouraged, because of eye toxicity concerns and the availability of better management alternative, but its usage in pregnancy is not discouraged [19, 24]. Pyrazinamide is a category C medicine. The World Health Organization thought out it safe to use pyrazinamide during pregnancy [19, 25, 26]. Its usage is specifically described in women with tuberculosis meningitis in pregnancy, human immuno virus coinfection, and suspected isoniazid resistance [27-29].

## 3. Conclusion

If PTB in pregnancy are managed accordingly there is no escalated the complications maternal or neonate rates, while there is no proper management; tuberculosis can influence to escalated the morbidity of neonate, LBW, fetus born before the normal time, and escalated the complications occurred during pregnancy, involving four times escalates the morbidity of mother owing to greater occurrences of abortion, postpartum hemorrhage, labour complications, and preeclampsia. Category C (pitfall can't be ruled out): Either studies in animals have displayed adverse effects on the fetus (teratogenic or embryocidal, or other) and there are no restrained studies in women or studies in women and animals are not avail. Drugs should be accustomed only if the potential advantage maintains the potential peril to the fetus or the survey in animal model displayed slight pitfall to the pregnant animal, but there is no confirmation in fetal peril of human survey in pregnant women. Isoniazid is a category C drug. H has the ability to highly soluble in lipid, a LMW, and crosses the placenta easily to reach fetal levels identical to

those of the mother [7]. Notwithstanding, there is a peril of advancing liver impairment in the postnatal period. The World Health Organization recommended that all women who are pregnant are taking isoniazid also receive pyridoxine or vitamin B6 (25-50 mg/day) because isoniazid raises excretion of pyridoxine which reduced by administration of pyridoxine (vitamin B6). A child less than 28 days born from pregnant women who received isoniazids for management of tuberculosis are at risk of advancing convulsive seizures or infantile spasm.

## Abbreviations

ATT: anti-TB treatment; H: Isoniazid; LBW: Low birth weight; LMW: Low molecular weight; MTB: Mycobacterium tuberculosis; PB: Placental barrier; PTB: Pulmonary tuberculosis; R: Rifampicin; Z: Pyrazinamide; USFDA: United States food and drug administration; WHO: World Health Organization.

## Acknowledgements

The author would be grateful to anonymous reviewers by the comments that increase the quality of this manuscript.

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