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Review Article

AN ANALYTICAL REVIEW ON HEALTH BENIFITS OF PRENATAL YOGA FOR MOTHER AND FOETUS

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ABSTRACT

Pregnancy is a physiological condition in which would be mother changes both from inside as well as outside. *Yoga* in pregnancy can help the women to balance through these physical, mental and emotional challenges. Embracing *yoga* during pregnancy provides multi dimensional benefits to mother and baby. Yoga calms the mind, revitalizes the energy and prepares the woman physically and mentally for delivery. Various respiratory exercises (*Pranayama*) and physical postures *(Asanas)*, performed by a pregnant woman under expert supervision, can help in harmonized relaxation and contraction of uterus, increase the strength, flexibility and endurance of muscles needed for childbirth,. They devour low energy and afford greater benefits. Also *Yoga-sasanas* can minimizes the complication of pregnancy, like pregnancy induced hypertension, intrauterine growth retardation and pre-term delivery. *Yoga* calms the mind, re-energies and prepares the mother physiologically, mentally and emotionally and for labour. Yoga is also helpful in improving sleep pattern, reduces lower back pain, nausea, headaches and shortness of breath. Simple stretching exercises encourage circulation, help fluid retention, and relieve stress. *Yogic* exercises can help pregnant women recover faster post-delivery. Different type of postures, mentioned in Ayurvedic and Yogic texts that can be comfortably performed in pregnancy. They consume lower energy and give better benefits. *Yoga* is useful for a variety of immunological, behavioral and psychosomatic conditions. Various research studies regarding the utility of yoga interventions for pregnancy shows that it is helpful in improving pregnancy and birth outcomes. Numerous clinical studies shows that yoga may produce improvements in stress levels, quality of life, aspects of interpersonal relating, autonomic nervous system functioning, and labour parameters such as comfort, pain, and duration.

INTRODUCTION

The word yoga is derived from the Sanskrit term *"yuj"* which means "to unite", i.e., oneness with self. *Astanga* (eight faculties) *yoga* helps a person to experience the self and improved overall health. It helps in restoring physical, psychological and spiritual well being. Yoga helps in improving the activity of immune system, nervous system, endocrine system, cardiovascular system etc.[1] Pregnancy is a crucial period of a woman's life. It is a physiological condition where a mother undergo various changes along with stress and unique physical and psychological needs. Yoga can be a beneficial implication in pregnancy, when there is a rapid change is undergoing in physical, hormonal and psychological functions. The complete health and well-being during pregnancy is crucial for favorable outcome.[2] Perinatal yoga is a multifaceted regimen that can help in regulating physical, mental, social and spiritual balance during pregnancy. It is found effective in improving pregnancy, labor and birth outcome.

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Common Health problems during Pregnancy

Pregnancy although is amazing period in a woman's life, it also brings some discomforts and aches. Pregnant woman may suffer mood swings, fatigue and sickness, painful leg cramps, morning sickness, breathing problems, swollen ankles and

constipation during pregnancy. Stress can be a factor that can cause harm during pregnancy.

Maternal stress releases harmful peptides, which may cause damage to programming of central and peripheral nervous system of foetus. Exposure to stress in first trimester, i.e., during the phase of organogenesis may slow down the developmental process. It may also result in behavioral and cognitive dysfunction later in life in the form of decreased brain size, ADHD, autism and learning disability.[3] Pregnancy stress can also affect the gestational time-period and birth weight.[4] Higher levels of cortisol, a stress related hormone is found to augment response of neonatal cortisol to a heel-prick procedure.[5] This shows effects of a prenatal yoga intervention on the maternal hypothalamic-pituitary-adrenal axis and sympathomedullary pathway.[6]

Modification in sympathetic nervous system through yoga is shown by decreased levels of cortisol. This may help in restoring psychosomatic health of mother. An integrated yoga program, including *Astanga yoga*, has demonstrated to reduction in cortisol levels in women with chronic pain because of fibromyalgia.[7] Yoga is also proved to decrease inflammatory markers and heart rate .[8]

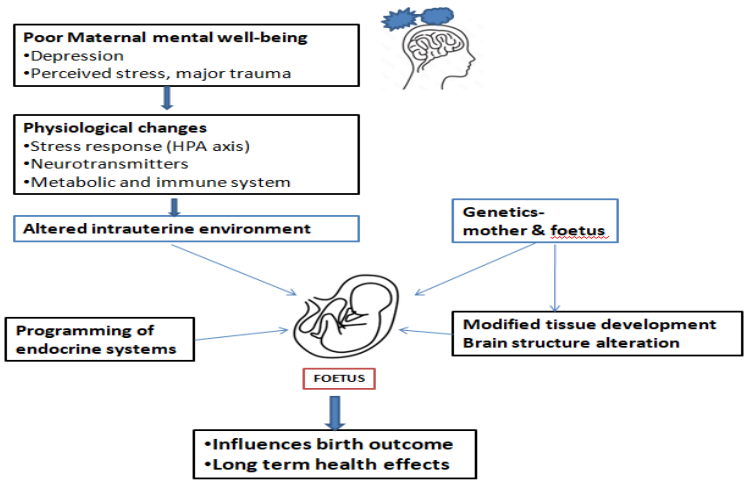

Fig.1. Impact of Maternal stress on fetus

Health Benefits of *Yoga* During Pregnancy

Various components of a *Astanga* (eight faculties) *Yoga* practice helpful in pregnancy:

- *Yama* (self control, sessions on lifestyle change)
- *Niyama* (discipline, sessions on lifestyle change)
- *Asanas* (physical exercises and postures)
- *Dharana* (concentration, Chanting)
- *Dhyana* (meditation) or *Yoga nidra* (yoga sleep/ deep relaxation)
- *Samadhi* (deep meditation)

The aim of prenatal yoga is to help the mother bring the unborn into the world with minimum hassle and completely no health complications. Positions and exercises practiced across the three trimesters of pregnancy should differ with every phase. *Yoga-asanas* relieve tension around the cervix by opening up the pelvic region.[9]

This prepares to-be-mothers for labor and delivery. *Yoga* and *Pranayams* can train one to breathe deeply and relax consciously, helping to face the demands of labor and childbirth. Gentle stretching and slow, deep breathing helps in relieving stress.[10]

Yoga also helps in improving sleep pattern, increases the strength, flexibility and endurance of muscles needed for childbirth, reduce lower back pain, nausea, headaches and shortness of breath. Simple stretching exercises encourage circulation, help fluid retention, and relieve stress. Yogic exercises can help pregnant women recover faster post-delivery. By doing regular *Yoga-asanas*, a lot of happy hormones are released called 'endorphins' that keep a mother energetic and positive sans the deterring and erratic mood swings coming in way.[11]

Important *Yoga-asans* for Pregnant Women

S.No.	Name of *Asanas*	Outcome
1.	***Marjariasana*- Cat Stretch**	• Stretches the neck and shoulders, alleviating stiffness. • Keeps the spine flexible. This is useful because the back has to support more weight as the pregnancy advances. • Relieves back pains. • Tones the abdominal region. • Improves blood circulation, ensuring that the reproductive organs are well nourished.

2.	***Konasana* I: Sideways bending with one arm**	• Keeps the spine flexible. • Exercises and stretches the sides of the body. • Helps alleviate constipation, a common symptom of pregnancy.
3.	***Konasana* II: Sideways Bending Using Both Arms**	• Stretches and tones the arms, legs and abdominal organs. • Stretches and exercises the spine.
4.	***Veerabhadrasana*: Warrior Pose**	• Improves balance in the body. • Tones the arms, legs and lower back. • Increases stamina.
5.	***Trikonasana:* Triangle Pose**	• Maintains physical and mental balance. Especially useful for pregnant women since their center of gravity shifts. • Stretches and opens the pelvic girdle which can be a big help during delivery. • Reduces back pain and stress.
6.	***Badhakonasana*: Butterfly Pose**	• Improves flexibility in the hip and groin region. • Stretches the thighs and knees, relieving pain. • Alleviates fatigue. • Helps facilitate smooth delivery when practiced until late pregnancy.
7.	***Viparita Karani*: Legs up the Wall Pose**	• Relieves backache. • Improves the flow of blood to the pelvic region. • Eases swollen ankles and varicose veins - a common symptom of pregnancy.
8.	***Vakrasna*: Twisted pose**	• Spine, legs, hands, neck are exercised along with gentle massage to abdominal organs.
9.	***Shavasana:* Corpse Pose**	• Relaxes the body and repairs cells. This helps self-healing which is vital, as pregnant women should avoid taking pills. • Relieves stress.
10.	***Yoga-Nidra*: The yogic power nap**	• Reduces tension and anxiety. • Helps regulate blood pressure. • Deeply relaxes every cell in the body.
11.	***Bhramari Pranayama:* Humming Bee Breathing**	• Helps regulate blood pressure. • Relieves headaches.
12.	***Nadi Shodhan Pranayama:* Alternate Nostril Breathing Technique**	• Practicing it for just a few minutes every day helps keep the mind calm, happy and peaceful. • It helps in releasing accumulated tension and fatigue. • Maintains body temperature. • Enhances oxygen supply which helps with the baby's growth • Release negative emotions like anger and frustration. Helps in releasing stress

Precautions for Pregnant Women While Doing Yoga

During the advanced stages of pregnancy, *Yoga-asanas* that put pressure on the abdomen should be avoided. For the first trimester of pregnancy, standing yoga poses should be adopted. This helps to strengthen the legs and enhance circulation. It can even reduce leg cramps. During the second and third trimester, time duration for holding *Asanas* should be shortened to prevent fatigue. It should be substituted with breathing exercises and meditation. Also practicing *Yoga-asanas* from the 10th to the 14th week of pregnancy should be avoided, since this is crucial time. Inversion poses should also be avoided. One should Listen to one's body and should do as much as one can do without undue effort.

A pregnant woman must take into consideration her health history before beginning with the exercises. Prior medical approval should essentially be taken before initiating any yoga program. The first trimester is very crucial phase and probability of miscarriage is higher. So, extra carefulness is necessary during this period. Yoga postures also focus on strengthening the pelvic muscles that help enhance the womb space for the healthy growth of the fetus.

Some important reminders/safety measures

Mothers with condition of asthma can try the above mentioned *Asanas* but shouldn't hold or suspend breath during the practice of *Pranayams* and *Yoga-asanas*. On the basis of pregnancy trimesters there are certain exercises that cannot be carried throughout all

pregnancy months. As *Konasana* (angle pose) should not be done in third trimester of pregnancy. Once the mother feels uncomfortable doing an *Asana* (posture), it is advisable to stop immediately without further straining the muscles. Forward bending exercises, lying down on the weight abdomen and twisted poses can impose pressure on abdomen. So, these should be strictly avoided.

Exercises involving balance should be done with utmost care. Hurry should be avoided into weight-loss exercise regime immediately after delivery. Post-natal yoga (post six weeks after birth) and exercises should be practiced only when the mother's body is fully ready and relaxed. If pain or other discomfort felt doing exercises, then should discontinue instantly and consult obstetrician.

Yoga poses to be avoided during pregnancy

- *Naukasana* (Boat Pose)
- *Chakrasana* (Wheel Pose)
- *Ardha Matsyendrasana* (Sitting Half Spinal Twist)
- *Bhujangasana* (Cobra Pose)
- *Viparita Shalabhasana* (Superman Pose)
- *Halasana* (Plough Pose)

Obstetrician should be consulted before starting a prenatal yoga program. Also it should be practiced under supervision of a yoga specialist.

Clinical Studies on Yoga Therapy During Pregnancy

Different domains of Yoga cultivate general health, diminish distress, and increase self awareness, may be particularly effective in addressing both the physical and psychoemotional aspects of pregnancy and labour.[12] Confidence, self- efficacy, and coping ability are considered important for a positive labour experience, and maternal prenatal anxiety is negatively associated with prelabour self-efficacy for child- birth and labour pain.[13] *Yoga-asana* are beneficial in combating stress and symptoms during pregnancy, as pedal edema, pregnancy associated hypertension and diabetes, mood swings, lethargy and aches. Safe and can be encouraged in routine prenatal care. Regular physical exercise has maternal and fetal advantages that outweigh risks and recommend at least 30 minutes of yoga-exercise, per day for the prevention of conditions associated with inactivity, such as gestational diabetes and hypertension.[14]

In a clinical study, women of similar age, parity, body weight, and Doppler velocimetry scores of were included. Intervention with yoga postures, breathing exercises, and meditation was done for an hour every day, from enrollment in the clinical study up to delivery. It was concluded that an integrated approach to yoga during pregnancy is safe. It improves birth weight, decreases preterm labor, and decreases IUGR either in isolation or associated with PIH, with no increased complications.[15]

In an another study, 7 weeks mindfulness-based yoga group intervention combined elements of Iyengar yoga and mindfulness-based stress reduction program when practiced by mothers during second and third trimester. The outcome was significant reductions in physical pain in participant of second trimester whereas women in their third trimester showed greater reductions in stress and anxiety level. Study concluded that preliminary evidence supports yoga's potential during pregnancy, particularly if started early.[16]

In a clinical study, the yoga intervention program involved six, 1-h sessions at prescribed weeks of gestation. A variety of instruments were used to assess maternal comfort, labor pain and birth outcomes. The intervention group has shown better comfort and lesser pain to mother during labor and 2 hour after delivery as compared to control. It also found to have a shorter duration of the first stage of labor, as well as the total time of labor. No differences were found, between the groups, regarding pethidine usage, labor augmentation or newborn Apgar scores at 1 and 5 min.[17]

In a review study by Kwon, R et al, five RCTs were included in the systematic review. The outcome of review shows that yoga during pregnancy is safe if done with adequate care and under supervision. It is helpful in reducing stress, anxiety and pain and improving immunity and emotional well-being. Yoga may improve psychological and pregnancy outcomes.[18]

In another study, twenty-five healthy pregnant women were evaluated for acute maternal and fetal effects of yoga postures. Baseline tests and pulse-oximetry performed. Vital signs were monitored. Participants then advised 26 yoga postures. Participants were contacted 24 hours post-session. Data presented no alteration in heart rate, temperature and oxygen saturation. During the 26 yoga postures, vital signs, pulse-oximetry, and uterine tocometry remained normal in all women and in all postures. Also fetal heart rate during and after all 26 yoga-postures was found within normal limit. All yoga postures were found to be safe and well-tolerated. Also no untoward effect was recorded on maternal and fetal well being.[19]

In a RCT the effects of 16–18-week-long integrated yoga program with chanting is compared with a control group that received standard prenatal exercises in the women between 18th and 20th week of pregnancy until their 36th week. The perceived stress scale (PSS) and heart rate variability (HRV) were used to evaluate stress. Pre- to post evaluation of study showed that PSS scores reduced significantly in the

yoga group as compared with the control group. Improvements were observed on psychological domains during pregnancy and labour e.g., quality of life and self-efficacy, on physical and pain measures during labour, and on birth variables e.g., birth weight, preterm births. The single adverse health outcome reported was uterine contractions, which can be monitored. The outcome suggests that, a prenatal yoga program results in benefits during pregnancy as well as throughout labour and on birth outcomes.[20]

In a RCT design on 102 healthy pregnant women, the effects of integrated yoga on the quality of life and interpersonal relationships were compared to standard antenatal exercises. The 16-weeks integrated yoga schedule was intervened from 5th to 9th months of pregnancy. It contains lectures, yoga postures, breathing exercises and a relaxation regime. The yoga-group presents better outcome as compared to control all domains of the WHO Quality of Life Inventory. The study concluded that yoga is a noninvasive and cost-effective way of improving quality of life and well-being during pregnancy.[21]

Relaxation therapies for pain management in labour are good alternatives to traditional treatment, including analgesics and anesthesia, which can be invasive and sometimes associated with negative side effects for both the mother and infant.[22,23]

Concentration and Meditation in the form of *Dhyana* and *Dharana* helps in reducing stress and anxiety by harmonizing endocrine and nervous system during pregnancy and labour. Mindfulness has been proved as an effective intervention in mitigating symptom and improving general health in a variety of conditions during pregnancy, as anxiety, depression, migraine and back pain.[24]

In an another clinical research, psychosocial mindfulness program has found to improve in anxiety, depression and induced positive effect in mothers during third trimester of pregnancy.[25]

An RCT assessing the effect of a mindfulness intervention during the second half of pregnancy found decline in levels of anxiety and negative mood in comparison to control group. The assessment of mindfulness and other system parameters may give worth approach for the main factors responsible for generating change.[26]

In addition to evaluating mindfulness as a construct within a yoga intervention, we also recommend that future research compare the effects of a prenatal yoga program with the effects of contemporary stress releasing intervention programs and relaxation therapies on mother and fetus outcome.[27]

Slow and clam breathing exercises (*Pranayama*), have proved to produce changes in fetal heart rate in response to uterine stimulation.[28]

During pregnancy when women were given an intervention of relaxation techniques, their fetuses had shown better long-term heart rate variability than controls. Also, mothers who received progressive muscle relaxation significantly shown better uterine activity as compared to controls.[29]

It is possible that breathing exercises or deep relaxation, may effect fetal heart rate and fetal movement.[30]

Special Safety Guidelines for Prenatal Yoga

One should not do prenatal yoga if at increased risk of preterm labor or have certain medical conditions, such as heart disease or back problems. Realistic goals should be tailored. However, even shorter or less frequent workouts can still help one stay in shape and prepare for labor. One should stay cool and hydrated and should practice prenatal yoga in a well-ventilated room**.** When doing poses, one should bend from gluteus not from back to maintain normal spine curvature. Lying on abdomen or back, doing deep forward or backward bends or doing twisting poses that put pressure on abdomen, should be avoided. Twisting poses should be modified to only move upper back, shoulders and ribs.

On should listen to one's body. Should pay attention and start slowly. Stretch should be only as much as one would have before pregnancy. Red flags or alarming signs should be communicated surely to the pregnant such as pain, vaginal bleeding, decreased fetal movement or contractions.

Adverse consequences in first trimester of pregnancy may results in defect in fetal neuro-behavioural development. Therefore safety of the mother and baby should be ensured throughout physical exercises.[31]

Although prenatal physical exercises are proved to have several benefits and positive outcomes, still possible negative consequences can't be ignored, as uterine contractions, maternal-fetal transfer of catecholamines, decrease of oxygen, premature labour, and nutrient flow or attenuation or decrease of fetal heart rate.[32]

Only adverse effect on mother's well being was noticed was uterine contractions. It can be monitored and physical activities can be modified or reduced accordingly. On the whole, it can be concluded for various researches prenatal yoga is helpful and compatible for mother and foetus.[33]

CONCLUSION

Perinatal is beneficial for both the mother and the baby. There should be individualized approach specialized yoga protocol, expert supervision and favorable environment. Team work between obstritican/gynecologist and yoga therapist should be ensured. Contraindications should be kept in mind.

Future research specialize Yoga Intervention programs should be framed keeping in mind various problems during pregnancy. Yoga therapist should prepare potent, standardized programs that should be based on evidence evaluation in a research environment. There is also a need to evaluate the efficacy of yoga for high-risk pregnancies, such as pregnancy-induced hypertension or diabetes and for women above 35 years of age. More RCT studies should be done to establish the various outcomes of Yoga intervention in Pregnancy. Strong evidences are required for planning prenatal yoga protocol that is safe and beneficial for mother and foetus. Also separate guidelines should be incorporated for all the three trimesters. Apart from this, specific modifications should be tailored in view of the needs of the individual woman, to prevent of exertion, premature labour and stress on the fetus. Yoga during pregnancy may result in safer pregnancy and healthy child. Various clinical studies shows improvement in quality of life and self-efficacy during pregnancy and labour, relief on discomfort and pain during labour and improvement on birth outcome in the form of good birth weight and lesser number of preterm births.

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