3. LITERATURE SURVEY

Outline of literature survey

The main issues addressed here are various interventions for reducing stress during pregnancy.

3.1. Exercise guidelines from obstetric practice
3.2. Psycho-social support during pregnancy
3.3. Complementary and alternative medicine [CAM]
3.4. Yoga therapy - IAYT
3.5. Lacuna in the knowledge of the subject
3.6. Application of the work in the context of national priorities of medical research

3.1 EXERCISE IN PREGNANCY

Doctors and pregnant women often demonstrate concern about the effects of exercise on the unborn child, however, research has shown that this concern is overstated. Many athletes train during their pregnancies [Carbon 1995]. Example is Evonne Cawley, who played championship tennis in early pregnancy [Carbon 1988].

However, these athletes are a minority, there are both women who exercise regularly and women who do not. The latter group often has little understanding of physiological aspects of their body and they need guidance and accurate information about the benefits of exercise.

There is little information on the safety of women beginning a regular exercise program in the period just prior to conception or just after conception [CASM 1998].

Dr. Clapp performed some research on weight-bearing activity and found that weight-bearing exercise has a much better effect on easing pregnancy discomforts and complaints than non-weight-bearing exercise [Gross 1995]. That does not mean that non-weight-bearing activities do not have their advantages. They do; they are extremely important aerobically and as the centre of gravity changes in a pregnant woman, [Carbon 1995] then non-weight-bearing activities may be easier on the body. However, "Dr. Clapp’s research shows that non-weight-bearing activities are not demanding enough to produce the same benefits in terms of labour and the fetal growth that weight-bearing exercises have demonstrated" [Gross 1995].
Experts who have listed and promoted the benefits of exercise have mentioned the contraindicators and concerns that should be followed. To reinforce the changing nature of the pregnant body, Professors acknowledge: "Because pregnancy increases the workload of any woman, even at rest, and because body weight increases throughout pregnancy, exercise during pregnancy represents a much greater workload than in the non-pregnant state" [Warren and Shangold 1997]. There are however increases to the efficiency of the body, but pregnant exercisers need to be aware that they are performing more work than before, and they should slow their pace. Pace should be adjusted by perceived exertion [Warren and Shangold 1997].

A general piece of advice, particularly sprouted by health care professionals is that a woman can/should be able to continue to exercise at the same level that she has been doing. The Canadian Academy of Sports Medicine [CASM 1998] quote: "Women who have been previously inactive are not advised to initiate an exercise program during the first trimester. Those women who have been previously exercising may continue but not increase their intensity or frequency during the first trimester". To further evidence this, studies have shown that previously fit women who continued to exercise in their pregnancy found no significant difference in the rate of miscarriage or congenital abnormalities [CASM 1998].

Exercise provides measurable health benefits, and many women report that exercise increased their self-esteem. For example, the Melpomene Institute for Women’s Health Research in US [a group of woman founded this institute to dispel exercise myths], found in a 1987 survey that the most important benefit women gained from exercise was improved self-image [Carbon 1988]. Exercise can aid this feeling, as many women report feeling good after exercise as endorphins are released into the body and provide an elevated feeling.

There are clear advantages to exercise during pregnancy. Weight-bearing exercises such as stair climbing, aerobic dance, walking and similar exercises, can maintain some muscular strength. However, there are other specific benefits for pregnant women. These include maintenance of physical health and self-esteem, decreased incidence of discomforts such as backache, constipation, shortness of breath, varicose veins, morning sickness and fatigue, limitation of weight gain, reduced length of labour, and need for intervention, caesarean section rate and analgesic requirements [Voice and Howell 1995].

The Canadian Academy of Sports Medicine suggest that exercise may prevent gestational diabetes, hypertension, nausea, leg cramps, insomnia, and heartburn [CASM 1998].
Likewise, physical activity strengthens the abdominal and back muscles and improve posture [Aerobic and Fitness Association of America 1999]. This is important for managing the extra weight, women have to carry, including muscular demands of labour and recovery after labour. These advantages may not reduce the risk of complications in labour, however the benefits are that fit women and their babies tolerate the rigors of labour better than unfit women [Carbon 1995 quotes Erkkola & Rauramo 1976].

The Borg’s scale created as an exercise exertion guideline for pregnant women has proved useful [Gross 1995].

Regular exercise is contra-indicated in pre-eclampsia (toxaemia), heart problems, high blood pressure, placental problems, intra-uterine growth restriction, bleeding or premature labour, habitual miscarriage, and multiple pregnancies [Weiss 1999]

As mentioned above, women who carry twins or multiples have a higher risk of complications including a pre-term delivery, and are considered by medical professionals as a high-risk pregnancy. Recommendations suggest limited exercise, non-weight-bearing activities focussing on toning and stretching only [Saulitis 1999]. So, high-risk pregnancies will have limited exercise programs and they need to pay attention to their health care providers’ advice.

The vigorousness of exercise is often debated. What is a safe level? In 1989 Clapp completed a study to test whether vigorous exercise would increase the likelihood of abnormal pregnancy outcome. All women had been exercising for several years [the sample was obviously only for exercisers] and the results showed that abnormal outcomes could not be proven [Voice and Howell 1995].

Many researchers [Weiss 1999] caution women about risks of strenuous exercise, and also seem to disregard the benefits of exercise. They seem to focus on potential complications, which realistically could occur in any pregnant woman, fit or otherwise. However, it is considered more and more that exercise is a healthy and safe option during pregnancy. For instance, in a recent study, 66% of all obstetricians recommend exercise to their patients during the first trimester, 64% recommended it to second trimester patients, and 53% in third trimester [Pirie 1987]. Women should avoid breath holding during resistance training [Pirie 1987] and it is well-known that exercise in the supine position after the fourth month of pregnancy is not recommended due to the pressure on the venacava. This reduces the amount of blood flow, and therefore oxygen to the fetus [Weiss 1999].
Another concern is regarding temperature and the effect on the fetus. Maternal core temperature should not exceed 38 degrees Celsius, "...because pregnant women are less efficient at exchanging heat" Aerobics and Fitness Association of America 1999. Therefore, exercise in very hot conditions is not recommended.

Moreover, few studies have examined maternal heat exposure induced by exercise as opposed to induced by saunas, spas and fevers. There is nothing to even suggest association between increased temperature induced by exercise and congenital malformations [CASM 1998].

American College of Obstetricians and Gynecologists (ACOG)

In 2002 the ACOG has issued new guidelines for exercise in pregnancy. The guidelines suggest that in non-complicated pregnancies, women should continue with the general health recommendations of getting an accumulation of 30 minutes of moderate exercise a day for most or all days of the week. This allows the pregnant woman to continue to benefit from healthy levels of activity.

**Participation in most activities is safe:** ACOG recommends that women evaluate the risk of injury by contact or falling of any sort, they would like to participate in. Most activities are safe, but those that pose a risk of abdominal trauma should be avoided. Similarly, scuba diving should be avoided not because of risk for injury, but because the baby's immature circulatory system makes him more susceptible to decompression sickness.

The physiologic and morphologic changes of pregnancy may interfere with the ability to engage safely in some forms of physical activity. A woman's overall health, including obstetric and medical risks, should be evaluated before prescribing an exercise program [ACOG, 2002].

**Overview and rationale for the 1994 ACOG Guidelines**

Regular exercise sessions are recommended for all healthy pregnant women because of exercise's favorable cardio-vascular, metabolic, and bio-mechanical effects. Exercise should be done three or more times per week at a comfortable intensity that does not result in fatigue. In women who have exercised regularly prior to pregnancy, the overall exercise load may be higher than that recommended for women who are beginning to exercise regularly. For safety's sake, the continuous portion of each session should be limited in intensity and duration while paying specific attention to environmental conditions and adequate fluid and caloric intake. This avoids undue physiologic stress. For the same reason, each session should
begin with a warm-up period and end with a cool-down period. The type of exercise should also minimize the risk of fetal and maternal trauma. Stationary cycling and swimming are the two recommended forms of exercise because the risk of physical injury is minimal. Most, if not all, complications of pregnancy, as well as any chronic maternal disease, are either relative or complete contra-indications to exercise during pregnancy. It has been observed that, 20 min exercise daily increased both feto-placental growth and size of baby birth. Studies show that, surprisingly, exercising at a moderate to high-intensity level is usually safe and many provide long as well as short-term benefits to both mother and fetus. What limitations, if any should be recommended at various stages of any active woman's pregnancy to avoid compromising the growth and development of her embryo or fetus. The obvious concern is the potential for one or more adverse effects of specific exercise responses, like increases in maternal body temperature, circulating stress hormones, and caloric expenditure, as well as hypoglycemia, bio-mechanical stress, and decreased visceral blood flow, possible sequelae of such a response are infertility, abortion, congenital malformation, growth restriction, premature labor, brain damage, fetal trauma, premature rupture of membranes, difficult labor, hemorrhage, and maternal musculo-skeletal injury. Fortunately, existing human data fail to support any of these concerns.

Likewise, follow-up studies for the first 5 years after delivery have revealed no evidence of abnormalities in postnatal growth or neuro-development in these offsprings and no evidence of structural defects, injury, or other health abnormalities in the women. These observational results led to a series of three prospective, randomized studies of weight-bearing [treadmill, aerobics, and stair-stepping] exercises training during pregnancy.

Studies show that, exercising at a moderate to high-intensity level is usually safe and many provide long as well as short-term benefits to both mother and fetus, according to ACOG. Research dealing with exercise during pregnancy continues, to demonstrate surprising safety as well as benefits for both mother and offspring according to ACOG. However, the type, intensity, frequency and duration of the exercise appear to be important determinants of its beneficial effects [Clapp JF, 2002].

Maternal benefits include improved cardio-vascular function; limited weight gain and limited fat retention; improved attitude and mental state; easier, less-complicated labor; quick recovery; and improved fitness. Fetal benefits include decreased neonatal fat mass, improved stress tolerance, and advanced neuro-behavioral maturation [Clapp JF, 2002].
Pregnant women should practice exercise in a moderate, sub-maximal aerobic range. Preexisting cardio-pulmonary diseases and pregnancy pathologies have to be considered as contra-indications. Thus gestational age adapted exercise gives a safe and effective support for mother and fetus. Recommendations concerning exercise in pregnancy underwent significant changes during the past three decades. Today there is a lot of evidence for the beneficial effects of moderate exercise in pregnancy even in formerly inactive women [Kagan KO, 2004]. There are benefits as well as risks associated with physical activity in all individuals, but there are some special medical considerations for the pregnant woman. There are some potential risks to the fetus resulting from maternal exercise including hypoxia, hyperthermia, and abnormal heart rate changes. The benefits, however, appear to outweigh the risks when they are minimized by prescribing appropriate exercises and using recommended precautions. Because human studies on exercise during pregnancy are currently limited, exercise prescriptions should be conservative. Swimming, biking, and aerobic walking are not associated with reported problems. Moderate aerobic exercise is safe provided the pregnancy is known to be normal. Contra-indications to aerobic exercise during pregnancy include conditions that limit cardio-respiratory reserves. If a woman has been participating in an exercise program before gestation, she may be encouraged to continue the program at a moderate level if her pregnancy is normal [Jarski RW, 1990]. Exercise has become an integral part of the lifestyles of many women. However, many women stop exercising during pregnancy because of concerns regarding the well-being of the fetus. Although pregnancy is associated with several physiologic changes and response to exercise is different in the pregnant state than in the non-pregnant state, exercise can be beneficial to the pregnant woman in the absence of obstetric or medical complications.

In recent years with ever-increasing numbers of pregnant women wanting to participate in sport activities, the question as to how safe maternal exercise is for mother and fetus has become more important. The effects of pregnancy on maternal cardio-respiratory system include increases in oxygen consumption, cardiac output, heart rate, stroke volume, and plasma volume. The increase in oxygen reserve seen in early pregnancy is reduced later, suggesting that maternal exercise may present a greater physiological stress in the third trimester. In the absence of either obstetric or medical complications, pregnant women can continue to exercise and derive related benefits. The type, intensity, frequency, and duration of the exercise seem to be important determinants of its beneficial effects. Evidence suggests that weight-bearing exercise produces a greater decrease in oxygen reserve than non-weight-
bearing exercise. Furthermore, to maintain a heart rate below 150 beats per minute during pregnancy, the intensity of weight-bearing exercise must be reduced. In addition, depending on the individual's needs and the physiologic changes associated with pregnancy, women may have to modify their specific exercise regimens. Although increases in the frequency of uterine contractions have been observed during physical activities, changes are often minimal. In response to moderate exercise, the increase in frequency of uterine contractions is gestation dependent and significant in the third but not in the second trimester. The physiological adaptations to exercise during pregnancy appear to protect the fetus from potential harm and, while an upper level of safe activity has not been established, the benefits of continuing to be active during pregnancy appear to outweigh any potential risks. All decisions about participation in physical activity during pregnancy should, however, be made by women in consultation with their medical advisers [Koshino T, 2003]. It is probably not advisable for women to begin high intensity exercise programs when pregnant, although moderate exercise is beneficial to both mother and baby. The type of activity that is undertaken has to be taken into consideration and in particular, the adverse effects of supine activity in late gestation recognised [Lumbers ER, 2002] The Physical Activity Readiness Medical Examination for Pregnancy is recommended for use by physicians and midwives to provide medical clearance for prenatal exercise. Evidence-based prenatal exercise guidelines are needed to counsel healthy and fit pregnant women on the safety of involvement in more strenuous physical conditioning. Future study is also recommended to determine the usefulness of prenatal exercise in the prevention and treatment of gestational diabetes mellitus and pre-eclampsia [Wolfe LA, 2003].

The endocrine effects of pregnancy cause striking changes in maternal metabolism, cardiovascular regulation, acid-base balance, and thermo-regulation at rest and during standard submaximal exercise. The apparent purpose of these changes is to accommodate fetal needs in addition to those of the exercising woman. A significant body of evidence supports the hypothesis that healthy women can perform acute exercise of moderate intensity and duration without jeopardizing fetal well-being. Compiled studies also suggest that maximal oxygen uptake [VO2max, L.min-1] and the work rate at the onset of blood lactate accumulation [OBLA] are not significantly altered during the course of a normal pregnancy. Recent studies support the view that moderate fitness conditioning can augment maternal metabolic and cardio-pulmonary capacities without altering fetal development or pregnancy outcome. Implications of recent scientific studies for the design of aerobic exercise programs for
pregnant women are discussed [Wolfe LA, 1993]. Women should be advised to avoid anaerobic training such as sprinting. Swimming is an excellent cardio-vascular conditioner with minimal risk of orthopedic complication. Violent sports should be avoided [Broso P, 1993].

**Walking** is a supportive alternative to jogging, cycling and other intense exercises because it does not involve any ballistic movements, but also helps to condition the cardio-vascular system. This appears to be the most common form of exercise during pregnancy [43%] and recent surveys have assessed the effects of regular walking on the course and outcome of pregnancy. None of these have noted any adverse effects. [Clapp JF, 2002]

**Aerobics:** The ACOG guidelines recommend that exercise in the supine position, as well as jerky, bouncing movements and deep flexion and extension, be avoided after four months of gestation. Low impact aerobics may be easier for the pregnant woman to tolerate, especially in the third trimester.

When considering exercise during pregnancy, one must evaluate both maternal and fetal responses to physical activity. There is a lack of human data in this area, because the pregnant female and the fetus are not easily studied by present research techniques. Most of our knowledge is extrapolated from animal studies and from retrospective reviews of pregnant women and their fetuses.

Yoga practices have proved to be very safe. Āsanas are not physical exercises. They are graded, modified and individualized, the pregnant women are asked to relax completely till the heart rate and respiratory rate comes back to normal. The āsanas are always associated with breathing and awareness of what is happening in the body, as such there is great calmness even while doing these postures. The entire yoga practices including āsana, prānāyāma, relaxation instructions are taught both in normal pregnant women and also in complicated and high-risk pregnant women, they are safe and beneficial.

### 3.2 PSYCHO-SOCIAL SUPPORT

Psycho-social support in pregnancy should be directed towards emotional, informational, material resources, for physical comfort and psychological comfort and lastly helping the family specially the husband and other siblings. These also include teaching positive health behavior and lifestyle changes.
Emotional support: in an early study, Gottlieb BH [1978] found that such support, being 'emotionally sustaining', is the most highly valued. Emotional support involves listening and showing concern as well as some intimacy. It may be further defined in terms of its duration and reciprocal nature.

Informational support: may not be simply the passage of neutral material. As Kahn and Antonucci indicate [Kahn RL, 1980], the transmission of information carries with it the affirmation that enhances the recipient's self-esteem. Thus, not only is information transmitted, but emotional support as well, leading to a blurring of the boundaries between the different forms of support. The timing of informational support is of greater significance than other forms. This point was established by Langford and colleagues [Langford CPH, 1997], who found that information-giving becomes supportive only if it is provided at a time of stress to facilitate problem-solving.

Instrumental support: is more practical, tangible or material than the emotional form. It operates by lightening the burden or allowing time for rest and recuperation. Although oneway transmission of instrumental support has been shown to engender resentment [Wills TA, 1985], this is likely to be overcome through a culture or ambience of instrumental support.

Esteem support: is integral to the psycho-social support already mentioned. Wheatley suggests that a person may use support to enhance her own self-esteem [Wheatley S, 1998]. Such enhancement, though, requires some degree of self-criticism if the need is to be recognised, creating an uncomfortable - even dangerous - vulnerability. For this reason, for esteem support to be effective, a longstanding and/or close relationship is necessary.

Given this brief description of some of the facets or support, its complexity becomes apparent. Moreover, the close inter-relationship between the different aspects of psycho-social support mean that differentiating them is not only difficult, but may also be futile. Knowledge of the various components that make up support, and their interdependence, is crucial to the effective care of the childbearing woman.

Although research on the effectiveness of support has been undertaken throughout childbearing [Oakley A, 1999], its beneficial effects have been demonstrated most clearly during labour through a series of seven randomised controlled trials [RCTs]. Undertaken in various countries, these RCTs have sought to examine the benefits of psycho-social support.
during labour provided by a range of personnel. The control groups comprised women receiving standard care.

"Supportive Care and Midwifery" [Blackwell Science], which explores the growing trend of using social, psychological and clinical supports during childbirth. The book also looks at the provision of this service and how different models have been set up internationally to fulfil this important function. Finally, it brings together the latest findings on the nature of the care provided, and considers what constitutes effective and efficient support [Hodnett ED, 2000].

Many of the psycho-social interventions are not successful in either altering women's perception of social support and satisfaction with the reproductive experience, as well as maternal and newborn's health care. It is concluded that although high levels of psycho-social distress during pregnancy may play an independent role in determining adverse pregnancy outcomes, this adverse effect does not appear to be ameliorated by psycho-social interventions conducted only during pregnancy, particularly those of a magnitude that can be realistically implemented [in content and frequency] at public care services in most developing countries the Latin American Network For Perinatal and Reproductive Research [LANPER] [Langer A, 1996].

Pregnant women need the support of caring family members, friends, and health professionals. While programs which offer additional support during pregnancy are unlikely to prevent the pregnancy from resulting in a low birth-weight or pre-term baby, they may be helpful in reducing the likelihood of caesarean birth [Hodnett ED, 2003].

3.3 COMPLEMENTARY AND ALTERNATIVE MEDICINE [CAM]

CAM is gaining popularity all over the world. However, very little research study is available. The following are a few therapies which are widely accepted.

Alternative Therapy: is the treatment or technique that is used instead of the standard medical treatment. It is also called unproven, unconventional, or unorthodox treatment. Limited evidence exists on the safety and efficacy of these therapies and attention needs to be given to undertaking high quality randomised controlled trials [Gaffney L, 2004]. This therapy encompasses a variety of disciplines that include everything from diet and exercise to mental conditioning to lifestyle changes. Examples of these are acupuncture, reiki, guided imagery, chiropractic, hypnosis, biofeedback, aromatherapy, herbal remedies, massage and many others.
There are many terms used to describe approaches to health care that are outside the realm of conventional medicine as practiced all over the globe, the National Center for Complementary and Alternative Medicine (NCCAM), a component of the National Institute of Health, defines some of the key terms used in the field of CAM. Which is a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine. While some scientific evidence exists regarding some therapies, for most, there are key questions that are yet to be answered through well-designed scientific studies and questions such as whether they are safe and whether they work for the diseases or medical conditions for which they are used. The list of what is considered to be CAM changes continually, as those therapies that are proven to be safe and effective become adapted into conventional health care and as new approaches to health care emerge. Integrative medicine, as defined by NCCAM, combines mainstream medical therapies and CAM therapies for which there is some high-quality scientific evidence of safety and effectiveness.

Many people, especially those with chronic illnesses, are looking for answers to their disease and management questions. Sometimes traditional medicine cannot provide those answers and, in turn, cannot provide a cure or relief of symptoms. Valid or not, alternative therapies often offer people those answers. In addition, people are becoming much more proactive in their healthcare decisions. With the emergence of the Internet there is much more information available and accessible to consumers. People are taking this information and deciding (with or without their health care providers) what course of action best meets their needs. Many times, alternative therapies seem "easier" or may appear as "a quick fix." However, this is not always the case.

Major types of complementary and alternative medicine

NCCAM classifies CAM therapies into five categories, or domains:

1. Alternative Medical Systems: Alternative medical systems are built upon complete systems of theory and practice. Often, these systems have evolved apart from and earlier than the conventional medical approach used in the United States. Examples of alternative medical systems that have developed in Western cultures include homoeopathic medicine and naturopathic medicine. Examples of systems that have developed in non-Western cultures include traditional Chinese medicine and Ayurveda.
**Ayurveda**: is a CAM alternative medical system that has been practised primarily in the Indian subcontinent for 5,000 years. Ayurveda includes diet and herbal remedies and emphasizes the use of body, mind, and spirit in disease prevention and treatment.

**Homeopathic medicine**: Here, there is a belief that "like cures like" meaning that small, highly diluted quantities of medicinal substances are given to cure symptoms, when the same substances given at higher or more concentrated doses would actually cause those symptoms.

**Naturopathic medicine**: The practitioners work with natural healing forces within the body, with a goal of helping the body heal from disease and attain better health. Practices may include dietary modifications, massage, exercise, acupuncture, minor surgery, and various other interventions.

2. **Mind-Body Interventions**: Uses a variety of techniques designed to enhance the mind's capacity to affect bodily function and symptoms. Some techniques that were considered CAM in the past have become mainstream [for example, patient support groups and cognitive-behavioral therapy]. Other mind-body techniques are still considered as CAM, including yoga (meditation, prayer), and therapies that use creative outlets such as art, music, dance, or karate.

**Hypnosis**: What hypnosis does is to allow our unconscious mind to listen, while our conscious mind takes rest. When we are hypnotized, we are still in control, just allowing someone to guide us to where we want to be.

Medical hypnosis can be used to treat common morning sickness that is experienced by up to 80 percent of pregnant women. Its use could allow a more comfortable pregnancy and healthier fetal development, and could prevent cases that might otherwise proceed to full-blown hyperemesis gravidarum [Simon EP, 1999].

**Cognitive therapy**: Is a way of helping people to cope with stress and emotional problems. The idea behind it is quite simple - the way we think about things affects how we feel emotionally.

3. **Biologically-based Therapies**: Biologically-based therapies in CAM use substances found in nature, such as herbs, foods, and vitamins. Some examples include dietary
supplements, herbal products, and the use of other so-called "natural" but as yet scientifically unproven therapies (for example, using shark cartilage to treat cancer and swallowing of fish to treat asthma).

**Aromatherapy:** Involves the use of essential oils (extracts or essences) from flowers, herbs, and trees to promote health and well-being. They are rich in gamma linolenic acids, and liquid wax esters. Some have phyto-compounds like phospholipids, sterols, etc., which improve immune system and cell builders.

4. **Manipulative and Body-based Methods:** These are based on manipulation and/or movement of one or more parts of the body. Some examples include chiropractic, osteopathic manipulation, massage, acupuncture and reflexology.

**Acupuncture:** is a strong component in China, and can be traced to their health care system for at least 2,500 years. The procedure involves inserting hair-thin steel surgical needles into specific points in the body. According to traditional Chinese thinking, "Chi" or "Qi." flows through our body in a rhythmic manner, and most acupuncture and acupressure methods employ stimulation of points that lie along the acupuncture "meridians" through which Chi is said to flow. The results suggest that acupuncture could be a good alternative or complement to those pregnant women who seek an alternative to pharmacological analgesia in childbirth [Ramnero A, 2002]. Acupuncture seems to be a useful tool for improving pregnancy rate after assisted reproduction therapy [Paulus WE, 2002].

**Massage therapy:** The technique involves manipulation of muscle and connective tissue to enhance function of those tissues and promote relaxation and well-being. In the massage therapy group the women had fewer complications during labor and their infants had fewer postnatal complications [e.g., less prematurity] [Field T, 1999].

**Osteopathic medicine:** It emphasizes diseases arising in the musculo-skeletal system. There is an underlying belief that all of the body's systems work together, and disturbances in one system may affect function elsewhere in the body. Some osteopathic physicians practise osteopathic manipulation, a full-
body system of hands-on techniques to alleviate pain, restore function, and promote health and well-being.

**Chiropractic:** Focuses on the relationship between bodily structure (primarily that of the spine) and function, and how that relationship affects the preservation and restoration of health. Chiropractors use manipulative therapy as an integral treatment tool.

**Reflexology Therapy:** "This technique including Lymphatic reflexology, relaxing reflexology and a period of rest had a non-significant oedema-relieving effect. From the women's viewpoint, lymphatic reflexology was the preferred therapy with significant increase in symptom relief." [Mollart L. 2003]

5. **Energy Therapies:** Energy therapies involve the use of energy fields. They are of two types:

✓ **Biofield therapies:** are intended to affect energy fields that purportedly surround and penetrate the human body. The existence of such fields has not yet been scientifically proven. Some forms of energy therapy manipulate biofields by applying pressure and/or manipulating the body by placing the hands in, or through, these fields. Examples include Qi gong, Reiki, and Therapeutic Touch.

**Qi gong:** is a component of traditional Chinese medicine that combines movement, meditation, and regulation of breathing to enhance the flow Qi [an ancient term given to what is believed to be vital energy] in the body, improve blood circulation, and enhance immune function. Qi-gong relaxation exercise [respiration, posture and mental training] was used for treatment of pregnancy-induced hypertension [PIH] It was found that the study group improved considerably [Zhou MR, 1989]

**Reiki:** is a Japanese word representing Universal Life Energy. Reiki, (pronounced Ray-Key), is an ancient Tibetan healing art rediscovered in Japan by Dr. Mikau Usui, Reiki is a Japanese word describing "Universal Life Force Energy". Reiki is based on the belief that when spiritual energy is channeled through a Reiki practitioner, the patient’s spirit is healed, which in turn heals the physical body. Recent research on pain and psycho-prophylaxis in relation to preparation for childbirth are examined. The various findings seem to lead
to the value of childbirth preparation classes in lowering anxiety levels and altering patients' assessments of their impending labors. These changes in patients' appraisals are reflected in the experience of childbirth: in lowered perceptions of pain and more positive feelings about the birth [Genest M. 1981]

**Therapeutic Touch:** is derived from an ancient technique called laying-on of hands. It is based on the premise that it is the healing force of the therapist that affects the patient's recovery; healing is promoted when the body's energies are in balance; and by passing their hands over the patient, healers can identify energy imbalances.

✓ **Bioelectromagnetic-based therapies** involve the unconventional use of electromagnetic fields, such as pulsed fields, magnetic fields, or alternating current or direct current fields.

**Electromagnetic fields:** [EMFs] are invisible lines of force that surround all electrical devices. The Earth also produces EMFs. Electric fields are produced when there is thunderstorm activity, and magnetic fields are believed to be produced by electric currents flowing at the Earth's core. Research work is going on in this field of therapy.

**NCCAM's role in the field of CAM**

NCCAM is the Federal Government's (USA) lead agency for scientific research on CAM. Its mission is to explore complementary and alternative healing practices in the context of rigorous science, to train CAM researchers, and to inform the public and health professionals about the results of CAM research studies.

**Update knowledge about CAM**

1. NIH Center for Complementary and Alternative Medicine www.nccam.nih.gov

2. MDConsult (patient information section) www.mdconsult.com

3. Alternative Medicine News Online: www.altmedicine.com

**Some alternative therapies are safe and effective during pregnancy**

In fact, some have been shown to be even more effective than traditional remedies. For nausea in early pregnancy, acupuncture, acupressure, ginger root (250mg capsules 4 times a
day), and vitamin B6 (pyridoxine, 25mg two or three times a day) work well. For backache, chiropractic manipulation holds the best track record. For turning a breech baby, exercise, hypnosis, and traditional Chinese treatment [burning incense-like substance on the fifth toe] have proven beneficial. A certain homoeopathic treatment seems to work for labor induction, as does evening primrose oil for cervical ripening. Relaxation techniques, patterned breathing, emotional support, and self-hypnosis are already widely used alternative therapies in labor.

**Dietary supplements are also included**: CAM definition of the term "dietary supplement" in the Dietary Supplement Health and Education Act [DSHEA] of 1994, is a product [other than tobacco] taken by mouth that contains a "dietary ingredient" intended to supplement the diet. Dietary ingredients may include vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes, organ tissues, and metabolites. Dietary supplements come in many forms, including extracts, concentrates, tablets, capsules, gels, liquids, and powders. They have special requirements for labeling. Under DSHEA, dietary supplements are considered foods and not drugs.

### 3.4 YOGA THERAPY – IAYT

**Therapeutic applications of yoga**

Yoga has been used in the management of a wide range of diverse ailments.

1. Disorders with a known lifestyle-related or psychosomatic link
2. Life threatening and degenerative disorders
3. Occupation-related disorders
4. Disorders related to development of aging
5. Pregnancy

**Disorders with a known lifestyle-related or psychosomatic link**

The conditions which will be covered under this category are bronchial asthma, non-insulin dependent diabetes mellitus, essential hypertension, coronary heart disease, and rheumatoid arthritis.

Of all these conditions, the therapeutic benefit of yoga in bronchial asthma has been studied in the most detail. The earliest study reported that Transcendental Meditation [TM] was a
useful adjunct in treating bronchial asthma [Wilson AF, 1975]. Subsequently a controlled trial on fifty-three patients in a yoga group compared with an equal number in a control group, showed greater improvement in scores for drug treatment, peak flow rate, and decreased weekly attacks of asthma, following two weeks of yoga [Nagarathna R, 1985]. The yoga practice was an ‘integrated approach’ with techniques which were intended to influence physical, mental, and emotional functioning.

Another study compared the effects of yoga with those of breathing exercises over a 3-week period. The breathing exercises significantly improved lung functions whereas yoga did not [Fluge T, 1994]. More recently, an attempt was made to understand whether correction in autonomic imbalances in asthmatics explained the benefits of yoga [Khanam AA, 1996]. The results indicated that yoga may be beneficial by reducing sympathetic reactivity and improving pulmonary ventilation by relaxing voluntary inspiratory and expiratory muscles.

Another disorder which significantly benefited by yoga therapy was rheumatoid arthritis. A study conducted in England demonstrated that hand grip strength significantly improved following yoga in rheumatoid arthritic patients [Haslock I, 1994]. It was subsequently proven that yoga resulted in similar benefits in rheumatoid arthritic patients in an Indian population [Dash M, 2001].

It is increasingly being understood that yoga has potential benefit for patients with coronary artery disease. In a one year prospective randomized controlled trial, yoga practice was shown to significantly reduce the number of anginal episodes per week, improve exercise capacity, decrease body weight and serum cholesterol [Manchanda SC, 2000]. These results are in line with those of the well-known study of Dean Ornish.

Closely related to coronary arterial disease is the effect of yoga on essential hypertension. The most rigorous and early trials were conducted by Patel CH [1977]. More recently it was shown that yoga decreases the blood pressure and risk factors [blood glucose, cholesterol and triglycerides], and improves subjective well-being and quality of life in mild to moderate hypertensives [Demondaran A, 2002]. There was also a decrease in VMA [a nor-adrenalin metabolite] suggesting decrease in sympathetic activity. Hence, yoga appears to reduce risk factors for cardio-vascular disease in mild to moderate hypertension.

With the increasing knowledge of psycho-neuro-immunological interactions, there has been an increasing interest in using stress management in cancer. For example, it was shown that an increasing number of women with breast cancer were seeking alternative treatments in
addition to the conventional management [Targ EF, 2002]. Another study examined the
relationships between a mindfulness-based stress reduction meditation and quality of life,
mood states, stress symptoms and cytokine production [Cartson LE, 2003]. All the
psychological measures improved and this study was the first to show changes in cancer-
related cytokine production associated with practicing meditation.

For the first time, a randomized controlled trial investigated the effects of yoga for a chronic
infections disorder, i.e., pulmonary tuberculosis [Naveen KV, 2003]. It was found that a yoga
group improved with respect to bacteriological status (Sputum microscopy, culture),
radiography, FVC, weight gain and symptoms, suggesting that yoga potentiates the action of
chemotherapy in converting an active infection to a passive one.

Occupation-related disorders

With the widespread use of computers these days there is an increasing awareness that
prolonged computer use can lead to health hazards such as musculo-skeletal problems (i.e.,
repetitive stress injuries, including carpal tunnel syndrome), visual strain, and mental stress.
A randomized controlled trial evaluated the use of yoga postures as compared to the
conventional management (splints) in patients with carpal tunnel syndrome [Garfinkel MS,
1998]. Yoga was found to be more effective than splints in reduction symptoms and signs of
carpal tunnel syndrome [O'Connor D, 2003].

Another occupation-related stress is working alternately in day and in night shifts, as this has
been recognized to upset the diurnal rhythm. The Indian Council of Medical Research (New
Delhi) found yoga beneficial for the psychological and physical health of nurses [Walia UJ,
1989].

Disorders related to development and aging

Yoga has been used with benefit in people of different age groups with different needs. Two
examples [of children and of older persons] will be given here:

A study on 250 schoolboys showed that they were less flexible than would be expected for
their age [Gharote MM, 2000]. It was suggested that practising yoga postures would reduce
this functional deficit.

It is now recognized that with aging certain changes are likely to occur in memory, hearing,
vision, gait, balance, and in exercise capacity. Gerontology has accepted that alternative
medicine strategies may be useful for all these functions, as well as to improve the
psychological status of the older people involved. A ten-week yoga program was organized with elders at community sites, with physical and psychological benefits [Haber D, 1983]. A recent review article looked at alternative methods of managing problems associated with aging [Scheider RH, 2002]. The authors concluded that these innovative strategies may help society achieve recommended health objectives for older adults, and that widespread implementation of this self-empowering, prevention-oriented approach in the elderly is feasible, cost-effective, and timely.

Yoga for disease prevention

Yoga has an important role to play in the prevention of disease. While this is especially important in the elderly [Go VL, Champaneria MC, 2002], it is also important in all vulnerable people. This includes highly stressed persons whose immune function may be compromised, or those whose lifestyle [i.e., diet, exercise, and relaxation] is ‘unhealthy’. A few examples of yoga for disease prevention will be given here:

Within this past century we have doubled the life-span of human beings. Genomic medicine, including stem cell research, cloning, and gene therapy can be expected to treat more diseases. However we can expect more chronic diseases related to aging, environment, and lifestyle, such as cancer, diabetes, osteoporosis, connective tissue disorders, cardio-vascular disease, and migraine [Reilly R, 1994]. Hence the new, alternative strategies can fuse the antiquity of ancient healing with innovations of modern medicine to increase life expectancy and improve the quality of life, the world over.

Yoga for the promotion of positive health [PPH]

Finally, it has to be emphasized that while yoga has important therapeutic benefits, the practise of yoga is very important in the promotion of positive health and human potential in body, mind, and spirit [Scott AH, 1999].

Yoga in Pregnancy

There are very few research studies showing results of intervention by IAYT. The following are some of them:

1) A controlled study on the effect of yoga practices in pregnancy conducted by Dr. Padmalatha and Uma Dev in 1998, wherein 20 were taken as control group and 20 as study group. The gestational week was between 30 and 32 weeks. Mind Sound Resonance Technique [MSRT] were taught for two weeks; three Doppler studies done
before, during and after yoga practices showed statistically significant improvement in Uterine Blood Supply.

II A pilot study on effect of yoga in IUGR pregnancy conducted by Dr. Shamanthakamani Narendran in 1999, wherein 25 in control group and 18 in yoga group were analyzed, which showed statistically significant improvement in the birth-weight of the newborns.

These two papers were presented in the International Conference on Frontiers in Yoga Research and Applications, at VYOMA, Deemed University, Prashanti Kutiram, Jigani, Bangalore, India.

Other important yoga centers in India and abroad using IAYT in pregnancy

International Association of Yoga Therapists provides and supports education and research in the field of yoga and pregnancy [Pre- and Post-natal Resources]. It is their goal to elevate the level of awareness of yoga as an established and respected therapy in the Western world. As an association, another purpose is to bring together and support a worldwide community of yoga practitioners, teachers, therapists, health care practitioners, and researchers interested in the profound potential of yoga for health, healing, and personal transformation. International Association of Yoga Therapists also serves members, the media, and the general public as an authoritative source of information about contemporary yoga education, research, and statistics [Yoga and pregnancy, 2004].

The University of Sydney will soon publish research that shows that yogásanas and meditation during pregnancy affect the birth itself, as birthing women have been found to be less fearful, able to remain calm, and more likely to access inner strength than others. [University of Sydney, 2002]

The research conducted by Monghyr Hospital in 1993, in cooperation with Bihar School of Yoga, proved that pregnant women practising Bhrāmarī, 1-2 times a day for 5-10 minutes during the entire pregnancy and through the first phase of the actual birth, that these pregnant women experienced normal blood pressure, a lower number of spontaneous abortions, and fewer premature births. None of the newborns suffered from lack of oxygen. There was greater average weight of the newborns. The results showed that there was less worry and stress during pregnancy as a result of the regular practice of Bhrāmarī. The women’s
hormone balance was better regulated, which promoted the birth of healthy children [Rodenbeck Joachim, 1993].

Monk, Catherine, et al have examined the effects of pregnant women’s acute stress reactivity and chronic anxiety on fetal heart rate. Their results have shown link changes in fetal behavior with acute changes in women’s cardio-vascular activity after psychological stress and women’s anxiety status. This indicates that variations in women’s emotion-based physiological activity can affect the fetus and may be centrally important to fetal development [Monk, 2003].

Bhole has tried therapeutic applications of yoga techniques in pregnancy and has shown beneficial effects [Bhole M.V. 1984-85]. Satyananda Saraswati Swami [1998] and Muktananda Saraswati Swami [1998] from Bihar School of Yoga have advocated yoga nidrā and other yoga practices for pregnant women to improve the pregnancy outcome. Collins Clare [1998] has done research studies with yoga intervention in pregnancy and given good results both for the mother and the baby. There are also manuals and books on yoga during pregnancy by Christensen Alice [2002], and Freedman [1998] advocating yoga techniques for good outcome.

3.5 LACUNA IN THE KNOWLEDGE OF THE SUBJECT

Very few studies have scientifically approached this subject of “Efficacy of [IAY] on outcome of pregnancy”. Controlled, matched studies require a large number of pregnant women at exactly the same gestational week and having many other parameters investigated. They hesitate to subject themselves to any tests or investigations as it is commonly regarded as a physiological process and not a disorder to be examined by a doctor. Cultural beliefs, language implications, ignorance and poverty are the key factors.

In the last four decades much research has been done on the effect of yoga on various psychosomatic disorders. And they have shown positive changes in psychological outlook, improvement in body-metabolisms, autonomic nervous system, endocrinal system, musculo-skeletal system, cardio-vascular, respiratory and immune systems.

It will be presumed that in addition to these features, yoga will help in feto-maternal communication and transfer systems in enhancing placental supply and in normalizing endocrinal environment.
Yoga is a new approach to prenatal preparation. To motivate the pregnant women to take up yoga practices, it requires enormous patience and perseverance. Obstetricians have to be motivated and convinced as they are very apprehensive about untoward effects like abortions, bleeding, miscarriages, etc. As many misconceptions about yoga are still deep-rooted, we have to bring about a change in maternity practices.

3.6 APPLICATION OF THE WORK IN THE CONTEXT OF NATIONAL PRIORITIES OF MEDICAL RESEARCH

The vision is to rebuild Mother Bharata in tune with her personality enshrined in yoga and spiritual lore. The genius of Eknathji Ranade located the holistic concept of yoga, another name for spirituality in the words of Swami Vivekananda ‘Each Soul is potentially Divine’, and adopted it as the basis of Vivekananda Kendra. He could see the vision of Śrī Aurobindo enunciating Integral yoga as a furthering depth of Swamiji’s thoughts on yoga. Eknathji trained in the organizational skills and powered by a patriotic fervor with holistic vision of Hindu nation enunciated a century ago by Swami Vivekananda, in tune with emerging treads of popularity of yoga gave a direction to the Kendra in his first pamphlet ‘Yoga, the core of Vivekananda Kendra’.

There are no controlled research studies to date to prove the efficacy and safety of IAY in pregnancy. This will be the first and original contribution to the obstetric field, to improve the pregnancy outcome, which is one of the national priority in the medical and family welfare fields. Complementary and alternate medicine is gaining importance globally. This work also proves that it : 1) reduces maternal and perinatal morbidity and mortality, 2) reduces the need for frequent investigations using expensive equipment and bio-chemical tests, 3) will add information about the pathology of uterine environment and the development of the fetus, and also about the pathology of stress-related problems in pregnancy [Nagendra H.R., ‘Yoga–A national perspective’].