INTRODUCTION

A woman’s health is her total well-being, determined solely by biological factors, reproduction, nutrition and stress. Recent decades have seen women’s health issues attaining higher international visibility and renewed political commitment with targeted policies and programs to lead healthier lives. Millennium Development Goal (MDG) 5 focuses on reducing the Maternal Mortality Ratio (MMR) by 75 per cent between 1990 and 2015 and ensuring universal access to reproductive health by 2015 (WHO, 2010). With the culmination of the MDG for reducing MMR fast approaching in 2015, it becomes important to promote maternal health issues.

Maternal health conditions are leading causes of death and disability among women. More than 99 per cent of the estimated 5,36,000 maternal deaths each year occur in the developing world (WHO, 2013). Every year, about 10 million women endure life-threatening complications during pregnancy and child birth, sometimes leading to long term disability.

Maternal health during pregnancy is of utmost importance as it influences the way in which the unborn child is programmed for future life outside the womb, besides leading to an uneventful pregnancy and safe motherhood. Mounting evidence shows that prenatal and early life development influence the risks of Non-Communicable Diseases (NCD) in later life. Health systems find an increasing double burden of infectious diseases and Non-Communicable Diseases in women. In recent years, it has become very evident that non-communicable diseases adversely affect large number of women (Dye 2013). With the multitude of the common complications which jeopardize the maternal health during pregnancy, diabetes is one of the most important.

Diabetes in pregnancy is an upcoming maternal health burden, that needs urgent attention not only for its negative maternal and perinatal consequences, but
for the potential life-long disabilities it causes for the women and child. Diabetes and treatment of diabetes in pregnancy pose a variety of health policy, health service delivery and technical challenges across the spectrum of worldwide health care contexts.

Diabetes in pregnancy relates to the background risk of diabetes in the population and contributes to future diabetes and cardiovascular risk in the mother and offspring. Disease like diabetes is the gateway to many other diseases causing both economic and physical burden to the society and the number of persons affected by diabetes is increasing at an alarming rate around the globe (Bloom et al 2012). Diabetes mellitus, long considered a disease of minor significance to world health, is now taking its place as one of the main threats to human health in the 21st century. Diabetes reduces both a person’s quality of life and life expectancy and also imposes huge economic burden on families and health system.

In 2010, there was an estimated 143 million women with diabetes. By 2030, this number is expected to rise to 222 million (www.idf.org/node/2288). Diabetes is the ninth leading cause of death in women globally, causing 2.1 million deaths per year. With changes in lifestyle and the increasing prevalence of obesity, diabetes is affecting young women of reproductive age and increases the risk of pregnancy complications.

Two out of every five women with diabetes are of reproductive age, accounting for over 60 million women worldwide (World Diabetes Foundation, 2009). Over the next 2-3 decades there will be 80 million reproductive age women with diabetes in the world. With this huge population of reproductive age, a significant segment of women with abnormal glucose tolerance during pregnancy needs cognizance. Pregnancy is a period of physical and physiological changes for the mother as it triggers an array of complex and sequential physiological changes and is a crucial time which determines the future health and well-being of the child.

“Gestational Diabetes mellitus” (GDM) is defined as carbohydrate intolerance with first time recognition or onset during pregnancy. Physiological changes occur
during pregnancy in order to sustain a successful outcome of a healthy baby and mother. Carbohydrate metabolism is affected in pregnancy with increasing insulin resistance associated with increasing weeks of pregnancy. When the disease exists prior to pregnancy it is known as Pre-Gestational Diabetes mellitus (PGDM). According to National Diabetes Data Group (NDDG) women with PGDM account for 4-15/1000 pregnancies and women with GDM account for 25-50/1000 Pregnancies (National Diabetes Data Group, 2006).

Gestational diabetes mellitus is one of the fore runners of Diabetes. GDM affects three generations as there is a risk of developing diabetes in the future - the mother, foetus and the reproductive cells in foetus. Women with a history of GDM are at increased risk of future diabetes, predominantly Type 2 diabetes, and also their children (King et al 2012). This translates to a huge number of Pre-Gestational Diabetes Mellitus (PGDM) and probably even high number of Gestational Diabetes Mellitus (GDM).

Recent data show that GDM prevalence has increased by 10-100% in several race/ethnicity groups during the past 20 years (International Diabetes Federation 2013). The frequency of GDM usually reflects the frequency of type 2 diabetes in the underlying population and there are ethnic differences in the prevalence of GDM. In the U.S., Native Americans, Asians, Hispanics and African-American women are at higher risk for GDM than non-Hispanic White Women. In Australia, GDM prevalence was found to be higher in women whose country of birth was China or India than in women whose country of birth was in Europe or Northern Africa. The high prevalence is now seen in India and China, the two nations bearing the main brunt of the global diabetes epidemic numerically (IDF Atlas, 2011).

Under the influence of globalization pronounced changes in the human environment, human behavior and lifestyle with socio-economic development and rapid epidemiological transition over the last 20 years in India has resulted in gaining dubious distinction of being called, “the diabetic capital of the world”. India was estimated to have had 31.7 million people having diabetes in year 2000 which is projected to be 79.4 million by year 2030 (Wild, et al 2012).
India’s diabetes burden is predicted to be more than 100 million, the largest proportion being in the economically active age group 40-59 and hence the future indirect costs of diabetes will be even larger than they are now (Hirst, 2012). Half of those with type 2 diabetes have not yet been diagnosed, and are not therefore being treated. A further 21 million people have impaired glucose tolerance, representing the “conveyor belt” of future cases of diabetes (Zimmet, et al 2012). Still more suffer from gestational diabetes, inflicting future health problems for their unborn children.

In India, the prevalence of GDM varies widely depending on the population studied and diagnostic test employed. The prevalence in India ranged from 2.4 to 21 per cent of all pregnancies and there are wide differences in living conditions, socio-economic levels and dietary habits. In the Chennai urban population, the prevalence of GDM was 17.8 per cent in a community based study of the Diabetes in Pregnancy Study Group (DIPAP) project done to ascertain the prevalence of GDM in an Indian setting, 13.8 per cent women in semi-urban and 9.9 per cent women in the rural areas (Seshiah et al, 2011).

The increasing population of diabetes in women in the reproductive age creates a potential for extremely high rates of maternal and infant mortality. Unrecognized GDM may have particularly severe consequences for the health and well-being of the mother. Hemorrhage, hypertensive disorders, obstructed labour and infection/sepsis are among the leading global causes of maternal mortality. GDM and hypertension are linked directly or indirectly to all of them (Retnakaran et al 2009).

GDM can lead to a number of complications for both the mother and child. The occurrence of pre-eclampsia, caesarean delivery, a greater chance of future type 2 diabetes and GDM in future pregnancies are the threats for the mother. The foetal complications include mortality, macrosomia, birth trauma, shoulder dystocia, neonatal hypoglycemia, neonatal jaundice and respiratory distress syndrome (Crowther, 2005).

Until recently, there has been a strong emphasis on genetic susceptibility, and that type 2 diabetes and obesity are brought on by genetic susceptibility and environmental/behavioral factors including sedentary lifestyle and overly rich
nutrition. Risk of maternal diabetes for obesity and diabetes in the offspring was first reported by Pima Indians and shown to be over and above the genetic susceptibility. This supported the concept of ‘fuel mediated teratogenesis’ and led to the idea that pregnancy diabetes is ‘diabetes for the two’ and ‘diabetes begets diabetes’ (Yagnik 2012).

There are strong links between maternal malnourishment, offspring’s birth weight and the child’s consequent propensity to early insulin resistance (Tuomilento, 2005). This is particularly important in countries like India where high levels of undernutrition co-exist with rapid changes in nutrition in young adulthood. Although several factors contribute to the epidemic of diabetes, intrauterine exposures are emerging as potential risk factors. The “foetal origin of disease” hypothesis proposes that gestational programming may critically influence adult health and disease. There is increasing evidence to support the theory that diabetes is triggered by events in the womb (Mattson 2010).

The concept of the Development Origins of Health and Disease (DOHaD) suggests that exposure to a diabetic environment in utero is associated with increased occurrence of Impaired Glucose Tolerance (IGT), a defective insulin secretory response in adult offsprings, a direct effect on development of fetal pancreas and is associated with increased susceptibility to future diabetes in the infant, an effect which is independent of genetic factors (Yagnik et al 2012).

GDM recurrence rates are influenced by maternal health characteristics and past pregnancy history. It has been shown that maternal age, parity, family history of diabetes, recurrence of GDM, pre-pregnancy BMI, and Index pregnancy outcome were related to the development of post-partum diabetes. Studies on post partum glycemic scenario in India have shown that 10 per cent of GDM women continue to be diabetic, 40 per cent have type II diabetes after 6 months and 2/3rds of GDM women have hyperglycemia within four years (Mohan et al, 2007).

The longest follow up data suggests that up to 50 per cent of women may develop diabetes over 20-30 years (Seshiah et al 2011). By 17 years of age one-third of children born to GDM mothers have had evidence of Impaired Glucose
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Tolerance (IGT) or Type 2 diabetes. Due to this, GDM by its merit demands close surveillance so that early life style changes may be instituted.

GDM is an important maternal health issue in India from two perspectives-as a factor influencing safe motherhood and as a precursor of Type 2 diabetes mellitus. Appropriate management of GDM should become an integral part of good antenatal care and be incorporated into all programs aiming at safe motherhood. Overt diabetes, which means presence of diabetes before pregnancy, should be detected and controlled before planning pregnancy because it is associated with increased risk for adverse foetal outcomes like foetal anomalies and foetal death.

The spreading of epidemics of obesity and diabetes worldwide, the increase in the incidence of GDM during recent years, and the short-term and long-term adverse health outcomes for both women and offspring associated with GDM highlight the significance of preventing GDM among women at high risk. The diagnosis of GDM offers a unique opportunity in identifying individuals who will be benefited by early therapeutic intervention with diet and exercise. While encouraging therapeutic lifestyle change is important at diagnosis, periodic counseling should also be integrated in to the treatment program. Lack of awareness of GDM, lack of appropriate timing and methodology of screening for diagnosis of GDM and inadequate management of the condition, further increase the burden of the disease in society.

Moreover, the outcome of pregnancies in Indian diabetic women is very important and the rates are always changing due to increase in the rates of diabetic mothers itself and availability of better treatment modalities. Only when outcomes are measured and compared can weaknesses in strategies, treatment methods and care systems be diagnosed and improvements made.

One of the important causes of diabetes developing after GDM is discontinuity of care as neglected by young women after delivery. It is important for these women to get their blood glucose estimation after childbirth (post-partum screening) after 6-8 weeks and every year thereafter. Post-partum blood glucose
measurement is critical after 48 hours of delivery and at 6-8 weeks after delivery to detect persistent or overt diabetes (Ghattu et al., 2007).

Studies have shown that a good number of patients 40-50 per cent do not turn up for follow-up program even in the developed countries (American Diabetes Association, (ADA, 2011). Unless there is a structured follow-up program for GDM patients, it would not be possible to bring most of the GDM mothers back for post-partum follow-up for detecting diabetes in country like India. Hence patient education in lifestyle modification and encouragement to return for glucose testing at regular intervals is important in the subsequent follow-up of women with GDM.

GDM may well be incurred in future as an open window of opportunity for prevention, rather than a closed door of bleak outcomes. GDM in Indian Scenario can be considered as a wake-up call and by doing the responsible job of screening and managing GDM in a meaningful way will translate to put India in the diabetic map of world as "Diabetes care capital of the world" (Basu and Maiti, 2012).

A short term intensive care gives a long-term pay off in the primary prevention of obesity, IGT and diabetes in the offspring. Diabetes in pregnancy is a neglected issue that needs urgent global attention not only for its negative maternal and perinatal consequences, but for the potential lifelong disabilities it causes for the women and child. As GDM is an important maternal health issue and a public health priority in prevention of diabetes, there is a compulsion to address women (reproductive age group) on maternal health and ante partum precautionary measures needed to be adopted to combat this phenomenal increase of glucose intolerance.

Recognizing the challenges posed by diabetes, the opportunities for prevention include timely identification, treatment and control during pregnancy. Hence it is imperative to study the diabetes scenario in pregnancy and assess the maternal and foetal outcome and address the younger age group on preventive and precautionary strategies. Therefore the present study was conceived with the following objectives:
To

(1) Study the scenario of diabetes in pregnancy and its management among pregnant women

(2) Assess the impact of gestational glycemia on maternal and foetal outcome

(3) Determine the postpartum glycemic status and cord blood insulin level

(4) Counsel gestational diabetes mothers and create awareness on GDM to prospective mothers.