CHAPTER I
INTRODUCTION

Statement of the problem

The study of human fertility occupies a central position in the study of population. In population dynamics, fertility is a positive force through which the population expands counteracting the force of attrition caused by mortality. Fertility refers to the actual reproductive performance—whether applied to an individual or group. According to Jones et al. (1995), fertility is the reproductive performance of an individual or population, measured as the number of viable offspring produced over a period and it is generally expressed as the number of live births per year per thousand of the population. Actual or completed fertility gives the actual picture of the fertility level. It is computed among the women who have reached menopause.

Human fertility is responsible for the biological replacement and for the maintenance of the human society. Fertility is the addition to a population through birth. Every society replenishes itself through the process of fertility. The fertility of an individual is limited by his or her fecundity, which refers to the physiological capacity to reproduce. The fecundity of a woman may be quite normal, yet the fertility performance may be low. Fecundity is biological, whereas the term fertility indicates the actual level of reproductive performance determined by social, cultural, psychological as well as economic factors. Fecundity also refers to the maximum fertility level that can be attained. Theoretically, during the physiologically limited child bearing period, a woman would get 37 children if she gave birth to one child every ten months over a period of 31 years. But fertility cannot be unlimited because of the operation of physiological, social as well as cultural factors which act as limiting influences (Bhende and Kanitkar, 2003).

When the average number of children born per woman is computed for those who are beyond the reproductive ages, this measure is known as completed fertility or completed family size (Bhende and Kanitkar, 1991). It is the total number of live-births given by a woman till the completion of the total reproductive span of life, that is, from the time of effective marriage or co-habitation to the attainment of menopause. Actual or completed fertility gives the actual picture of the fertility level.
Fertility in spite of being a biological phenomenon is profoundly influenced by a large number of socio-cultural factors as well as attitudes and behaviour of the society. Bogaarts and Potter (1978) listed seven proximate determinants of fertility that are the biological and behavioural factors through which social, economic and environmental variables affect fertility. They are marriage (marital disruption), onset of permanent sterility, post partum infecundability (when menstruation is not resumed), natural fecundability, frequency of intercourse, use and effectiveness of contraception, spontaneous intrauterine mortality (still birth) and induced abortion. The first two of these determinants determine the length of reproductive span and the other five determine the rate of child bearing.

The physiological factors affecting fertility are adolescent sterility, post-partum sterility and average interval between successive births and reproductive wastage. Other factors that affect fertility are age at menarche, age at marriage, age at first conception, age at first child birth, age at menopause, widowhood and physical separation due to divorce. The social and cultural factors affecting fertility are education of husbands and wives, economic status, urbanization, family type, religion etc. which equally affect fertility, causing difference in fertility performances in various groups of people. In India, Kingsley Davis (1951) studied differential fertility on the basis of different socio-cultural factors like residence, religion, caste, economic status and educational status of spouses.

Onset of menarche marks the beginning of the fertile period in the life of a woman. But, ovulation may not occur for a year or more after the first menstruation. This period is known as adolescent sterility. In many societies, onset of menarche is related to age at marriage. Women with early age at menarche are likely to get married earlier and therefore more prone to earlier conceptions and childbirths (Bhasin and Nag, 2002). The average age at menarche is widely used as a demographic indicator of population fecundity (Bhavani et al., 2010).

One of the most important factors of differential fertility is the age at marriage. In developed countries, generally, the age at marriage is higher than in the developing ones. Various studies worldwide and in India have revealed the inverse relationship of fertility with age at marriage. Agarwala in his study conducted in 1965 observed that if the age at marriage of women rises from 15.6 years to 19.6 years, the birth rate
decreases by 27 percent. It has been observed that the fertility rate increases with lower age at marriage and decreases with higher age at marriage. In the studies conducted by Choudhury (1984) in Bangladesh, Driver (1963) in Central India, Audinarayana (1986), Sinha (1987), Verma et al (1999), Khongsdier (2001), etc. the inverse relationship of fertility with age at marriage has been reported.

Education is considered to be a key indicator of the socioeconomic development of a population and also of a country. Several studies have consistently reported a significant inverse relationship of the fertility rate with the educational level of the spouses, especially the wives. The studies conducted by Bharati and Ghosh Dastidar (1990), Murthi et al. (1995) and many more have revealed that the education of the mother is the crucial determinant of the fertility rate. Educated women generally marry and bear children at later ages, are more aware of family planning methods, have more decision making power and are more independent than the illiterate women, which affect their fertility. Patil (1995), in his study on the determinants of fertility in rural Karnataka, established that female education and the desired family size motivate the younger mothers to adopt birth control measures.

Occupation of the spouses and especially of the wives is also related to the fertility level of women. Women who are gainfully employed outside their homes find it difficult to raise more number of children and therefore tend to limit their family size. The type of occupation is also an important factor in determining the fertility rate. Fertility is found to be higher among agricultural labourers than among those in the service sector (Pandey and Talwar, 1987).

The income level of the family is also found to be associated with the fertility rate. Higher income groups tend to have lower fertility and vice versa. The studies conducted by Dutta and Seal (1974), Ahmed Das and Saikia (1999) have revealed the impact of income level on the fertility rate.

The relationship between type of family and fertility has also been revealed in many studies. While some studies like those conducted by Deka Mahapatra (1970) have shown that women in joint families tend to have higher fertility, others like the ones done by Pakrasi and Malakar (1967) and Sengupta and Chakraborty (1995) have found the reverse. Joint families encourage early marriage and provide support which manifest in higher fertility of women. But with the changing times, the joint families
have disintegrated leading to the greater dominance of nuclear families. A few studies (Mahadevan and Sumangala, 1987) in India however have found no relation between the type of family and the fertility rate.

Religion affects the people’s views and attitudes towards marriage, family values and family size, son preference, contraceptive behaviour etc. which has an impact on the fertility rate. According to Bhasin and Nag (2002), many studies have suggested that the differential population trends are the function of these aspects along with a mindset of preference for a particular sex of children, age at marriage etc., which may also be dictated by religion.

Fertility of a group of people is also influenced by their place of residence. It is observed that fertility is lower in urban areas and higher in rural areas.

Menarche is the occurrence of the first menstruation in girls. A woman becomes biologically capable of bearing a child with the onset of menstruation. Her capacity to bear children comes to an end with the onset of menopause that is when menstruation ceases. Menopause refers to the cessation of a woman’s reproductive ability; it is the opposite of menarche. The difference in years of the onset of menarche and onset of menopause is the duration of the fertile period of a woman. Age at menarche and age at menopause, which are biological factors, vary in different populations. Several studies have revealed the influence of various factors such as body built, nutrition, heredity and environment on the onset of menarche and menopause.

The word “menopause” literally means the “end of monthly cycles” from the Greek words “pausis” meaning cessation and the root word men from ‘mensis” meaning month. The term post menopause is applied to women who still have a uterus, who are not pregnant or lactating and who have not experienced a menstrual bleed for at least twelve months. Menopause is characterized endocrinologically by evidence of decreasing ovarian activity, biologically by decreasing fertility and clinically by alterations in the menstrual cycle intervals (Pathak and Parashar, 2010).

According to WHO (1996), menopause is defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity with subsequent
Menopause occurs with the final menstrual period, which is known with certainty only in retrospect a year or more after the event (WHO, 1981).

Menopause is an unavoidable change every woman experiences once she reaches middle life and beyond. It is the permanent cessation of ovarian function occurring in midlife, signalling the end of the fertile phase of a woman’s life. Menopause is of two types: natural menopause and artificial menopause. Natural menopause is defined to have occurred after 12 consecutive months of amenorrhea, for which there is no other psychological or physiological cause. Artificial menopause or induced menopause is defined as the cessation of menstruation that follows either surgical removal of both ovaries (with or without hysterectomy) or iatrogenic ablation of ovarian function by chemotherapy or radiation (WHO, 1981).

The word perimenopause literally means around menopause. It refers to the period during which a woman’s body makes its natural transition towards permanent infertility or menopause. Perimenopause is also called the menopausal transition. It describes the years both before and after the final period (although it is possible to determine in retrospect which episode of flow was indeed the final period). In the perimenopause years, many women undergo noticeable and clinically observable physical changes resulting from hormonal fluctuations. The duration and severity of perimenopause varies in individuals and cannot currently be predicted in advance.

Postmenopause refers to the phase after twelve consecutive months of amenorrhea (WHO, 1981). According to the definition of the WHO (1998), the post menopausal period lasts until death. The term post menopause is applied to women who still have a uterus, who are not pregnant or lactating and who have not experienced a menstrual bleed for at least twelve months.

Natural menopause occurs between 45 and 55 years of age for women and the median age of menopause has been estimated to be around 50 years worldwide. The age at menopause is lower in developing countries with the mean age at menopause being 44-45 years (Singh and Arora, 2005; Agwu et al., 2008). With the development of science and improvement of health in general, the average life expectancy at birth has become longer. The average life expectancy at birth in the world for females in the year is 73.5 years (2011-2013) and in India it is 68 years according to 2011
Census. With life expectancy increasing, on an average, it can be expected that women may live two to three decades in the postmenopausal period. With the duration of the postmenopausal period becoming longer, the number of elderly female population is also rapidly increasing. According to estimates, by the year 2020, the actual number of women aged more than 50 years will be nearing 150 million in India. Thus menopausal health assumes greater significance especially for those who suffer symptom and substantial morbidity. Moreover menopausal health which signifies overall health and well being status of a woman during and beyond middle age is also linked to various socio-economic, cultural, physiological as well as psychological factors. (Sengupta et al., 2010).

Natural or physiological menopause occurs as a part of a woman’s normal ageing process. Menopause is an unavoidable change that every woman experiences once she reaches middle age and beyond. It is the permanent cessation of ovarian function occurring in midlife, signalling the end of fertile phase of a woman’s life. It is confirmed after twelve consecutive months of amenorrhea in the absence of other pathological or physiological causes. Natural menopause, by this definition, can be known with certainty only in retrospect. Menopause may also be induced by surgical removal of both ovaries (with or without hysterectomy) or oestrogenic ablation of ovarian function (e.g., by chemotherapy or radiation) (WHO, 1981).

The cause of natural menopause is the burning out of the ovaries. Female sex hormones oestrogen and progesterone are produced in sub critical quantities for a short time after menopause, but after a few years fall almost to zero. These hormones are important for keeping the vagina and uterus healthy as well as for normal menstrual cycles and for successful pregnancy. Oestrogen also helps to keep bones healthy. It helps women to keep good cholesterol levels in the blood (Hussain Khan and Hallad, 2006).

The incidence of shorter menstrual cycles of two to three days and infertility are the preliminary signs of menopausal transition (Dennerstein et al., 2000; Longcope et al., 1996). During perimenopause, i.e. the menopause transition years, the ovarian production of the oestrogen and progesterone becomes irregular, often with wide and unpredictable fluctuations in levels. This results in the manifestation of various signs and symptoms. The signs and symptoms that lead to menopause
include: irregular menses, vasomotor instability (hot flashes and night sweats, breast tenderness, vaginal dryness, atrophy of genitourinary tissue, increased stress, forgetfulness, and mood changes and in certain cases osteoporosis and/or heart disease (Bucher et al., 1999). These symptoms are related to the changes a woman’s body is going through and they affect each woman differently. The duration of perimenopause with noticeable bodily effects can be brief, lasting a few years, but it may also continue up to ten years or more.

The period leading to menopause coincides with the onset of ageing. Changing societal perceptions and economic realities about aging also affect the health status of the woman. The end of fertility may bring about a sense of loss among the woman. During this period, the children grow up and do not require as much care and attention as required during childhood. The birth of grandchildren places the woman of middle age into a new category of “older woman”. In case of working woman, approaching retirement age leading to change in economic condition and daily work schedule also add to the stress.

The cultural context within which a woman lives can have a significant impact on the way she experiences the menopausal transition. Research indicates that whether a woman views menopause as a medical issue or an expected life change is correlated with her socio-economic status (Winterich, 2008). The paradigm within which a woman considering menopausal also influences the way she views it- women who understand menopause as a medical condition rate it significantly more negatively than those who view it as a life transition or a symbol of ageing (Gannon and Ekstrom, 1993).

Ethnicity and geographical location also play a role in the experience of menopause. US women of different ethnicities report significantly different types of menopausal effect. One major study found Caucasian women most likely to report psychosomatic symptoms while African-American women were more likely to report vasomotor symptoms. Additionally, while most women in the US have a negative view of menopause as a time of deterioration or decline, some studies seem to indicate that Asian women have an understanding of menopause that focuses on a sense of liberation and celebrate the freedom from the risk of pregnancy (Avis et al., 2001).
Problems related to menopause were given scant attention till the 1980’s. The concept of menopause got its importance only in 1981 when a report of the World Health Organization, Scientific Group based on its meeting on Research on the Menopause held in Geneva during December 1980 said that there is virtually no data on the age distribution of menopause and no information on its socio-cultural significance in the developing countries. Further the Scientific Group made some specific recommendations as WHO sponsored research should be undertaken to determine the impact of health service needs of the rapidly increasing numbers of postmenopausal women in developing countries: uniform terminology should be adopted by health care workers with regard to the menopause; uniform endocrine standards should be developed which can be applied to the description of peri and postmenopausal conditions and diseases; and descriptive epidemiological studies of the age at menopause should be performed in a variety of settings (Khan and Hallad, 2006).

Women during the age of 45 to 60 years are in a very critical stage in their life. This is a period of transition—they have completed the reproductive span which is very strenuous and has a tremendous effect on their health. The period of child rearing is also almost over, as the children have grown up. With the onset of menopause the women undergo great physical, physiological and mental changes. It brings about imbalance in their hormonal system and this has several repercussions. During this age the women begin to suffer from ailments specific to ageing. There is a change in the women’s perceived role in the society and the effect of life events at the time of menopause contributes to her health status.

Attainment of menopause is a landmark event in the life of a woman which marks the end of her fertile period. This period is complex as the process of aging also sets in along with changes in social status, family roles and lifestyle of the women. There is wide variation in which menopause is experienced by women of diverse biological, socio-cultural and economic backgrounds. These have profound implications on the health and morbidity of the women. Menopausal women may experience different types of psychological, vasomotor and musculo-skeletal problems. Good health and nutritional status of the postmenopausal women can definitely reduce morbidity and improve their quality of life.
Health is the most pertinent indicator of the social worth of an individual. While maternal and reproductive health issues constitute an important area of woman’s health, they are by no means the only ones that need to be addressed. Most planning in the area of women’s health has so far been targeted at reproductive and maternal health. Truncating the reproductive years from infancy, girlhood and old age results in a scenario where undernourished and unprepared wives and mothers have to face lifelong health problems. Women’s health in each stage of the life cycle is affected by the preceding stage, and in turn influences the succeeding stage. Women’s health status can be improved only if attention is given to the entire life cycle. There is also an urgent need to study health issues arising from ageing and menopause.

Menopausal health assumes greater significance especially for those who suffer symptoms and substantial morbidity. Moreover, menopausal health which signifies overall health and well being status of a woman during and beyond middle age is also linked to various socio-economic, cultural, physiological as well as psychological factors (Sengupta and Srinivasan, 2010).

In the Indian scenario however, there is an over emphasis on reproductive health and a total neglect of all other health aspects of women, which lead to policy attention in their child bearing years and for their reproductive functions only. Therefore, there is an urgent need to study the health of women who have completed their reproductive period and have started ageing.

Thus, in order to formulate effective need based health policies for women it is necessary to study the fertility patterns and the post menopausal health of women and also their interrelationship.

**Aims and objectives**

The objectives of the study are to understand the completed fertility and post menopausal health of working and non-working Assamese caste women of Guwahati, Assam. The specific objectives of the study are to understand the

i) Socio-economic background of the surveyed people.

ii) Fertility performance of the women.
iii) Influence of biological factors like age at first conception, age at first childbirth, age at last conception, age at last childbirth, age at menopause etc. on fertility

iv) Influence of socio-cultural factors like age at marriage, education, occupation, income, birth control methods adopted by both husband and wife etc. on fertility.

v) The various types of health problems in the perimenopausal, menopausal and post menopausal stages

vi) Effect of the demographic, social, economic and educational factors on the post menopausal health of women and

vii) Relation between completed fertility and post menopausal health of the working and non working women.

**Materials and Methods**

For the purpose collecting data, the respondents have been interviewed by using structured schedule. A demography survey schedule has been used to collect information regarding socio economic background like age and sex of each family member, type of family, marital status, education, occupation and income of the women and her family members.

A second schedule has been used to collect data on fertility history of the women from the age at menarche to the attainment of menopause. Information on age at marriage, age at conceptions, outcome of conceptions, survival status of children, live birth, still birth and abortion have been collected. Care has been taken while recording the accurate ages of different events as ages at menarche, marriage, first conception, first childbirth, last conception, last childbirth and menopause as they occurred long back and the women had to recall these events. Cross verification was done by associating these events with other events of their life or other natural, social or political events.

A third schedule has been used to collect information on the perimenopausal, menopausal and post menopausal health of women. All the symptoms of health, along with the incidence and treatment of diseases, their problems and complications have been recorded for the different stages of menopausal transition. Information regarding
the present health condition of the women and their perception of their own health condition has been also collected.

To determine the nutritional status of the women, their height and weight have been recorded. Instruments like the anthropometer and weighing machine have been used to collect data on the women’s health status. The height and weight of the women have been recorded. The weight was taken on a standard calibrated portable weighing machine. The respondents were made to stand in the centre of the instrument with minimum clothing and no footwear. The height of the respondents was recorded with an anthropometer from the floor to the vertex with the respondents standing erect against a wall with no footwear and the eyes looking straight so that the head rests on the Frankfurt horizontal plane.

A total of 557 families have been visited for the collection of data for the present study. The sample comprises 307 working and 250 non-working Assamese caste women. The women who have attained natural menopause at least one year before the date of data collection have been considered for the present study. The upper age limit of the surveyed women is 60 years. The women selected have at least one live birth and conjugal relations with their husbands till the end of their fertile period. An effort was made to include women belonging to different economic backgrounds in the urban setting of the city of Guwahati.

In the present study, the term working women refers to the women who are gainfully employed in paid work or are self employed outside their own households and who can contribute to the family’s expenditure and fund. In order to ascertain whether a working woman’s work was an established employment or not, the regularity and time devoted to her work was taken into consideration. A worker, according to the 2011 Census, is a person whose main activity was participation in any economically productive activity. Such participation could be physical or mental in nature. Work involved is not only actual work but also effective supervision and direction of work (Government of India, Statistical Profile on Women Labour 2012-2013).

Non working women, on the other hand, refer to those women who are not presently engaged in gainful employment, or do not participate in any economically productive activity.
Data collection for the present study has been carried out in two different intervals. In the first phase, the field work was carried out between May to August 2011 and in the second phase data collection was done between September to December 2012. Data was collected only from the caste Hindu Assamese women from different areas of Guwahati city like Uzanbazar, Maligaon, Dispur, Lokhra and Rupnagar.

The data from various secondary sources like books and journals were consulted at various stages of the present work.

**Analysis and Interpretation of data**

The data for the present study have been compiled, tabulated, analysed and presented keeping in view the objectives of the present investigation. The computer software SPSS version 16 has been employed to analyse the data. The data has been calculated in terms of percentages, means, standard deviation and standard error. Chi-square, t-test, and ANOVA tests were done wherever necessary. The results were presented in the form of tables and graphs.

**Land and people**

**Assam**

The study has been conducted in Guwahati, Assam. The state of Assam is part of the north-eastern region of India with an area of 78,438 sq. kms. accounting for 2.4% of the total geographical area of the country. For administrative and revenue purposes, the 27 districts of the state are divided into 56 subdivisions and 184 revenue circles (Assam- a Hand Book, 2014).

Known for the exquisite beauty of her verdant green valleys, the blue hills and the mighty river Brahmaputra, Assam presents an enchanting picture. The name ‘Assam’ is the anglicised version of the Assamese word ‘Asom’ meaning uneven or unparalleled. According to another interpretation, ‘Asom’ is the phonetic variation of the word Ahom, a Tai Mongoloid race ruling over a major part of the present Assam valley for almost 600 years till the advent of the British in 1826. In ancient Indian writings, Assam was referred to as Pragjyotisha or Kamarupa (Chaliha, 2008).
On the basis of the physiographic characteristics, Assam is broadly divided into four major divisions. They are namely

i) the Brahmaputra Valley,

ii) the Barak Valley or the Surma Valley,

iii) the Karbi plateau and

iv) the Barail and Southern hill ranges.

i) The Brahmaputra Valley

The Brahmaputra Valley covers a length of 800 kms from west to east and is 80-90 kms wide. Towards the east of the valley are the Naga hills, the Karbi plateau and the Meghalaya plateau. The name Brahmaputra Valley is derived from the mighty river Brahmaputra which flows through the plain. During the rainy season, the plains are prone to floods. Extensive floodplains and char lands are formed by the Brahmaputra River. A belt of tall grassland are found in the southern bank which are home to diverse flora and fauna, including the Kaziranga National Park. The soil is very fertile and a lot of crops like rice, jute, tea and other vegetables are grown here. The valley is densely populated.

ii) The Barak or Surma Valley

Named after the Barak river, this valley is situated towards the south of the state. It lies below the Garo, Khasi, Barail, Naga and Patkai hills. The districts in this region are Cachar, Karimganj and Hailakandi.

iii) The Karbi Plateau

The Karbi plateau is part of the Meghalaya Plateau and the valley is divided into two parts by the Kopili River. The height of this region varies from 1,000 m to 1,200 m above mean sea level. The Rengma Hills are the key topographical feature of this section.

iv) The Barail and Southern Hill

The hills district of Dima Hasao lies in this area. The Barail range divides the district into two parts, one falling in the Brahmaputra Valley and the other in the Barak Valley. The northern face of the Barail range is comparatively less steep than the southern face since the northern face has been eroded headwards by the rivers like the Kopili and Barapani.
Assam is the homeland of a large number of ethnic groups belonging to various racial and socio-cultural backgrounds. In the state, sixteen ethnic groups are notified as Scheduled caste and twenty five as Scheduled tribe (Assam - a Hand Book, 2014). Interspersed among the various tribes are the caste Hindu, Muslim population groups, the tea garden communities and other communities. Besides people from different parts of the country like the Marwari, Punjabi, Nepali, Bihari, Oriya etc. have also come and settled in the state after coming here to seek employment opportunities.

People belonging to various religions also live in Assam. Hindus, Muslims, Christians, Sikhs and people adhering to animistic faiths or traditional religious groups have been co-existing here peacefully since long past.

The economy of Assam is basically agrarian. Rice is the main crop grown; tea, jute and sugarcane are the main cash crops cultivated in the state. Although Assam has great potential for industrial development, the pace of industrialization has been very slow. The industrial establishments in the state at present include oil refineries, petro-chemical complex, fertilizer plants, paper mills, jute mills, sugar mills, cotton mills, cement factories etc. According to the Census of 2011, the total work force of the state can be categorized as cultivators (33.9%), agricultural labourers (15.4%), cottage industry workers (3.8%) and other workers (46.5%).

Assam is famous for her handloom and handicraft products. Eri (Philosamia ricini), muga (Antheraca assama) and pat (Bombyx mori) textiles, bamboo and cane products, bell metal and brass metal products are traditionally produced by the people.

As per 2011 census, Assam has a total population of 31.16 million with the sex ratio (females per thousand males) being 958. The density of population has gone up to 398 as against 340 in 2001 census. In 2011, the literacy rate of the state is 72.19%, which is a increase of 8.94% since 2001. Among the districts of the state, Kamrup (Metro) is on top with 88.71% literacy rate. The Kamrup (Metro) district also has the highest density of 1,313 persons per square kilometre in the state.

Guwahati, where the present study has been conducted, is located in the Kamrup (Metro) District of Assam. This district was created on 3rd February, 2003, by bifurcating the old Kamrup district. It is the most important district of the state with the state capital being located here.
RELATIVE LOCATION OF KAMRUP DISTRICT (Not to Scale)

Map: I.1 Map of India
Map: I.2 Map of Northeast India
Map: I.3 Map of Assam
Map: I.4 Map of Kamrup District
LOCATION OF THE STUDY AREAS IN GUWAHATI CITY (Not to Scale)

Map I.5 Map of Guwahati city

STUDY AREAS

NAME OF THE AREAS: UZAN BAZAR, MALIGAON, DISPUR, RUPNAGAR-BIRUBARI, LOKHORA.
The city of Guwahati

Guwahati, the largest city in Northeast India, lies on the intersection of 26°11’’N parallel of latitude and 91°45’0” E meridian of longitude. The mighty river flows through the city, which is dotted with many hills. The name Guwahati is derived from ‘Guwa” meaning areca nut and ‘hati’ meaning marketplace. Earlier Guwahati was known as Gauhati. Guwahati is the capital of Assam and is known as the gateway of Northeast India. It is a growing commercial and academic hub which attracts people from rural Assam, Northeast India and other parts of India seeking occupational opportunities.

The history of Guwahati, earlier known as Pragjyotishpura, dates back to the great epic age of the Vedic period. Various historical sources refer to it as being the seats of government from the early 5th century till the downfall of the Pala dynasty in the 13th century AD. In fact Guwahati was also the sub-capital of the Ahom kingdom throughout its long period of rule. Thereafter with the coming of the British during the early 19th century AD the town continued to remain as an important administrative centre in both civil and military aspects.

With the coming of the British, Guwahati began to grow as a modern town. Guwahati became a municipal town in the year 1865 with the establishment of the Municipal Board in that year. The town was connected by railway line with the rest of India in 1890, which is responsible for the rapid growth of Guwahati as an urban centre as well as in terms of population. At present, Guwahati city is governed by Guwahati Municipal Corporation (as defined in the year 1973) and is situated in Guwahati Urban Region. Its area is about 215.73 square kilometres. The Census 2011, Government of India, declared Guwahati as an Urban Agglomeration coming under category of Class I UAs/Towns. As per the 2011 census, the population of Guwahati Municipal Corporation area is 9,68,549 of which 5,05,542 are male and 4,63,007 are female. The literacy rate is 91.12% which is higher than National Urban average of 85.0%. Literacy rate for male and female for Guwahati stood at 92.88% and 89.19% respectively. The sex ratio of female to male in Guwahati was found lower with 916 females against national urban average of 926 females per 1000 males.

The extension of the urban site of Guwahati has undergone a remarkable change since independence of India, the present expansion of the city is the result of
agglomeration of urban structures developed around multiple nuclei. The significant development whichever took place in the evolutionary history of Guwahati was the establishment of the oil refinery at Noonmati. This brought in its subsidiary industries and the establishment of the refinery township and the Guwahati Railway station. The construction of the railway cum roadbridge over the Brahmaputra River, and the establishment of military cantonment at Satgaon are also noteworthy in Guwahati’s evolutionary history of urbanization. The acceleration of growth and development of the city was furtherance during the early seventies with the setting up of capital complex at Dispur in Guwahati from Shillong. Establishment of several public and private sector offices and shifting of state government offices from Shillong to Guwahati gave increasing employment opportunities and thereby provided impetus to urban growth. Guwahati today extends more than 20 kilometres, from the cantonment area at Satgaon in the east to the Gauhati University in the west and about 10 kilometres from the water front in the north to the Basisthashram and the National Highway 37 in the south.

Guwahati is situated on the crescent shaped south bank of the river Brahmaputra in the district of Kamrup, Assam, and The physical character of the bank of the River Brahmaputra at this point is unique in the sense that here the river is the narrowest for which it can easily be crossed for better linkage with the region around in the north and at the same time stable rocky bank has helped in providing the city a permanent site without any apparent shifting in urban location. Physiologically, the city region is not a smooth terrain. In fact it is an undulating plain occasionally encroached upon by a number of hills. This physiographic feature is also responsible for the complex growth pattern of land occupants in the city region. The northern limit of the city is bounded by the mighty Brahmaputra, the only “male river’ of India. The average ground level along the river bank is 51.3 mts above the mean sea level. The central and western portion of the city has an interrupted level plain. The plain area, however, gradually rises in the eastern portion, especially from the Kharghuli and Nabagraha hills. In the central northern part, the Nilachal hill stands as a barrier for continuous extension of the plain area of the city towards the western direction. Beyond the Nilachal hill, the plain area extends to the western boundary limit. The plain also extends to the southern side with interrupted hills. Beyond these hills the plain again extends up to the extension of the Meghalaya plateau. These hills in the
southern periphery of the central city region stand as obstacle for uniform growth of land occupants throughout the city.

The municipal area is under the jurisdiction of the Guwahati Municipal Corporation (GMC) whose limits were last extended in 1991 to cover an area of 216.79 sq.km. The GMA covers about 262 sq.km. and is under the jurisdiction of the Guwahati Metropolitan Development Authority (GMDA). (Desai et al., 2014)

Guwahati witnessed a very high rate of growth in the period from 1971 to 1991; 8.1 per cent p.a., which is likely on account of the city becoming Assam’s capital in 1972, migration from rural Assam and other states of the North-East region of India, and also the cross-border migration from Bangladesh after the latter’s formation in 1972. Since then, GMC area has registered slowing down of population growth rate, from 3.3 per cent p.a. in 1991-2001 period and 1.8 per cent p.a. in 2001-11 period (Table 1). In fact, in the last decade the GMC area has experienced a growth rate that is even lower than that of Assam’s urban population growth rate of 2.5 per cent p.a. The GMA areas have registered a population growth that is even lower than that of GMC rate in 2001-11. This means that the migration rate to the city has slowed down in the decade of 2001-11 due to either decline in migrants from other North-East states and rural Assam or decline from cross-border migration or both. Thus, contrary to the expectation, the population of Guwahati city and its metropolitan region has stabilised since 2001 due to economic and geo-political reasons.

Table I.1: Employment Indicators, Guwahati, 2004-05

<table>
<thead>
<tr>
<th>Employment</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-employment</td>
<td>36.8%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Regular employment</td>
<td>50.4%</td>
<td>91.5%</td>
</tr>
<tr>
<td>Casual labour</td>
<td>12.8%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Primary sector employment</td>
<td>12.5%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Secondary sector employment</td>
<td>24.1%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Tertiary sector employment</td>
<td>63.4%</td>
<td>82.8%</td>
</tr>
</tbody>
</table>

Note: Guwahati employment data are for Kamrup district, which is largely comprised of Guwahati city. Data below district is not available in the NSS surveys unless there is a metro city.

Source: Srivastava et al 2010, Table 3.3, p.36 and 37 (based on unit level data of the NSSO).
The tertiary sector is the main sector of employment even in Guwahati’s economy. According to NSSO’s 2004-05 round data, a large proportion of workforce, both male and female, is engaged in the tertiary sector (Table 3). 63.4 per cent male and 82.8 per cent female workers were engaged in tertiary sector in 2004-05. While 24.1 per cent male workers were employed in secondary sector, just 0.9 per cent of the female workers were in this sector. Employment in the primary sector is larger in Guwahati as compared to urban Assam in 2004-05, which is somewhat surprising. The NSSO data also shows that Guwahati has a large share of regular salaried employment with 91.5 per cent females and 50.4 per cent males falling under this category in 2004-05 (Table 3). Regular wage employment would include informal tertiary-sector workers like domestic maids. Unlike urban India and even urban Assam, just 2.0 per cent female workers in Guwahati were self-employed when this proportion among male workers was 36.8 per cent. Regular employment among male workers is much higher in Guwahati than in urban Assam, but, again, a significant proportion of that will be in tertiary sector, given that secondary sector employment among them is just 24 per cent.

The service sector provides employment in both the formal sector and the informal sector. Most of the workforce in the formal service sector is likely to be engaged in administration and other institutional areas of employment since Guwahati is the capital of Assam and also a hub of educational institutions. The workforce in the informal service sector, comprising of the urban poor and lower-income groups, are likely to be petty shopkeepers and vegetable sellers, small shop assistants, mechanics, cleaners, domestic help, cooks and waiters in food joints, construction workers, cycle rickshaw drivers, and manual labourers working in the wholesale and retail markets.

The geographical setting of the city has a direct relation with the population distribution and the settlement pattern in it. It is seen that because of the uneven relief, population growth, settlement and land use pattern, show different character in different parts of the city. Rapid growth of population of the city is making the settlement and land-use pattern quite complex and houses are coming up even in the hilltops and slopes, and also in the area occupied by drainage outlets. The problems of land slide, occurrence of flash floods during the rainy season, blockade of drainage system and overflow of drainage water there from are the regular feature in the city.
If the urban population of Greater Guwahati is extended, the rest of the Kamrup district would be a vast sea of rural settlement. In Guwahati, overcrowding has become an acute problem. As per the 2001 census, the municipal area of Guwahati has 1,86,006 housing units sheltering 8,09,895 individuals who are distributed either in their own houses or in rented houses.

In Guwahati, most of the tenants, particularly of low income category, can neither offer a higher amount as rent nor can they own a house with their limited income. Therefore, the number of sub-standard houses with low rent is rising in the city. This has also caused a rise of slums in the city’s landscape. Many such economically backward people are even compelled to encroach on government land in different hills and hillocks of the city, thereby rising a number of residential colonies. Many such colonies are dominated by the rural migrants from different parts of the state.

Along with various other reasons, overcrowding of Guwahati is also associated with developed transport and communication system. Guwahati is connected by all types of regional transportation system, viz., road, railway, air and inland waterways. However, road and railway play a major role in this respect. The National Highway 37 links Guwahati with the rest of India and other parts of the state. This communication advantage has led many a people to come to Guwahati in search of economic opportunities and viable avenues which ultimately resulted to the rapid growth of the population of Guwahati. At present Guwahati is fast becoming an economically vibrant cosmopolitan city with heterogeneous population of different region, caste and creed, occupation, cultural background and so on.

The Assamese

The fertile river valleys and salubrious climate of Assam have attracted human habitation since long past. Being strategically situated between mainland India to the west and Southeast Asia to the east, Assam has witnessed several waves of migration through different routes since time immemorial. The present day Assamese is an amalgamation of various groups of people, who, with their languages, social customs and their modes of dress have mingled into the pan-Assamese identity of today.
The people of Assam include all the people whose mother tongue is Assamese and the indigenous or long settled tribal inhabitants. The Assamese language is Indo Aryan, having its root in the Sanskrit language. According to Prof. B.M. Das (1987), the present day Assamese people at the time of their migration to Assam were not known as the Assamese, their language was also not Assamese of the modern form. Like other elements of culture, the language too passed through different stages of development in different times to assume its present form. In the course of its development, various non Aryan elements have also become an integral part of the Assamese language. Several words from different linguistic families—Austro, Dravidian, Tibeto-Burman etc. in addition to English, Arabic, Parsi etc. have been incorporated into the Assamese language thereby enriching its vocabulary.

According to the renowned Assamese scholar, B.K. Kakati (1962), “Assamese is the easternmost Indo-Aryan language spoken in the Assam Valley districts with Lakhimpur in the extreme east and Goalpara in the extreme west. It meets Bengali in the west and is surrounded on all sides by speeches belonging to altogether different families of which the principal are the Tibeto-Burman and the Khasi (of the Monkhmer family). In the areas in which it is spoken, it is not the only vernacular. It is a language of the plains. Everywhere its home as a vernacular is bounded by the hills lying on the north and on the south between which the river Brahmaputra takes its westernly courses”.

The people of Assam can be broadly divided into two groups—tribal and nontribal. The tribal people of the state belong to many ethnic groups and they have been categorized as plains tribes and Hills tribes based on their habitation. Besides the tribes, which are basically of Mongoloid origin, some other Mongoloid populations like the Ahom, Chutiya, Moran, Tai Phake, Aiton, Turung etc. have been designated as ‘Other Backward Castes’.

The nontribal category includes, besides the above mentioned Mongoloid populations, the caste Hindus, the Muslims and the tea garden communities. The castes are mostly concentrated in the Brahmaputra and Barak valleys. The Assamese speaking castes are concentrated in the Brahmaputra valley, while the Bengalis dominate the Barak valley.
According to Prof B M Das (1987), the Assamese caste Hindu population are Caucasian in origin but because of intermixture with the Mongoloid population, which has been taking place since long past, appear to be a composite people. The Australoids were the first to arrive in Assam. Then came the Mongoloids, who partially or fully, absorbed the old Australoid strains. Though the Mongoloids have been migrating to Assam at different times and from different directions, it can be said that after the Mongoloids the Caucasoids came from the western direction. Slow and gradual flow of genes from the Mongoloid people to them brought many changes in their biological make-up. This ongoing phenomenon occurred mostly in the Brahmaputra Valley, which is regarded as the meeting place of two major races of mankind, namely, the Caucasoids and the Mongoloids. As a result, admixture in varying degrees has been taking place between the members of the two groups. In fact, sometimes it is impossible to distinguish from physical features alone a person of Mongoloid origin from that of Caucasian origin.

The base of the culture of the Assamese was provided by the Hindu religion and the Vedic civilization, before the spread of which the earlier settlers had their own characteristic culture. Intermingling of these two broad cultural entities, one that came from the West at a later period and the other that existed since earlier times, gave rise to Assamese culture. The Mongoloids contributed their share to the formation of the basic sub-stratum, both biological and socio-cultural, of the people of Assam. Many Mongoloid tribal individuals have been assimilated into the non-tribal Caucasian Assamese Hindu fold through a process known as tribe-caste continuum. In the course of time, the contributions of these various groups of people have led to the formation of the heterogeneous and composite Assamese people and culture (Das, 1987).

The caste system, one of the most important features of the Hindu society is not practised very rigidly in the Assamese society. Various factors can be attributed to the fairly liberal and flexible ethos of Assamese culture. Assam came under the influence of the Vedic- Aryan culture at a comparatively much later date, and casteism could not become deep-rooted. The profound influence of the tribes, because of both biological and socio-cultural admixture, contributed to the emergence of the lax caste system in Assam. Another reason is the influence of the Neo- Vaishnava movement launched by the great saint, religious preacher and social reformer Srimanta Sankardev of the 15th -16th century. Many tribal populations converted to
Hinduism and were given a caste name, thereby becoming an integral part of the caste system. The classic example is the Koch caste which has been formed by the amalgamation of people of various tribes like the Bodo, Karbi and Lalung. They were elevated to caste status in the sixteenth century. They subsequently absorbed many local tribes who accepted their methods of sanskritization. By the end of the fifteenth century, the Vaishnavite movement initiated by Srimanta Sankardeva (1449-1569) brought considerable changes in the social structure by introducing social mobility in the caste system. The establishment of Satras (Temple organization) and Naamghar (temples) fostered the feeling of brotherhood among the people, thereby reducing caste rigidity.

Two broad categories of Hindu castes are generally recognized in Assam_ the Bamun (Brahmin) and the Sudir (Sudra: non Brahmin). Traditionally, in the hierarchical caste system, the Brahmins enjoyed social superiority. But there was no rigid rules regarding occupation, social rules and regulations and commensality. The Sudir group consists of many castes belonging to different hierarchical status. The other high castes are the Kayasthas, also known as Kaith and the Kalitas. The Kalitas are the most dominant caste in numerical terms. The other castes of Assam are the Koch, Keot, Kaibarta, Kumar, Hari etc.

The scheduled castes in Assam are largely assimilated and there are no exclusive pockets for scheduled castes. By and large, the entire scheduled caste population of Assam is part and parcel of the mainstream population of the state. Besides, unlike other states of the Indian Union, the scheduled castes of Assam have not experienced the rigours of untouchability, which is the main criterion of inclusion of a community in the scheduled caste list. But they are not extremely backward. Although agriculture is the sole means of livelihood of most of the rural scheduled caste people, fishing is also practised by them particularly the Kaibartas, Namasudras and Jalkeots. Some scheduled caste populations like the Hiras, Kumars and Banias depend on particular traditional occupations like pottery and goldsmithy. Yet, occupational mobility is observed among them as there are no restrictions.

The Assamese caste Hindu people are patriarchal. But the women in Assamese society enjoy a relatively high status due to its cultural ethos.
Review of Research and Development in the Subject

Fertility

Fertility studies in India were started by the Census of India first in 1911, although in a very limited manner. In 1937, under the directorship of Prof. Mahalanobis, a sample survey on fertility was conducted and statistics on birth was collected by the Indian Statistical Institute, Kolkata. The other pioneers in this field are considered to be Jain (1939), Chandrasekharan (1948), Dandekar (1959), Dandekar and Dandekar (1953) who studied the relationship between fertility, social status and economic condition.

Studies on differential fertility based on such socio-cultural factors such as residence, religion, caste, economic status and educational status of husbands and wives, occupation, type of family etc have been conducted by various scholars like Sovani (1948), Sinha (1957), Mukherjee and Singh (1961), Driver (1963), Kurup and George (1964) etc. Fertility is a biological process, but it is profoundly affected by a complex interplay of various socio-cultural factors (Mitra, 1978; Nag, 1981; Mahadevan, 1986; Mahadevan and Sumangalam, 1987).

Many studies have revealed the inverse relationship between education especially of the women and fertility (Driver, 1963; Agarwala, 1970; Chauhan, 1974; Murthi et al. 1995). Bhende and Kanitkar (1982) found a moderate and positive association between husband’s education and a strong positive relationship between wife’s education and fertility.

Studies on the relationship between age at marriage and fertility rate were conducted by several scholars like Wattal (1958), Mukherjee (1962), Goyal (1962), Agarwala (1964) and Jain (1964). These studies reveal that the fertility rate increases with low age at marriage and vice versa. Bhargava (1984) in his study on the slum dwellers of greater Bombay found that in the lower socio-economic groups the fertility level is relatively high and the mean age at marriage is low.

The association of fertility with income and economic status with fertility have been studied by Dutta and Seal, 1974; Bharati, 1981; Choudhury, 1988; Verma et al.
Ahmed, Das and Saikia (1999). Nayar ((1974) and Gupta et al. (1981) have reported negative correlation between economic status and fertility.

Several demographers, sociologists and anthropologists have studied the relationship of type of family with fertility. K. Davis (1965) found that women of joint families have higher fertility than of the nuclear families. However, Pakrasi and Malakar (1967) and Mahadevan (1979) reported that women in nuclear families have higher fertility than in joint families. This result was also confirmed by other studies conducted by Patel (1993) and Sengupta and Chakraborty (1995). A few studies (Mathen, 1962; Mahadevan and Sumangala, 1987), however, reported that there is no relationship between fertility and type of family.

Several studies in India have shown the relationship of religion with fertility (Mandelbaum, 1974, Ghosh et al 1983, Irudaya Rajan and Rao, 1991). Many studies (Agarwala, 1964; Kirk, 1968) have reported that among the religious groups, the Christians have the lowest fertility rate followed by the Hindus and then by the Muslims.

Santhi (1990), in a study conducted in Pondicherry found that occupation of women, education of wife and duration of married life had an impact on fertility. In another study in rural Pondicherry done by Malathi in 1991, it was revealed that labour participation had significant positive impact on fertility while duration of married life and education of wife had a negative impact.

Paul (2001) in his study among the Mahatos of West Bengal found that the fertility rate has an inverse relationship with educational and occupational status. The other variables found to be related with fertility were age at marriage, age at first conception and age at first child birth.

Shukla (2005, 2006) analyzed the fertility pattern in Sagar district of Madhya Pradesh and correlated it with factors like age composition and age at marriage of women.

Reddy and Sudha (2010) conducted a case study on factors affecting fertility and mortality among the Setti Baliya community of Andhra Pradesh. They found that all the fertility components are higher in non-consanguineous couples than
consanguineous couples. Also the low income group shows high fertility than among the middle income and high income groups.

**Studies on fertility in Northeast India**

Rakshit (1960) first studied population variations in mean age at menarche in Northeast India. Nag (1965) and Deka Mahapatra studied the fertility pattern of the Khasi of Meghalaya. Kar and Sharma (1982-83) studied the Wancho tribe of Tirap District in Arunachal Pradesh. Barua (1983) studied the Hajong tribe of Meghalaya and found that the tribe was characterized by high fertility and comparatively lower mortality. Buzarbaruah (1994) studied the bio-demographic structure of the Nocte tribe of Arunachal Pradesh. On comparing, his findings revealed that the mean number of live birth per married Nocte woman was higher than the Hajong (Barua, 1983) of Meghalaya but lower than the Mishing (Buzarbaruah, 1984) and the Santal (1982) of Assam.

Deka (1989) published a paper on reproductive performance and selection among the Jaintias of Saphai village in Meghalaya in which it was reported that fertility among them is relatively high which was probably due to their continued reproduction until the end of the fertile period. Saikia *et al* (2001) analysed fertility among the Khasi and found that they have a high fertility rate in spite of having a high level of autonomy in the matrilineal society.

Choudhury (1993) studied some aspects of fertility and child mortality among the Mishmis of Arunachal Pradesh. In 1994, Choudhury, Behera and Adak published a paper on some bio-demographic aspects of the Khampti which revealed a high sex ratio, index of aging and low rate of selection intensity. In a research paper on natural increase of population among the Deoris of Assam published in 1994, Das reported that higher educational level of the urban females had an impact on fertility, which was found to be lower than among the women in the rural areas.

Sengupta and Chakravarty (1995) studied the family types, fertility and mortality among the Ahoms of Upper Assam. The study revealed that the nuclear families had a higher total fertility rate and foetal wastages than the joint families. Chaudhury and Devi (1997) studied the Meiteis and Muslims of Manipur and found that the Meitei women have a higher mean age at marriage and first child birth than
the Muslim women. The age specific fertility rate of the Meitei women was found to be lower than the Muslim women. The study found fertility to be inversely related to educational and occupational status in both the groups. And, women in joint families were found to have higher fertility than in nuclear families.

Padmanabhan (1998) studied the Singpho tribe of Arunachal Pradesh and found the fertility rate among them to be relatively lower. Nath, Land and Goswami (1999) analysed the effects of the status of women on the first birth interval and found that a female’s age at marriage, education, present age, role in decision making and the per capita income of the household were effective in influencing the length of the first-birth interval of Hindu females in urban Assam. Maheo and Kalla (2000) studied the fertility status in relation to various socio-demographic characteristics among the Mao Nagas of Manipur. The study revealed that the current age of the mother, experience of infant mortality and desire for sons significantly influenced fertility among them. Khongsdier (2002) conducted a study on fertility and mortality differentials among the War Khasi of Meghalaya. His study found an inverse relationship between mean number of live births and mothers’ education in both the Christians and non-Christians. Sengupta and Purnungla (2004) analysed fertility and mortality in relationship to a few biological and socio-cultural characteristics among the Ao Nagas of Nagaland. It was found that age at menarche is negatively related to fertility. Mother’s age at birth, educational status and birth order influenced the fertility rate among them.

In a study conducted by Das and Goswami (2004) among the tea working population of Dibrugarh District, Assam, it was found that illiteracy and low age at marriage were responsible for high fertility. Poor economic conditions indirectly influenced high fertility as it was perceived that higher number of children would contribute to the family earnings.

Singh (2006) analysed ethnic variation in fertility patterns among four communities of Manipur. His study also indicated an inverse relationship between fertility and educational level of mothers. The study also found that women engaged in manual labour have a higher fertility rate, and among the manual labourers, those engaged in agriculture have the highest fertility.
Baruah (2007) observed that the incidence of live birth is positively associated with maternal age and negatively associated with age at marriage, education, income and occupation. Khiloni (2009), in his study among the Anal women of Chandel district, Manipur, reported that the age at menarche, education and economic status are the factors which influenced fertility. Dey and Goswami (2009) studied the fertility patterns and its correlates in Northeast India. The study revealed the impact of mothers’ education and age at marriage on fertility. The study also found that even in the absence of family planning, increasing level of mothers’ education, age at marriage and opportunity to work outside the home helped in reducing fertility.

Kaur (2010) conducted a study on fertility performance and nutritional status among the Assamese Sikh women of Assam. The study revealed that there are observable differences in the fertility performance of the Assamese Sikh women of rural and urban areas. The economic background and fertility performance were found to be inversely related and mothers from nuclear families were reported to have lesser number of children compared to those from joint families.

Khongsai (2012) examined the biosocial determinants responsible for fertility and child mortality among the Khongsai Kukis in Saikul subdivision and Imphal town of Manipur. The study revealed that the effect of various biosocial factors on fertility and mortality rates were higher in the rural areas than in the urban area.

Menopause

A number of menopausal women are projected to increase rapidly from a total of 467 million to 1200 million by 2030 all around the world. The great majority of increase will occur in the developing countries. The rate of increase in the number of postmenopausal women is substantially faster in developing world than in industrialized world. Postmenopausal women will be increasing as a proportion of the total population from 9% in 1990 to 14% in 2030 (Hill, 1996). A total of 130 million Indian women are expected to live beyond menopause into old age by 2015.

The age at which natural menopause occurs is between 45 and 55 years for women worldwide. In developed countries, the average age at menopause is about 51 years (Luoto et al., 1994; Kono et al., 1990; Suzanne et al., 1995; Kazem et al., 2004); whereas in countries like Philippines, Papua New Guinea, in various parts of Africa,
India, Pakistan and Thailand, it is reported to be 45-50 years (Sukwatana et al., 1991; McKinlay et al., 1992; Brambilla and McKinlay, 1989; Richardson, 1993; Goodman, et al., 1985; Randhawa et al., 1987; Talukdar, 1978; Wasti et al., 1993). There has been a significant decline in the age at menarche over the past 100 years (Tanner, 1962; Laslett, 1977; Diers, 1974). Similarly, a four year increase in the age at menopause over the past 100 years has been suggested (Frommer, 1964; McKinlay et al., 1972).

Identifying factors associated with the early and late menopause are important because age at menopause has been associated with risk of onset of several chronic diseases such as cardiovascular diseases, breast and endometrial cancers and osteoporosis (Sowers and Pietra, 1996; Kato et al., 1998; Lindquist and Bengtson, 1979; La Vecchia, et al., 1987). There are various bio-social factors/variables which are believed to be associated with early and late age at menopause, like, body size and shape, blood pressure, age at menarche, socioeconomic status, age at first child birth, parity, income, education and dietary habits.

The pattern of constant change in variables such as body weight, (Lindquist and Bengtson, 1979; Singal and Sidhu, 1982; Willet et al., 1983; Leidy, 1996; Whelan, et al., 1990), body fat (Poehiman et al., 1995; Tchernof et al., 1998), age at first child birth, and nulliparity/low parity (Willet et al., 1983; Whelan et al., 1990; Stanford, et al., 1987) may be important in relation to the process of atresia. Several studies have fairly shown that lower socio-economic status is associated with early menopause in comparison to higher socio-economic status (Luoto et al., 1994; Randhawa et al., 1987; McKinlay et al., 1972; Whelan et al., 1990; Stanford et al., 1987; Magursky et al., 1975; Togerson et al., 1994; Van Noord et al., 1997; Sethi et al., 1996). Lower educational attainment and non-employment of women play a significant role in early age at menopause (Luoto et al., 1994; Gold, 2004), and it is shown that working women experience delayed menopause than non working women (Singh and Arora, 2005; Naddaf and Semreen, 2005). The difference in the age at menopause between working and nonworking women may also be attributed to better financial and living conditions of working women (Naddaf and Semreen, 2005).

The association between age at menarche and age at menopause was not statistically significant (McKinlay et al., 1972; Chompoonweep et al., 1993; Treloar, 1967; Hidayat et al., 1999). While some studies showed that age at menarche was
significantly associated with age at menopause, with women reporting early age at menarche also having early age at menopause (Reynolds and Obermeyer, 2003; Ginsberg, 1991; Cramer and Xu, 1996; Gonzales and Villena, 1997). A direct effect (early menarche, early menopause or late menarche, late menopause) was also reported in Italy (Meschia et al., 2000) and India (Chatterjee et al., 1989). A statistically significant inverse relationship between age at menarche and age at menopause (early menarche, late menopause) was described in Australia (Do et al., 1998).

A consistent finding in the association of nulliparity/low parity (number of children) with early age at menopause was found by many researchers (Stanford et al., 1987; McMahon and Worcester, 1966; Clausger-Madsen and Yitting, 1992). On the other hand, Jeune, (1986) and Ayatollahi et al, (2002) observed high parity among women reporting late age at menopause while other studies do not confirm such associations (Brambilla and McKinlay, 1989; Whelan, et al., 1990; Sherman et al., 1981; Ozdemier and Col, 2004). In many studies lean women appear to experience a natural menopause slightly earlier than heavier women (Lindquist and Bengtsson, 1979; McMahon and Worcester, 1966; Brand and Lehert, 1978; Neri et al., 1982). Some studies have also observed that women with lower BMI (Body Mass Index) had an earlier menopause (Willet et al., 1983; Sherman et al., 1981; Nagata, et al., 1998, Aloysio, et al., 2005), whereas, no relation between BMI and age at menopause has been observed by (Van Noord, et al., 1997, Ozdemier and Col, 2004, Neslishan et al., 1998). Some studies have observed that relatively taller and heavier women experience menopause at a later age (Lindquist and Bengtsson 1979, Singal and Sidhu, 1982; Willet et al., 1983; Leidy, 1996; Whelan et al., 1990).

Every woman’s menopausal experience is unique. Some women may have all of the symptoms of menopause; other may have just a few. The intensity of menopausal symptoms can also range from mild to quite severe (Wallics, 2002). According to WHO (1996), a variety of symptoms occurring either singly or together are frequently reported as being a part of menopausal symptoms. These include urinary problems, depression, nervous tension, palpitation, irritability, headache, sleeplessness, lack of energy, backache, and difficult in concentration. Hot flashes and night sweats are the symptoms most consistently associated with menopause,
although their prevalence varies in different cultures (Lock, 1997; UNICEF 1994; Holte and Mikkelson 1982).

Understanding the determinants of age at menopause is important, because an early menopause increases the length of women’s exposure to risk factors for diseases related with decreased oestrogen levels like, osteoporosis (Snowdown et al., 1989) and late menopause increases the risk of breast and endometrial cancers (Kelsey et al., 1993, Parazzini et al., 1992; Jick et al., 1977). While very little research has been done on menopause in Indian context, there is a need to recognize menopause as an important issue in women’s health care. The menopause is emerging as an issue owing to rapid globalization, urbanization, awareness and increased longevity in urban middle aged Indian women (Sengupta, 2003).

Flint (1974) was one of the first to carry out a community based investigation on menopause among Indian women, wherein she showed that menopause was experienced differently in India as compared to United States and there is a variation in age at menopause, and associated symptoms.

In India, studies have mainly been carried out to determine the age at menopause in various population groups (Piplai, 1991; Kriplani and Bannerjee, 2005; Sharma et al., 2005; Baghla and Sharma, 2008) and symptoms experienced by them during menopause (Singh and Arora, 2005; Kapur et al., 2009). Under the leadership of Pieter Vann Keep a series of surveys were conducted in northern India but the interest in the relationship between culture and menopausal age and subjective reporting of symptoms remained central in those (Melby et al., 2005).

The studies carried out among different population groups of India suggest lower age at menopause as compared to women of western countries (Piplai, 1991; Kriplani and Bannerjee, 2005; Singh and Arora, 2005). The factors found to be responsible for lower age at menopause include socioeconomic status, poor nutrition, reproductive history and health care ignorance apart from genetic predisposition which is hard to establish (Bairy et al., 2009; Mahadevan et al., 1982).

Only a few studies have been undertaken to understand the effects of menopausal transition in relation to aging process on general health profile of women in postmenopausal life (Nongkynrih, 2004; Bairy et al., 2009). Added to this, a few
studies are available based on clinical sample which have investigated effects of hormone replacement therapy on postmenopausal women’s health (Naddaf and Semreen, 2005; Datta et al., 2001).

Aaron et al. (2002) studied the rural women of India to assess the medico-social dimensions of menopause. The study revealed that majority of the postmenopausal women perceived menopause as convenient and complained of diminishing abilities after menopause.

Sidhu, Kaur and Sidhu (2005) conducted a study among the educated women of Amritsar in Punjab to estimate their age at menopause and climacteric complaints. the median age at menopause was found to be 47.54±2.31 years. The common clinical symptoms associated with menopause were found to be hot flushes and night sweats, insomnia, headache and body ache, fatigue, irritability etc.

Pathak and Parashar (2010) conducted a study among Punjabi women in Chandigarh to assess their age at menopause, evaluate the influence of certain bio-social factors on menopause and to find the menopausal symptoms experienced by them. The mean age at natural menopause was found to be 47.91±3.16 years. Significant differences were found for height, weight and parity, while BMI, body fat, blood pressure, age at marriage and age at first child birth failed to reveal significant differences between early and late menopausal groups. Hot flashes and irritability were the most common menopausal symptoms experienced by the women.

Kaulagekar (2010) explored the experiences of postmenopausal women with specific reference to perceived effect of menopause on feminity and subjective description of feeling about attaining menopause. The study conducted in Pune revealed that majority urban women viewed menopausal transition from socio-cultural perspective and disassociate reproduction from feminity.

Sagdeo and Arora (2011) conducted a study in a medical institute in Nagpur to find put the age at menopause in rural and urban women and to assess the prevalence and knowledge about menopausal symptoms. It was found that urban women experience menopausal symptoms more than rural women. The commonly observed symptoms were hot flushes, joint and muscular discomfort and physical and mental exhaustion.
Christian et al. (2011) studied the social and demographic characteristics of the postmenopausal women in rural areas of Vadodara district, Gujarat. The study concluded that rural postmenopausal women suffer many social disadvantages that make them vulnerable to experience frequent and severe menopausal symptoms.

The pattern and severity of menopausal symptoms of women in the age group 40-65 years and the factors associated with them were assessed by Joseph et al. (2014) in Mangalore. The mean age at menopause was found to be 48.4±4.5 years. The most common symptoms reported were joint and muscular discomfort and physical and mental exhaustion. Also, educated women reported more symptoms.

Ray (2010) studied the knowledge, attitude and perception of urban middle class women of West Bengal toward menopause. It was found that the Bengali middle class women did not perceive menopause as a health risk. Som et al. (2012) investigated the association of menopause-specific quality of life with socio demographic and reproductive characteristics among the postmenopausal Bengali speaking Hindu women of Kolkata. The study revealed that socio demographic variables are more likely to be associated with menopause-specific quality of life of postmenopausal women compared to reproductive variables. A similar study was conducted by Som and Ray (2012) among Bengali speaking Hindu women of Kolkata aged 47-62 years to find the association of menopause-specific quality of life of women with both working status and duration of postmenopausal years. The study revealed that although bivariate analysis demonstrated that working women had a better menopause-specific quality of life than their non working counterpart, multivariate linear regression model did not corroborate to this finding.

Prevalence of obesity among working premenopausal and postmenopausal women of Jalandhar district, Punjab was assessed by Khokhar et al. in 2010. The study used BMI, Waist Circumference (WC) and Waist Hip Ratio (WHR) as the measures of obesity. The study concluded that the obesity trend is higher in women of Jalandhar district, Punjab compared to other Indian women populations.

Knowledge of postmenopausal women on importance of nutrition and life style in prevention and management of osteoporosis was assessed in an urban slum in Rangareddy district of Andhra Pradesh by Sirivole and Eturi in 2014. The findings
revealed a significant association between level of knowledge and demographic variables such as age, education, monthly income and lifestyle patterns.

Kanthe *et al.* (2015) conducted a study to assess which anthropometric measure had the strongest association with cardiovascular disease risk factors in middle aged women. The results showed that both pre and postmenopausal obese women with higher waist-hip ratio and waist-height ratio have more chances of having cardiovascular diseases.

A study on knowledge and practice of post menopausal women on health maintenance in a selected rural community of Mangalore Dakshina Kannada district, Karnataka was conducted by Veigas *et al.* in 2014. The results show that there was no association observed between knowledge score and selected demographic variables but there was positive correlation between pre-test knowledge and practice of the subjects.

Javoor *et al.* (2008) studied the nutritional status of menopausal women aged 40-55 years in Dharwad. The study found that menopausal women had higher intake of fat, protein and energy with obesity and higher waist to hip ratio which may pose a risk for health problems.

In Northeast India, studies on menopause have been mostly limited to assessing the age at menopause. The menopausal age of some populations are as follows- the Ahoms, 46.58±0.27 years (Dutta and Sengupta, 2011); and 46.80±0.63 years (Baruah, 2007); Khamyang, 46.25±1.58 years (Das, 1985), Turung 44.30±0.68 years (Das, 1985), Garo 145.85±0.41 years (Ahmed Das and Saikia, 1999), Singhpho, 43.63±0.48 years (Kar and Mahanta 1985); Mishing, 48.40±0.60 years (Baruah, 2007); Sonowal 47.12±0.50 years, (Baruah, 2007) and 47.22±0.29 years, (Sengupta and Kalita, 2001); and Ao Nagas 51.33±0.44 years, (Sengupta and Purnunila, 2005).