The term 'peptic ulcer disease' refers to one or more of the facets of a spectrum of disorders that includes gastric ulcer, duodenal ulcer and post-operative ulcers at or near surgical anastomoses. The cause of peptic ulcer is unknown but it is probable that the acid and pepsin of the gastric juice are the factors in initiating and maintaining the ulcers. It may occur in the stomach, pylorus, duodenum, oesophagus and jejunum. An ulcer, occurring in the duodenum is called duodenal ulcer, an ulcer in the stomach - gastric ulcer, an ulcer in the jejunum - jejunal ulcer and an ulcer in oesophagus - oesophageal ulcer. About 95% of duodenal ulcers are situated with 2cm. of the pylorus, in the duodenal bulb (Way 1983). 20 to 50 percent of duodenal ulcer may be caused by one or more physiological defects, which by themselves or in combination, increase the concentration of aggressive factors presented to the duodenum. The defects include increased number of parietal cells, increased serum pepsinogen I concentration, increased basal secretory rate of acid (during fasting period) and pepsin, increased stimulated capacity to secrete acid and pepsin, increased parietal cell sensitivity to gastrin, increased meal stimulated gastrin release.
Pain, the presenting symptom in most patients is usually located in the epigastrium. The daily cycle of the pain is often characterised. The patients usually have no pain in the morning until an hour or more after breakfast. The pain is relieved by the noon meal, only to recur in the later afternoon. Pain may occur again in the evening and in about half of cases, it arouses the patients during the night. Food, milk and antacid preparations give temporary relief. Vomiting is also common among the duodenal ulcer patients.

As the stomach and the duodenum of the human alimentary system are mainly involved in this study, it is necessary to discuss the anatomy of these two parts clearly.

**The Stomach:**

The stomach, a J-shaped organ, lies obliquely in the upper part of the abdomen in between the oesophagus proximally and duodenum distally. It is the most dilated part of the alimentary tract. It communicates with the oesophagus by a sphincter and with the duodenum by another anatomically well defined pyloric sphincter.
Topographically the stomach occupies the epigastrium (upper central region of abdomen), left hypochondrium and a part of umbilical region of the abdomen. The size, shape and position of the stomach vary with body build, posture, volume of gastric contents and tonicity of the stomach.

The stomach has two borders or curvatures and two surfaces. The shorter or right border is the 'lesser curvature' and the longer lateral or left border is the 'greater curvature'. There are two surfaces—interior and posterior. In an adult, normally, the lesser curvature of the stomach is nearly 12 to 14 cm. long and the greater curvature 35 to 40 cm. It has a capacity of 1 to 1.5 litres.

For describing the different parts of the stomach, various terms have been used by the anatomist, surgeons, radiologists and others according to their own convenience. But for gross description, the stomach can be described in three parts—the fundus, the body and the antrum. (fig.-1)

The duodenum:

The duodenum is a C shaped tubular organ connecting the stomach with the rest of the small
Fig.1: DIFFERENT PARTS OF DUODENUM
The partly digested food materials and secretions from the stomach enter the duodenum and then into the rest of alimentary canal for further digestion and absorption. Its four main parts—(i) The first or superior portion, (ii) The second or vertical or descending portion, (iii) The third, horizontal or transverse portion and (iv) The fourth, oblique or ascending portion (fig-2).

The superior portion is mostly movable part of the duodenum. It begins at the end of pylorus and ends at the level of the neck of the gall bladder. The vertical or descending portion descends along the right side of the vertebral column as low as the lower border of the body of the third lumbar vertebra. The horizontal or transverse portion passes from right to left with a slight upward inclination in front of inferior vena/cava and is continuous with the fourth part of the duodenum— the oblique or ascending portion which ascends immediately in an upward direction towards the second lumbar vertebra.

The stomach is meant for 'secretion of gastric juice and for storage, mixing, trituration and regulated emptying of gastric contents'. The output of gastric juice in a fasting subject varies between 500 to 1500 ml. per day. After each meal about 1000 ml. are secreted by the stomach.
Fig 2: ANATOMY OF DUODENUM
The components of gastric juice are as follows:

(i) mucus
(ii) pepsinogen
(iii) intrinsic factor
(iv) blood group substance
(v) electrolytes (which include hydrochloric acid)

(i) **Mucus**: Mucus is a heterogeneous mixture of glycoprotein manufactured in the mucus cells of the oxyntic and pyloric gland areas. Mucus provides a weak barrier to the diffusion of H⁺ and probably protects the mucosa.

(ii) **Pepsinogen**: Pepsinogens are synthesized in the chief cells of the oxyntic glands. Unlike acid, pepsin is not a single substance. In gastric juice there are at least seven electrophoretically and antigenically different pepsin enzymes.

(iii) **Blood group substances**: Some people secrete blood group antigens into their gastric. This trait is genetically determined.

(iv) **Electrolytes**: The unique characteristic of gastric secretion is its high concentration of hydrochloric acid, a product of parietal cells.
Normally, the duodenal secretion is alkaline due to the presence of bi-carbonate ions. But stomach contents (gastric chyme), which is acidic in reaction, continuously try to neutralize this duodenal alkalinity.

So any condition, which increases acidity, the gastric chyme will be able to reduce the alkalinity of secretion of the duodenum. Pepsin, the protein digesting (proleotylic) enzyme from stomach which is only active in acid medium and loses its activity in the alkaline secretion of duodenum, can now act on the mucosa of the duodenum and start digesting it. Thus, when more acid enters the duodenum from the stomach than in normal condition, pepsin can act on the duodenal mucosa and cause an ulcer in the duodenum. The most common site of duodenal ulcer is the first part or the superior portion of the duodenum which is closest to the stomach.

(Fig 3) shows the site of duodenal ulcer.

Liability to develop an ulcer:

It is difficult to find out, which members of certain community are more liable than others to develop an ulcer. But to some extent, there are
Fig 3: Site of Duodenal Ulceration
probably some striking differences in relation to possible environmental influences such as social class pattern, occupation, dietary habits, smoking habits, etc. There are also important differences relating to constitutional factors such as blood group, parietal cell secretary activity, etc. Also of significance is the anxiety factor with its interplay between environmental stress and temperament (Jones 1957). The two factors i.e. the constitutional and environmental are discussed below;

a. Constitutional factors:

It includes (i) sex in relation to parietal cell mass, (ii) age and (iii) blood groups.

(i) Sex incidence in relation to parietal cell

Duodenal ulcer patients tend to have a larger parietal cell mass than normal. Cox, in 1945, emphasized the fact that duodenal ulcer tends to be associated with a secretory mucosa containing a large number of parietal cells. Cox's conclusions were based on a careful study of 135 human stomachs (both male and female, age ranging from 17 to 85 years). He found that the normal stomach in males has a mean parietal cell population of 1.09 billion i.e. 1.09 x 10^9 and females 0.82 billion i.e. 0.82 x 10^9. In contrast the average parietal cell amount in duodenal ulcer patients is (both male and female together) 1.8 x 10^9 cell. Male persons and duodenal
Ulcer patients have increased capacity to secrete acid as they possess large number of parietal cells. Therefore, the probable risk of developing duodenal ulcer is more in men than in women. The parietal cells are acid secreting cells which secrete hydrochloric acid. On the otherhand, pepsin is secreted from chief cells. There are three main phases of gastric secretion, namely;

(i) Cephalic or neural phase
(ii) Gastric phase
(iii) Intestinal or hormonal phase.

In the cephalic phase, the gastric acid-pepsin secretion is stimulated at the sight, smell, taste or thought of delecious food, mediated through the vagus nerve (Kay 1953). In the gastric phase, acid pepsin is secreted as a result of direct stimulation of stomach by food materials. And in the intestinal phase, acid pepsin is secreted as a result of stimulation of acid-pepsin secreting areas of stomach by the hormone-gastrin. Here, gastrin is released from the lower part of the stomach. Any condition which can influence any of these three phases, can stimulate gastric acid pepsin secretion from parietal cells and in turn may cause of the duodenal ulcer.

(ii) Age

It is also very important to distinguish the age groups which are at risk of developing ulcer. A
study of 62 cases of gastric resection for duodenal ulcer has been presented by H.L. Skinner and R.D. Duncan in 1948. They found the highest occurrence of duodenal ulcer among those patients who were between the age group of 41 and 50 years, (48.38%). In a study of 250 patients in London, Kellock (1951) reported that the highest incidence of duodenal ulcer was between 41 and 45 years (21.60%). Jones in 1961 showed that the duodenal ulcer generally occurs more in people between 45 and 65 years than in people over 65 years of age.

In India, a series of 100 patients which include both gastric ulcer and duodenal ulcer showed that out of 100 patients 33 patients were between 31 and 40 years (33.00%) (Sharma, Mehta, 1962). One year later, Mehta (1963) again studied 155 patients in Salford Royal Hospital, India and showed that the highest frequency was between 46 and 85 years (35.85%). Another picture of high incidence of duodenal ulcer in between the age group 30 and 40 years was shown by Gupta, Roy, Rudra and Roy (1964) from the Calcutta hospital, India.

It is observed from different surveys that the duodenal ulcer can develop at any age group it occurs more often in young men and is rare in childhood and old age. Recently, Harding Rains
(1988) gave an idea that the secretion rate is lower in the old age and it may be a cause of lesser incidence of duodenal ulcers in old age.

(iii) Blood group

Duodenal ulcer is more common in individuals with blood group O and in those who fail to secrete blood antigens H, A or B in their gastric juice (Way 1983). A close association of duodenal ulcer with blood group is an interesting discovery of the 20th century. Aird, Rentall and Robert (1953) first demonstrated that duodenal ulcer subjects are more likely to belong to blood group O and this had been confirmed by Clarke and his co-workers (1955). They considered that blood group O substances offered less resistances against duodenal ulcer than the other blood group substances like A, B and AB. It seems possible that the ABO genes may some way modify the amount of hydrochloric acid which an individual can secrete.

The blood group substances are distinguished from each other by their specific antigenic properties. It is also difficult to find out the chemical nature of blood group substances of the human body. Many workers have attempted to isolate the blood group antigens from human erythrocytes but, these attempts have failed. Only
very few studies, in biochemical field, have been attempted so far and assumption has found that the blood group antigens are mucopolysaccharides, which form an important proportion of the mucus normally secreted by the gastrointestinal tract. The genetic control of the water soluble blood group substances in saliva and gastric juice has been the subject of much research, resulting in the discovery of five serologically distinct blood group substances (A, B, H, Le⁻ and Le⁺). These blood group substances are weakly alkaline in nature (King and Morgan 1947), and may lead to decrease acid secretion. Witebsky and Klendshoj (1940-41) have also tried to describe the isolation of B and O blood group substances from human gastric juice. But owing to lack of materials, detailed chemical explanation of specific substances was not possible. Humphries (1988- 'Duodenal ulcer' ed Clobanin) in his article said that duodenal ulcer patients with blood group O have a 30 percent increase in the incidence of duodenal ulcer disease, and if this is combined with a ABO non-secretor status, the risk of duodenal ulcer is increased to 2.5 times.

b. Environmental factors:

There is an interesting correlation between the duodenal ulcer and the environmental factors such as social class pattern, dietary habits, etc. There is also a close relationship with
the anxiety factor which interplays between mental condition and duodenal ulcer. Under the head line of environmental factor, we may include the following incidences such as (i) occupational incidence and social class pattern and (ii) others i.e. anxiety, dietary habits, smoking habits etc.

(i) Occupational incidences and social class pattern

Doll, in 1957, threw light in the relationship between the duodenal ulcer and the social class pattern. He showed that the occupation has surprisingly little bearing on the condition, high incidences have been found among foremen, while significantly low incidences occur among agricultural workers. He said that duodenal ulcer was more common in the professional group than the labour class. In 1957, Doll, Avery Jones and Buchalzsch reported that a high incidence of duodenal ulcer was found among doctors and executives. Agricultural workers were found to have a remarkably low incidence of duodenal ulcer. High mental exercise cause more acid secretion mediated through the vagus nerve and this is very much responsible for duodenal ulcer formation. The irregular food habits due to different occupations also may cause duodenal ulcer.

In India, the findings are quite contrary to the western workers where the patients mostly belong
to the poor class and are either cultivators or labourers. The observations of Somervell, Orr, Dogra (1940) and Sharma (1962) give similar results that the duodenal ulcer is almost entirely a disease of poor agriculturists and labouring classes. Harding Kains (1988) said that the effect of physical stress is hormonally transmitted to the stomach via the pituitary adrenocortical axis.

(ii) Others.

The emotional and psychological status which involves anxiety due to different condition like family disharmony, job-dissatisfaction, type of job, etc. affect the cephalic phase of gastric secretion (Jones 1961). Stimulation of vagus result in gastric hyper secretion and therefore, mental stress or anxiety may be a cause of duodenal ulcer. All clinicians agree that acute anxiety is a most significant factor for the complication in ulceration. The other factors increasing the incidences of ulcer diseases are diet, alcohol-intake, smoking, use of chillies, irritant drugs, etc. Many of these factors are difficult to study. There is no direct evidence that any type of diet including caffeinated beverages and alcohol are associated with an increased risk of duodenal ulcer. There is, however, an association between ulcer disease and alcoholic cirrhosis. Cigarette smokers and persons who use it frequently do have an increased incidence of ulcer disease (Humphris, 1988). It is also suggested that the duodenal ulcer

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is a disease characterised by an enlargement of several exocrine glands such as parietal cell system, salivary glands and pancreas, while only the enlargement of one gland of the stomach is related to ulcer symptoms. Salivary response to stimulation with citric acid is higher in ulcer patient (Andre 1972). Novis's report of 1973, shows that there is a significant co-relation between basal-acid output and number of cigarette smoked per day. Therefore, there is a possibility that cigarette smoking over a long period may be a cause of ulceration.
Definite mention of an ulcer in stomach was first made in the first century B.C. by Diocles and Carystos. Celsus, a resident of Rome, suggested the treatment of ulcer at about 20 A.D. In the second century, A.D. Galen discussed some of the symptoms of ulcer such as gastric haemorrhage and black stool. Aetius, in the sixth century A.D. wrote a comprehensive dissertation on ulceration of stomach. An article on the symptoms of ulcer of stomach in the seventh century by Paulus Aegineta. Avenzoar, an Arabian physician, wrote extensively about its treatment in the twelfth century A.D. Another article on its treatment was written by Averrhoes, an ancient Muslim physician.

Systematic study and its result seems to be originally described by Muratt in 1688. Several case histories with duodenal ulcer and gastric ulcer were reported in 1937 by Morgagni. The symptomatology about gastric ulcer and duodenal ulcer was described in the early nineteenth century. In 1842, Curling mentioned about the duodenal ulcers occurring after extensive burns. A report published in 1853, suggested that peptic ulcer was the result of pathologic changes in the blood vessels (Virchow 1853). Trier and Krauss (1865) made extensive studies on duodenal ulcer. Increasing number of
reports on duodenal ulcer began appearing in the literature. In 1879, Pean performed the first partial gastrectomy but the patient died. Later in 1881, Billroth performed a successful partial removal of stomach. In the same century, among others, Ewald, Einhorn, Boas and later Hurst, Chron, Sippy, Eusterman made extensive studies and contribution in the field of medical diagnosis and treatment of peptic ulcer as well as duodenal ulcer.

Several studies were carried out by many researchers on the relationship between different parameters and duodenal ulcer. In 1926, Naumann first showed the importance of psychic shock which leads to an increase in the number of peptic ulcer as well as duodenal ulcer cases during World War I. Steward and Winser (1942) noted a tremendous rise of peptic ulcer which included duodenal ulcer also during the period of intense air raid in England.

A report published in British Medical Journal by Kellock (1951) who investigated the childhood factors in duodenal ulcer. The points chosen for investigation were those factors in childhood which might be of importance in affecting duodenal ulcers. The factors were the size and composition of family, age at death of parents, illness in childhood, etc. But there is no real difference between the group and controls. The slightly greater number of only children among the
duodenal ulcer is not statistically significant. No difference is found either in the number of patients with duodenal ulcer who had lost a parent before the age of 15 or who were separated from the parents before the same age level. In case of age, the highest frequency of affection duodenal ulcer occurred in between the age group 41-45 years. In the same study, he also tried to find out the association between the duodenal ulcer and social class of father. The result showed that the duodenal ulcer was more common among the children whose fathers were of the lower social class than those of the upper ones.

A study in West Germany investigated by William in 1956 showed that alcohol was a cause of ulcer related to the duration of excessive drinking. In the same year, Cooper and Knight (1956) found no difference in acid secretion between a group of smoker duodenal ulcer patients and non smoker normal person.

The book "Clinical Gastroenterology " (Jones 1961) presented an elaborate and clear-cut idea on peptic ulcer. In this book, the author described that duodenal ulcer is related to the hyper secretion of acid and generally occurred more commonly in men (approximately 80%) and in the 35 and 65 years age than in above 65 years. Therefore, it might be said that the risk appeared low among the
young and old age group people. Another point of his investigation on the social class incidence was that duodenal ulcers were evenly distributed throughout the whole population but there is a noticable deficiency of ulcers in the professional groups and the striking excess among the labouring classes. He agreed that acute anxiety is a most significant factor indveloping duodenal ulcer.

In 1971, Debas, Cohen, Holubitsky and Harrison observed jointly that no significant overall change in the acid secretion in 12 volunteers who smoked three cigarettes over one hour period.

Similar type of study in the same year (1972) was presented by Andre and Joel who said that salivary secretion was dependant upon the local irritants such as smoking (one or more cigarette per day) and drinking (two or more cocktails per week).

Another interesting study by Lain and Org in 1976 on "Duodenal ulcer : early and late onset " was based on a hospital series of 1042 duodenal ulcer patients. They attempted to determine the relationship of duodenal ulcer with different parameters such as age, sex, blood group, family history , duration of illness, smoking habits, alcohol consumers, complaints, etc. There were 822
male and 320 female with a mean age of 42.2 years.

The association of blood group in relation to different diseases were given more interest than the relation with the other socio-behavioural habits by the large number of scientists and physicians. Alexander (1921) was perhaps the first to conclude that person with blood group B and AB were susceptible to carcinoma. In the same year, Buchanan and Higly (1921) reported the relationship between the peptic ulcer and blood group. Their study presented that the high incidence of ulcer patients belong to the blood group O (59%).

It was only after 1950s that a great interest emerged in problem concerning the association of various diseases with blood group. Aird (1954) demonstrated a very convincing and significant relationship of peptic ulcer with O and carcinoma with A blood group. In the next year, Clarke and his coworkers suggested that it seemed possible that the O gene might some way modify the amount of hydrochloric acid which an individual could secrete (1955).

In 1955, Koster showed that the relationship of acid secretion and ABO blood group is closely related. His report shows that the duodenal ulcer is more common belonging to O blood group (50.2%).
In 1956, Brown reported a highest incidence of group O in gastric ulcer cases than that found in duodenal ulcer.

Another observation by Jones (1961) concluded that the relative risk of duodenal ulcer is more among O as compared with A, B and AB blood group.

Grahame in 1961, also reported a higher incidence of blood group O cases when they were pre-pyloric and associated with duodenal ulcer.

A report was published in 1973 by Novis, Marks and their associates whose aims were to re-examine the relationship between gastric acid secretion and blood group. Their materials were 176 students free from gastric-intestinal disease and some of these students had a fairly high mean of acid output. Examining those students, they found that the high production of acid had an increased frequency of blood group O.

Hamphris, in 1981 said that duodenal ulcer patients with blood group O have a 30 percent increase in the incidence of duodenal ulcer disease. and if this is combined with an ABO non-secretor status, the risk of duodenal ulcer is increased 2.5 times.

Harding Rains in 1988 again reported that
the effect of physical stress is hormonally transmitted to the stomach via the pituitary adrenocortical axis.

In India

Peptic ulcer (gastric, duodenal, etc) is a common disease all over the world. Formerly, it was thought to be rare in Africa and Asia, but the improved hospital facilities, it is now known to be much more common than it was supposed. It is indeed a world wide disease. Plenty of literature on this subject are available from the Western countries. Although duodenal ulcer is a common condition, very little study is available in Indian literature in this regard. Of course the duodenal ulcer is briefly mentioned as a part of the wider coverage of peptic ulcer disease. In India, most of the series reported from the South, e.g. Bradfield (1927), Somervell (1927), Rao (1938), Dogra (1940), Menon (1940), etc. Somervell and Orr (1936) estimated that peptic ulcer was 600 times more common in Southern India than in the Northern part. But Dogra (1940) reported that the ratio was nearly 15:1 between Madras on the one hand (South India) and Punjab on the other (North India). In 1944, McCarrison estimated the incidence to be fifty eight times higher in the South India than the North India. Again Chatterjee (1958) had reported increasing number of peptic ulcer cases in the population from West Bengal.
In 1962, an elaborate discussion had been attempted by Sharma on 100 patients from Rajasthan. He investigated different aspects, such as age, sex, religion, occupation, symptomatology, complaints of the patients, dietary habits, including drinking and smoking. He found that the disease predominated in the males as the ratio in 13:1 and the age group ranges from 23 to 70 years. Maximum age period for duodenal ulcer was between 30 and 50 years. The ratio of population between Hindu and Muslim being 9:1 approximately. In his study, the patients belonged to the poor class and were either cultivators or labourers. He thought that the rising cost of living and difficulty in getting pure milk, ghee and curd now-a-days might be the main reasons. In the examination of correlation between duodenal ulcer and ABO blood group showed the high frequency among the O blood group person (40%).

A study based on age group and duodenal ulcer were reported by Mehta in 1963. In his study, he observed that the highest frequency was remained between 45 and 55 years in case of both male and female.

Nath, in the same year (1963) presented another report from Uttar Pradesh where he showed that the O blood group persons had greater chance to be affected by the duodenal ulcer.
A clinico-pathological study carried out by Gupta and his co-workers (1964) who were influenced by the problem of great magnitude of suffering duodenal ulcer. In this study, it was revealed that majority of the ulcer in both the sexes were in the age group between 30 and 40 years and more common among the males.

A valuable study has been shown by Verma in 1964. He shows the incidence of duodenal ulcer in different parts of India with relation to food which varies from 0.1% in Delhi (Malhotra 1964), in 5.7% in Trivandram (Nair 1961) among the hospital admission. The following map of India shows the incidences of duodenal ulcer (a percentage of hospital admission and indicating principal wheat growing areas). This map shows that the duodenal ulcer disease is more common in the rice growing areas than the wheat growing areas. The percentage of duodenal ulcer is significantly higher in the South India than the North.

Fig-4 Map of India showing incidence of duodenal ulcer (as percentage of hospital admission and indicating principal cereal growing areas - (Verma, R. A. 1969)
Fig 4: Map of India showing incidence of DUODENAL ULCER (As percentage of Hospital admission) and indicating principal cereal growing areas. (After VERMA 1969)
From the B.J. Medical College and Sesson General Hospital, Poona (1977), Vyavahare and Bhat found that the M:F ratio of duodenal ulcer patients being 19:1 which also proved the high occurrence among the male than female.

A ten years study was published by Yogiram and Chowdhary jointly in 1983 that chronic duodenal ulcer is a common disease in Andhra Pradesh and other Southern States of India. They conducted their study in Govt. General Hospital, Guntur, Andhra Pradesh during a 10 years period from 1968 to 1977. The M:F ratio was 7:1 and age ranged from 13 to 80 years. The most common complaints of those patients were pain and dyspepsia. The ABO blood groups of 2068 duodenal ulcer patients were determined and O blood group patients were found to be predominating (48.7%).

In the same year, Chakravartti and Chakravartti (1983) attempted to find out the probable association between ABO blood groups and peptic ulcer and said that the blood group O individuals were having more risk in suffering from duodenal ulcer.

In North-East India

In comparison to the other parts of India no published reports are available.
AIMS AND OBJECTIVES OF THE STUDY

As duodenal ulcer is quite common in India (Verma 1964), it has sufficient scope for study from both medical and anthropological point of view. Very few studies have been attempted in India to find out the association of duodenal ulcer with different types of genetic and environmental factors.

Studies of duodenal ulcer are mainly confined to the physicians who are much interested to find out the various phases of gastric secretion in different types of ulcers. Study on this subject in North East India, particularly in Assam is very much limited from the Anthropological point of view.

The main purpose of the study is to explore the probable association between different socio-genetic parameters and duodenal ulcer. As such, it has been attempted to study the incidence of duodenal ulcer among two populations, the Hindus and Muslims of the undivided Kamrup district of Assam i.e. the population variation and the association of blood groups with the duodenal ulcer. The present study attempts to find out how far the different socio-genetic parameters (such as age, marital status, educational status, birth order, residential pattern, religion, caste, community, occupation, working hour, occupational type, income, income per capita, family structure, dietary habits, smoking habits, alcoholic habits, blood group, etc. are close to suffering of duodenal ulcer.)
MATERIALS AND METHODS

Duodenal ulcer is a condition, which during the past 50 years increased into prominence (Robert 1964). Verma in 1964 reported that the duodenal ulcer was quite common in Southern and North-Eastern part of India. Assam with her heterogenous population has particularly a great health problem, i.e. 'gastric' problem, as it is colloquially called. Therefore, an attempt has been made to find out the probable association between the different socio-genetic parameters and duodenal ulcer.

The data for the present study were collected from Gauhati Medical College Hospital between August, 1985 and July, 1987.

There are three Medical Colleges in Assam. Two are in the Brahmaputra Valley viz. The Assam Medical College, Dibrugarh (established in 1947) and Gauhati Medical College, Guwahati (established in 1960) and one in the Barak Valley, the Silchar Medical College, Silchar (established in 1968).

Each of the Medical Colleges has its own hospital. The present study is confined to Gauhati Medical College Hospital. This two years study is again restricted among two sections of population i.e. the Assammmese Hindu and Assamese Muslim of the
district of undivided Kamrup. At present the Kamrup district is divided into three districts viz. Kamrup, Nalbari and Barpeta. There are hospitals in the headquarters of all these three districts (Kamrup, Nalbari and Barpeta). But except Gauhati Medical College Hospital, others do not have good facilities for the diagnosis of ulcer and its operation. Therefore, most of the cases are sent to the Gauhati Medical College Hospital by the physicians for their better treatment. Therefore, the present work is confined to the Gauhati Medical College Hospital.

The duodenal ulcer patients were mainly admitted to the surgical ward of this hospital. There are four units in the surgical ward viz. Unit I, Unit II, Unit III and Unit IV. Table 1 shows a picture of the number of patients who were affected by the different diseases including duodenal ulcer and admitted to these surgical units between August '85 and July '87.
Table - I

Numbers of patients admitted in different Surgical units:

<table>
<thead>
<tr>
<th>Units</th>
<th>M</th>
<th>F</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit I</td>
<td>2149</td>
<td>126</td>
<td>2,275</td>
</tr>
<tr>
<td>Unit II</td>
<td>1928</td>
<td>761</td>
<td>2,689</td>
</tr>
<tr>
<td>Unit III</td>
<td>2317</td>
<td>90</td>
<td>2,407</td>
</tr>
<tr>
<td>Unit IV</td>
<td>1845</td>
<td>705</td>
<td>2,550</td>
</tr>
<tr>
<td></td>
<td>8239</td>
<td>1682</td>
<td>9,921</td>
</tr>
</tbody>
</table>

Table 2 gives the total number of duodenal ulcer patients who were admitted to different Units of the Surgical ward. The total number of duodenal ulcer patients was 768. Out of these patients, 631 were male (82.16%) and 137 were female (17.83%). The male female ratio was approximately 5:1.
Table - 2

Number of patients (duodenal ulcer) admitted in the Surgical Ward.

<table>
<thead>
<tr>
<th>Units</th>
<th>M</th>
<th>F</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit I</td>
<td>191</td>
<td>30</td>
<td>221</td>
</tr>
<tr>
<td>Unit II</td>
<td>147</td>
<td>42</td>
<td>189</td>
</tr>
<tr>
<td>Unit III</td>
<td>127</td>
<td>29</td>
<td>156</td>
</tr>
<tr>
<td>Unit IV</td>
<td>166</td>
<td>36</td>
<td>202</td>
</tr>
</tbody>
</table>

631 137 768

I, however, collected a few general information like age, sex, religion, residential backgrounds, etc. from all 768 patients (631 male and 137 female). Out of these patients (768) for the purpose of this study, a detailed analysis of 450 patients (male 388 and female 62) has been made.

The first step of the study was to confirm the cases to be duodenal ulcer. All the cases were diagnosed by the physicians of the same hospital.

Data were collected by interview method. A very few cases, the patients who were unable to talk, data were recorded with the help of their attendents.
The blood collection is not allowed by the outsiders. Therefore, the blood groups of patients were recorded from the hospital records.

The family history of the patients were collected to know whether there was any affected member in his/her family with duodenal ulcer. But due to lack of clear knowledge about duodenal ulcer, the patients could not answer properly and therefore, this point was avoided in this study.

The data have been properly analysed in different tables and the following statistical computation are incorporated for the calculation of association of blood group and the duodenal ulcer.

In case of blood group, the statistical method used for the analysis of data is that recommended by Woolf (1954). This method helps to compare the frequencies of two characters in two populations (patients and control) and to assess the differences in those frequencies of the characters concerned.

Let \( P \) and \( p \) be the number in which two characters such as blood group \( O \) and blood group \( A \) are observed among patients suffering from duodenal ulcer and \( C \) and \( c \) the corresponding numbers among the control groups. Thus, the relative incidence is

\[
X = \frac{P/p}{C/c} = \frac{Pc}{pC}
\]
For the comparison O:A, this means

\[ x = \frac{\text{O patients} \times \text{A control}}{\text{A patients} \times \text{O control}} \]

When blood group O is more frequent in the patients group, then \( x > 1 \) (Woolf, 1954).

In all statistical computation, it is best to transfer \( x \) into its logarithm. This avoids difficulties due to asymmetry. In comparison of two different blood types (A:O) gives \( X = 2 \) say, comparison of (O:A) will give \( x = \frac{1}{2} \) but \( \log x \) will retain its numerical value, merely changing in sign. Moreover, the sampling variance of \( \log e^x \) is a very simple expression free of 'minus parameters'. It can be converted as \( y = \log e^x \). If \( V \) is the sampling variance of \( y \), then.

\[ V = \frac{1}{p} + \frac{1}{c} + \frac{1}{p} + \frac{1}{c} \]

and \( W \), the weight of \( y \), is of course \( \frac{1}{V} \), i.e.

\[ W = \frac{1}{\frac{1}{p} + \frac{1}{c} + \frac{1}{p} + \frac{1}{c}} \]

If the attack rate is same for both blood types, the expected value of \( Y \) will be zero. This is tested by \( \chi^2 \) will \( y^2 / V \) or \( wy^2 \) (Woolf 1954).
THE PEOPLE OF ASSAM.

The State of Assam between the latitude 28° 18' and 24° north and longitude 89° 4 and 94° 4 east, (area 78,528² km) is mainly composed of extensive plains of the river Brahmaputra which cover 18 districts. There is also a hill area divided into two districts of Karbi Anglong and North Cachar Hills (total area of Assam Hill is 15,222² km) and the small plains of the river Barak area divided into two administrative districts, namely, Cachar and Karimganj.

The Brahmaputra Valley is commonly divided into three regions namely Upper, Middle and Lower Assam.

Till 1963, Assam was not merely much bigger in size but also had a heterogeneous population including a large number of Hill tribals. The creation of the State of Nagaland in 1963, the State of Meghalaya in 1971 and the State of Mizoram (former Union Territory) in 1971 contributed towards lessening of diversity, number and siz of the hill tribal population of Assam.

Assam is surrounded by other administrative region, namely, Arunachal Pradesh in the North, Nagaland and Manipur in the East, Mizoram, Meghalaya.
and Tripura in the South and West Bengal in the West. According to 1971 Census Assam (1981 census is not published) had a total population of 14.6 million (projected figure of 1981 - 18.9 million) of which nearly 11% were tribes belonging to some 19 recognised groups. Assam is the least urbanized State in India with 9% of total population being classified as urban population. The rate of literacy is also rather low, being only 28.1% (1971) of the State's total population.

The present population of Assam can be classified into two broad categories viz. the tribals and the nontribals. The Rabhas, Boro or Bodos, Kachari, Karhis (Mikir), Tiwas (Lalung), Mishings (Miri), etc. are most prominent tribes in Assam who have their own dialects and migrated from Northern Burma and Central Asia at different intervals of time. They are most probably the autochthonous groups of Assam. The non-tribals such as the Caste-Hindu, Scheduled Caste and Muslims came later. Here, the caste-Hindu is recognized in two broad categories 'Bamun' or Brahmin and the 'Sudir' or non Brahmin. The Kayastha, Kalita, Baisya are included in Sudir group. Some of the important Scheduled Castes of Assam are Hira, Jol Keot, Kaibarta, Bania, Namasudra, etc. In the early part of 13th century the Muslim came to Assam. Muhammad Bin Bakhtiyar Khiliji, a Muslim general of King Kutubuddin came to this region.
first as an invader. Later, different Muslim invaders came to Assam but they were defeated seven times. In the middle of the 16th century, Turbak was again defeated by the Ahom king and some of the Muslim soldiers were captured as prisoner. The soldiers were given settlement in different parts of Assam. Their occupation (Working on brass metal) is still found among some of the Muslim group known as Marias (Das 1984).

In 13th century, another population known as 'Ahom' came from the Upper Burma. The 'Ahoms' are known as a branch of the Shan, the Sino-Tibetian Hillmen. They established their kingdom in Upper Assam and later, they conquered the whole Brahmaputra Valley. They named this region as 'Assam'. Before this name, 'Assam' was known as 'Kamrupa and its capital as "Pragjyotishpura" or the city of eastern light. The 'Ahom' gradually accepted Assamese language. They became Hindu in 16th and 17th century (Das 1984). At present, the Ahoms are recognised as other backward class (OBC) according to the Indian Constitution.

Most of the immigrants came from Bengal, Bihar, Uttar Pradesh, Rajasthan and other parts of India during the British period. Another important group of immigrants was the teagarden labourers who were brought from Bengal Bihar, Madhya Pradesh and
Orissa by the British tea-planters for employment. They came during the later part of the last century.

The evolution of the Assamese society thus has become a plural society through the process of conflicts, conciliation and convergence. Slowly, the composite culture was taking shape.

Religion:

A large section of about 71.04 percent of the people of Assam are Hindus (1971 census). The Muslims are placed in the second position (24.03 percent). The percentage of other religious groups, namely the Christian, Sikh, Buddhist and Jain are 4.46, 0.08, 0.30 and 0.09 respectively. In Upper Assam, very few Buddhist inhabit in small pockets. They are Khamyang, Alton, Tai-Phake, Turung, Duania etc.

Language:

The Assamese is the main language in this region. It is an Indo-Aryan language derived from Sanskrit. 60.88 percent of the total population of Assam speak Assamese language (1971).

Castes and Tribes:

In Hindu society, the caste system plays an
important role. It varies from region to region in India. The caste system is not practised rigidly in Assam like other parts of the country.

In Assam, the cast groups are divided into two broad categories namely the Brahmin and the non-Brahmin. Amongst the Brahmin, there are three sub-castes - Gosains, Priest Brahmin and Daibagya or Ganak. The non-Brahmins include a variety of castes and sub-castes. The 'Kayastha' ranks the highest among the non-Brahmin castes and inhabits mainly in lower Assam. The traditional Kshatriya or a warrior people, of the rest of India is represented by the 'Kalita' in this region. Their position is next to the Kayastha. Changing their traditional occupation, they took agriculture as their new occupation. The Kalitas are the most populous caste of Assam. The 'Vaishyas' of Assam is not comparable to the commercial community of North India. Another caste known as 'Keot' has two sub-divisions, namely 'Haloi Keot' and 'Jaloi Keot'. There are also few functional sub-castes of the Keot like Mali Keot, Teli Keot, etc.

In Assam, the following population are identified as Scheduled Castes according to Indian Constitution. They are - Bansphore, Mali, Banias, Dhobi, Hira, Jal Keot, Kaibarta, Namasudras, Sutradya, etc.
In Assam, the following tribes are living in different parts of the State. Those are Barmans in Cachar, Boro, Boro-Kachari, Deuri, Hojai, Kachari, Sonowal, Tiwa, Mech, Mishing, Rabha, Karbi. Almost all over the State, the Kacharis are distributed. They are divided into different sub-groups like Dimasa (a hill people inhabited mostly in North Cachar district), the Sonowal, Thengal and Jharma are distributed in Upper Assam. They are referred as Boro-Kachari or Boro in lower Assam. The Rabhas are mostly concentrated in lower Assam. The Deuris live in some parts of Upper Assam, the Tiwas and Hojais in Middle Assam and Mechs mostly live in lower Assam.

A few settlement are found in Assam, though their homeland is Garo Hills of Meghalaya. In this way, a few Khasi and Naga tribes are also living in the border of Assam. The Kuki and Hmars live in the southern hilly areas of the State.

The high caste population of present Assam claim their descent from the earliest Aryan settlers i.e. the Caucasoid group and the Kaibarta (Scheduled Case) are believed to be the descendant of the Dravidians. All tribes of Assam are of Mongoloid origin. Some other population also inhabit in different parts of Assam, such as Ahom, Chutias, Morans and the small Buddhist population. Though they are of Mongoloid origin, they are not included in tribes.
Diet:

Rice is the staple food crop of Assam. The major part of the land of the villages is devoted to growing rice. There are three different types of rice such as Sali, Bao, Ahu. Sali is transplanted on low lying land. The Bao rice is usually sown in deep water. Ahu is grown in high lands. A variety of rice called Boka Dhan is consumed uncooked. It is soaked in water until it becomes soft. It is taken with curd and molasses, a favourite snack on festival occasions among the Assamese village people. Besides rice, fish, meat, fruits and vegetables are also the chief articles of food. Various kind of fruits tree such as jack-fruit, mango, walnut, jujube, etc. are grown over fields. The milk of cow and buffalo, curd and ghee are also favourite food. Different dishes are prepared with vegetable, pulses, fish and meat. Spices, such as ginger, cumin, long pepper, camphor, mustard are used in these preparation. Common eligible herbs are spinach lai, cuka, lopha, dheka (a kind of fern) and another item called 'Kharicha' prepared from the bamboo-shoots, and so forth. Meat and fish are the common diet. The Assamese people eat the flesh of ducks, pigeons, tortoise, goats, deers, wild boars, etc.

As the study is confined to undivided Kamrup district only, a brief discussion is given below:
The district of undivided Kamrup lies between latitudes 25° 43' and 26° 43' North and longitude 90° 39' and 92° 11' East, which covers an area of 9,863 square kilometers. The district is surrounded by Bhutan in the North, Darrang and Nagaon districts of Assam, in the East, the State of Meghalaya in the South, and Goalpara district of Assam in the West.

Kamrup is one of the most densely populated districts in the Brahmaputra valley with 289 persons per square kilometer. According to the 1971 census, the total population of this district is 2,854,183 of which 1,510,149 are males and 1,344,034 are females. The population distribution in three sub-divisions (now called district) of Kamrup is given below:

<table>
<thead>
<tr>
<th>District</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barpeta</td>
<td>508,184</td>
<td>463,553</td>
<td>971,737</td>
</tr>
<tr>
<td>Nalbari</td>
<td>363,891</td>
<td>335,923</td>
<td>699,814</td>
</tr>
<tr>
<td>Kamrup</td>
<td>638,074</td>
<td>544,558</td>
<td>1,182,632</td>
</tr>
</tbody>
</table>

(1971 census)

There are 17 towns in this district and all these towns have developed. The administrative centres are situated there and better public-
utility Services are available in these towns. Out of these 17 towns, Guwahati is the only Class H-2 city. There is no town in the district with population of more than 30 thousand.

The rural-urban difference of this district shown below:

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>1,315,628</td>
<td>1,203,400</td>
<td>2,519,028</td>
</tr>
<tr>
<td>Urban</td>
<td>194,521</td>
<td>140,634</td>
<td>335,155</td>
</tr>
<tr>
<td>Total</td>
<td>1,510,149</td>
<td>1,344,334</td>
<td>2,854,183</td>
</tr>
</tbody>
</table>

(1971 census)

In this district, two dominant religious communities namely, the Hindus and the Muslims. But there are sizable number of followers of Christianity, Jainism, Sikhism, Buddhism. There are 1,996,640 Hindus (1,061,799 males and 934,841 females according to 1971 census). The Muslims are the next predominating group with 825,657 individuals (431,482 males and 394,175 females). The Muslims constitute 28.93 percent of the total population in the district of Kamrup.

The Brahmin, Kalita, Kayastha, Vaishya, different Scheduled Caste like Kaibarta, Hira,
Banias, Namassudra, Mali, Malakar, etc. are living in different parts of this district. Besides the caste group, some tribal group are also found.

Assamese is the most predonating language of this district. Out of the total population of 2,854,183 in this district, 21,88,505 persons (11,49,304 males and 10,39,202 females) speak Assamese (1971). 3,52,210 (184,853 males and 167,357 females) speak Bengali as their mother tongue. There are 77,998 persons (53,186 males and 24,812 females) of the total population who speak Hindi.

Data on languages spoken by various indigenous groups like Bodo-Kachari, Rabha, Garo, etc. of this district are not yet available for 1971 census. From 1961 census, it is found that there are 77,724 speakers of Bodo/Boro and 7213 speakers of Kacharis, including Sonowals. Other groups belonging to different linguistic groups in this district are Garo (10,759), Mikir or Karbi (6,952), Santhali (6,977) and Nepali (15,680). Though there are 43,603 Rabha people in this district, only 1089 individuals use Rabha as their mother tongue. The remaining persons use Assamese.