Review of Literature:
'Irritable bowel syndrome' is the term used to embrace a group of colonic disturbances in which there may be pain of colonic origin, disordered bowel habit, with either diarrhea or constipation, and sometimes the passage of mucus per rectum, in the absence of any demonstrable organic cause. Various names like spastic colon syndrome, dys-synergia of the colon, colonic neurosis, nervous diarrhea, emotional diarrhea, functional diarrhea, functional enterocolonopathy, spastic colitis and membranous colitis have been given to the condition depending on the particular presenting feature of the disorder which most appealed to the writer as of cardinal significance.

De Costa (1871) used the term 'membranous enteritis' as he was struck by outstanding symptoms of the passage of mucus per rectum. According to him, "the disease is characterized by attacks of abdominal pain, followed by the discharge of what looks like skins or membranes, sometimes coming off in the shape of moulds or long tubes".

Hale-White (1905) used the term 'membranous colitis' when patients passed sheets of mucus per rectum, though his criterion of diagnosis was not very precise.
Ryle (1928) gave an excellent description of 90 cases of functional disorder of the colon under the term 'chronic spasmodic affections of the colon'. Thirty nine of these suffered from spastic colon, with pain abdomen as the dominant feature and without an excess of mucus in the stools. The remaining eleven patients suffered from what he described as 'muco-membranous colic', the only difference from the spastic colon group being the passage of mucus per rectum.

Bockus, Bank and Wilkinson (1926) employed the phrase 'neurogenic mucus colitis', because in great majority of their patients some sort of psychological factors appeared to play a part in the causation of the disorder. The criteria for diagnosis were a history of the passage of a characteristic type of mucus, a distinctive sigmoidoscopic picture consisting of "a glistening, glairy, or shining lustrous appearance" of mucus of the rectum or visible sigmoid colon. Such sigmoidoscopic findings were present in forty six of the cases. In spite of their own criteria, only nine cases (18%) of the fifty patients described by them suffered from the passage of mucus per rectum.
Thirty-two out of the fifty cases were females and eighteen males. The age varied from fourteen to fifty-three years with an average of thirty-six years. Twelve patients (24%) had undergone some sort of abdominal operation. Abdominal pain present in nineteen cases (38%), was usually colicky in nature and was associated with diarrhea and passage of mucus. Twenty cases were markedly constipated, and fourteen had alternating constipation and diarrhea. The bowel function was normal in only four patients.

Springge (1931) described 242 cases of 'functional disorders of the colon'. Hundred and fifty-seven were classified to have mucus colitis and eighty-five were described to suffer from irritable colon, spasm and nervous diarrhea.

White and Jones (1940) described 60 cases of mucus colitis with special attention to the psychological factors in the etiology of the disorder. All their patients suffered from abdominal pain, so that they would represent the condition which others have called spastic colon. They were able to observe the close relationship between the emotional factors and the onset as well as severity of the symptoms.
Reiser, Zion and Rockus (1996) described sixty-nine cases of 'functional diarrhoea'. The criteria for the diagnosis were the absence of objective evidence of organic or constitutional disease, an absence of nutritional deficiency, the presence of emotional disorders or trauma and signs of irritability and often hypermotility of the small intestine as demonstrated by a barium meal study. Possible aetiological factors were emotional disturbances (69%), post-surgical diarrhoea (5%), post-infectious diarrhoea (10%), post-antibiotic diarrhoea (5%) and gastrointestinal allergy (3%). No aetiological factors could be determined in 12% of the cases studied. The age range was from 20 to 79 years. The median age was 38 years. There were twice as many women as men. The duration of the symptoms when first studied varied from 4 weeks to 25 years. Symptoms had been present in over half of the patients for 3 years or longer. Eight patients (11%) had continuous diarrhoea (many weeks to several years). The other 61 (89%) had intermittent exacerbations of diarrhoea at intervals occurring as long as 2 to 3 times a year or as frequently as every few days. The number of bowel movements per day differed from
patient to patient and from day to day in the same patient. Some patients had as many as 18 to 20 motions per day.

Constipation was present between exacerbations of diarrhoea in 25 patients (55%) while diarrhoea alone occurred in 44 (65%). Sixty-three patients (91%) had abdominal pain, the most common location of the pain was in the lower abdomen. Other sites of pain were the epigastrium and periumbilical region. The pain was 'crampy' in 44 instances (70%), while in 10 patients (16%), it was a constant ache. In 33 patients, lower abdominal cramping pains and a strong defecatory urge preceded defaecation. Usually the bowel movement temporarily relieved the discomfort. In 2 patients, the onset of pain occurred after a bowel movement. An urgent desire to defaecate during or immediately after eating was present in 25 patients.

Other symptoms of disturbed gastro-intestinal function included nausea, vomiting and aerophagia. Mucous discharge was reported by 50 percent of the patients. No significant abnormalities were noted on physical examination. Roent-gen signs of an irritable colon included hypertonicity, zonal areas of spasm, increased and irregular haustra, prediverticulosis and narrowing and loss of haustra of left colon. Irritable colonic mucosal patterns
included excessive cramation and string sign due to excessive secretion of mucus. Roentgen signs of an irritable colon were present in 40 (67%) cases.

Kiran and Palmer (1958) mentioned that "irritable colon" probably is the most common illness of the gastro-intestinal tract, accounting for 50 to 75% of all patients with digestive complaints. Women predominate in the ratio of at least 3 to 2. It occurs in people with all types of socio-economic status and professions. Sustained anxiety or nervous tension is a predisposing factor to the development of the disease in some individuals.

Chaudhary & Truslova (1962) gave an excellent description of 130 cases. The main age group was distributed between 20 to 50 years, only 4 patients were below 20 years of age. The condition was twice as common in women as in men. Many of these patients had suffered from symptoms for a number of years, one quarter of these had a history of more than ten years duration. They analysed the clinical features under two groups, spastic colon group and the painless diarrhoea group. All the patients under spastic colon group had pain of colonic origin. The bowel habit
was variable, sometimes associated with periodic constipation or diarrhoea or with both these symptoms alternating. The patients who were included in painless diarrhoea group had the diarrhoea as the sole manifestation of colonic disorder. The patients with spastic colon were considerably more numerous than those with painless diarrhoea (37 men and 69 women compared with 7 men and 17 women). In the majority of the cases, pain was located over one or more parts of the colon, but 31 patients complained solely of low abdominal pain or discomfort. The character of the pain was variable. It was most commonly a colicky pain coming on in bouts in 45 patients. In 37 cases, it was a continuous pain and 19 had continuous dull ache with attacks of colic superimposed. In rather more than half of the patients (56 out of 106), the act of defecation was followed by temporary relief of pain. Bowel action in the spastic colon group was extremely variable. It was normal in 15 patients, constipation either usual or intermittent in 59; and alternating constipation and diarrhoea in 21 patients out of 106 cases. In painless diarrhoea group, a minority (seven out of 24) had suffered from continuous diarrhoea from the onset of symptoms until they attended hospital, while the remainder had periods of diarrhoea, with normal bowel action between them. Of the 130 patients, 29 (22%) had been regular
users of purgatives while another 10 (85%) used purgatives occasionally. In 34 patients, the symptoms dated from an attack of infective dysentery, either proven or strongly presumptive. One or more of the psychological factors were present in four out of five patients, being present in 77% of patients studied under spastic colon group and in 87.5% of patients of painless diarrhoea group. Psychological factors were incriminated more often in the women than in the men. It was found that patients with the irritable colon syndrome invariably had a normal mucosa on histologic examination. The colonic mucosa as seen on sigmoidoscopy was frequently flushed and secreting mucus more heavily than usual. Nevertheless it did not show any evidence of true inflammation. Barium examination in mild cases frequently showed a reduced size of colonic lumen and a decided increase above the normal number of so-called "haustral marking". Descending and sigmoid colon was the region which most conspicuously showed increased number of haustrations. In more severe cases, in addition there were one or more segments of the contracted colon seen. The patients who secreted excessive mucus had characteristic patterns in post-evacuation radiographs.
Haffemon and Lippincott (1966) and Dorfman (1967) have suggested that spastic colon may be symptom of depression & psychotic depression may be masked by irritable colon syndrome.

Pimparkar, (1970) presented a study of 210 patients. The condition was seen three times more commonly in males. The incidence was also significantly more in married persons. Nearly 75% of the patients were between the ages 20 and 40. 60% patients had abdominal pain, and 29% patients complained of fullness in abdomen especially post-prandial. 19.2% patients suffered from constipation while 46% passed mucus in stools. 20% patients had features of insomnia alongwith. Most of the patients (203 out of 210) complained of discomfort in the abdomen, colicky type in 93 (47%), continuous 47 (23%), sharp biting in 24 (11%) & vague pain or fullness in 39 (19%). Pain was localised in upper abdomen in 21, in lower abdomen in 47, in epigastrum in 34, in periumbilical region in 70 & in whole of the abdomen in 31 patients. There was tenderness over left colon in 63 (43.44%), over right colon in 23 (15.65%), and in epigastrium in 13 (8.97) patients. There was tenderness all over the abdomen in 7 (4.02) cases. The tenderness was usually superficial. There was no weight loss in 118
cases out of 210. Only 6 patients had a weight loss of more than 20 pounds. Nearly two-thirds of the patients falling in upper and middle income group had their duration of symptoms for more than 3 years, whereas two-thirds of the patients who belonged to lower income group had duration of symptoms less than 3 years. There were only six patients who showed some abnormality on barium enema examinations. These were mostly restricted to either reduced distensibility, loss of haustrations or fuzzy mucosal appearance. There were 24 patients in whom the colon was reported to show somewhat increased spasticity but in none the area of spasticity was either localised or persistent. On sigmoidoscopic examination, no mucosal lesion was seen in any of the patients. The most common finding was that of spasm particularly that of rectosigmoid area. This spasm was temporary and could be overcome easily with blowing in air or by reassurance. In none of these patients, did the mucosa show any ulceration, easy bleeding, polyposis or pseudopolyposis. The sigmoidoscopic swab examination in all patients was negative for any parasitic infestation or any mucopurulent exudation. Previous history of dysentery, helminthic infestation, enteric fever and jaundice were the most common findings. The genesis and recurrences in these patients were related to emotional upsets, in 90% of patients. Financial worries,
business or career difficulties and marital problems were the most common precipitating factors for these recurrences. Intolerance to spices and chillies, pulses and milk was most common.

Hislop (1971) reported 67 patients of irritable colon syndrome in whom psychological factors associated with the genesis of the disease were explored in detail. The series comprised 47 females and 20 males, a sex ratio of 2:4:1. The disorder had been present less than six months in 19 patients and for more than 2 years in 38, 22 of whom reported symptoms exceeding five years. Sixty-four patients experienced pain in varied intensity over the distribution of the colon. Fifty-two patients had upper abdominal pain while two had central pain and 10 had pain only in lower abdomen. Upper abdominal pain was usually continuous but lower abdominal pain was generally noted to be colicky. Nocturnal pain occurred in 32 patients. In 31 patients, pain occurred 10 to 30 minutes after food. Thirty-four persons were relieved of pain after defaecation or the passage of flatus and in 10 others, the pain initiated an urge to stool. Pain was often exacerbated with increasing constipation. Purgation tended to aggravate the pain. Twenty nine patients had constipation, six had alternating
bouts of diarrhoea and constipation, and twenty-four had diarrhoea which was either continuous or occurred in bouts. Patients often experienced a characteristic early morning exacerbation of diarrhoea. Post-parietal urgency of defaecation was frequently described. Eight patients denied any abnormality in bowel habit. Disharmony between husband and wife or problems of relationships between the patient and other close relatives were found to occur in 26 patients. Thirteen patients were divorced or separated. Twelve patients considered economic difficulties or occupational tension to represent significant stress in their lives. Twenty-eight patients described an emotionally disturbed childhood. Concomitant disturbances of an affective disorder occurred with greater frequency in females than in males. Depression was reported by the majority of females (41 patients) but was present in only eight males. Fifteen patients (2 males and 13 females) were judged to be suicidal. Fatigue was the commonest symptom reported and was prominent in 44 females and 16 males. Insomnia characteristically of the early morning awakening type, occurred in 34 patients. Anxiety symptoms consisting of palpitations, dizziness, tremor or sweating were noted by 46 patients. An acute episode of psychological stress occurred before the onset of symptoms in 34 patients.
Eeler et al (1979) studied the levels of anxiety in colonic disorders. They concluded that patients with the irritable-colon syndrome who had predominantly diarrhoea were significantly more anxious and more neurotic than the control population of general medical patients, as measured by the Institute for personality and ability testing (IPAT) anxiety scale questionnaire. Females scored higher for anxiety than males. The mean anxiety score in patients with diarrhoea-predominant form of the syndrome was significantly higher than that in patients with the other form. Both groups of patients with irritable colon syndrome were significantly more introverted, as derived from testing with the Eysenck personality inventory (EPI). They also showed that the neuroticism score was significantly higher in patients with diarrhoea-predominant form as compared to those with the pain-predominant form.

Palmer et al (1974) measured aspects of personality, psychoneurotic characteristics in forty-one patients of the irritable colon syndrome and compared them with a matched group of patients suffering from psychoneurotic disorders. Each patient had to complete the Eysenck personality inventory form (EPI), (Eysenck and Eysenck, 1964) and the Middlesex Hospital questionnaire (MHO) (Crown and Crisp, 1966)
administered in random order. The CPI is a measure of personality providing scores on two dimensions termed neuroticism and extraversion/introversion. The MMPI is a brief standardised self-rating inventory of psychoneurotic symptoms. They concluded that patients who were suffering from the irritable bowel syndrome had a moderate degree of psychoneurotic disturbance in the form of both neurotic personality structure and the presence of psychoneurotic symptoms. They suggested from the conclusions of the study that neurotic disorder may be a more pervasive characteristic of the irritable bowel syndrome than the bowel symptoms, being unrelated to the chronicity of the latter symptoms or their immediate intensity.

Drossman (1978), stressed upon the role of stress factors in the initiation and aggravation of bowel symptoms. He put forth evidences that acute stress factors may cause bowel changes in healthy persons. The range of factors considered was not specific and included most of the anxieties and fears that all people have. No specific personality profile, psychiatric illness, or set of stress factors could be conclusively shown to relate to the syndrome. During the study, two separate symptom patterns were observed.
that seemed to reflect the patient's mood state. In those patients with a clinical history of abdominal pain and constipation (spastic constipation), increased amplitude and frequency of sigmoid contractions were noted at the time the patient appeared angry. These patients were observed to be tense, and seemed determined to solve their problems. The spastic contractions led to constipation by "holding back" the fecal matter in the distal colon. In contrast, those patients who gave a history of painless diarrhoea were noted to have more hypotonic sigmoid pressure during stress, the tone of which could be abolished when they showed feelings of hopelessness and wept. The decreased pressures in the rectosigmoid caused a gradient from proximal to distal colon. This led to more rapid colonic transport and diarrhoea. These patients were assessed to be more passive and soft spoken, were frequently anxious and maintained an underlying sense of personal inadequacy in dealing with problems. They reacted to stress by "giving up". These two types of symptom patterns could coexist in the same patient. The presence of constipation or diarrhoea may be the unconscious mode of expressing one's current mood states.

Abdominal pain occurring more than six times a year was reported by 62 persons. There appeared to be two pain syndromes. In 41 subjects, the pain was relieved by defaecation, an established characteristic of the spastic type of irritable bowel syndrome. Therefore, these 41 patients were classified in the spastic colon group. The remaining 21 subjects with pain were called the non-colonic pain to be below the navel and to be relieved with passage of flatus. It was also more likely to be associated with increased frequency of defaecation and with looser stools. In contrast, pain in the non-colonic pain group usually occurred at or above the navel and features of ulcer-like dyspepsia such as relief with food and nocturnal occurrence were numerically but not significantly greater. Symptoms of colonic dysfunction were frequent in the spastic colon group compared with the pain-free individuals, they more commonly admitted to have passed mucus, a feeling of incomplete evacuation after defaecation, urgency, distension, loose or runny stools and straining. In contrast, there was no increased frequency of colon symptoms in the non-colonic pain group, except for straining at stool. Using loose consistency on more than one quarter of occasions as the criterion, they identified 14 people with diarrhoea.
of whom 11 had no pain. This diarrhoea group had none of the six features of colon dysfunction characteristic of the spastic type of IBS. Significant constipation, as defined by frequent straining at stool, was present in 10.3% of their subjects. Some of these also had pain, usually of the spastic colon group, but 6% had painless constipation. Unlike painless diarrhoea, painless constipation seems to have many characteristics of the spastic type of IBS.

Macdonald & Gouchier (1980) presented a medical and psychiatric study of non-organic gastrointestinal illness. 100 patients attending the gastro-enterology clinic were studied, out of them 50 were men and 50 women. Sixty-nine patients were married and 22 lived alone. Mean age was 45.91 years. For analysis, the medical diagnoses were grouped as follows: non-organic gastrointestinal illness eg. Irritable colon syndrome, (32 patients); non-organic non-gastrointestinal illness eg. hypertension, myocardial infarction (20 patients).

In non-organic gastrointestinal group, 17 out of 32 patients suffered from psychiatric disorders viz. 4 from depressive psychosis, 3 from depressive neurosis, 6 from anxiety neurosis, 1 from hysterical neurosis, 1 from
bereavement reaction and 1 from alcohol addiction. Out of 95 persons included in organic gastrointestinal illness, only 7 had psychiatric disorders viz. 2 had depressive psychosis and 5 suffered from anxiety neurosis. For the two gastro-intestinal illness groups, the difference in the incidence of psychiatric illness was statistically significant. High 'somatic symptoms' scores identified 12 of the 17 non-organic gastro-intestinal group as against seven of the remainder 25 patients. High 'obsessions and compulsions' scores identified eight of the 17 non-organic gastro-intestinal group as against 3 of the remaining 25 patients. High 'Fatigue' scores identified 16 of the 26 patients in the non-organic group as against three of the 18 patients in the organic group. Three of the seven patients with depressive psychosis used laxatives several times weekly compared with only two of the other 33 psychiatric patients. This could be expected as constipation is a common symptom in depressive psychosis.

The basic pathophysiologic abnormality in the irritable bowel syndrome (IBS) is an alteration in intestinal motility. The most consistent changes in colonic
motility in patients with IBS are those first described by Almy in 1947 after a series of classical investigations. It was demonstrated that those patients with the spastic colon variant showed marked increase in motility while the patients with the painless-diarrhoea variant had markedly decreased sigmoid motility.

Chaudhary and Truelove (1962) first demonstrated a significant increase in sigmoid motility in both spastic colon and painless-diarrhoea variants after parenteral prostigmine. This was later on confirmed by Wangel (1965), Misiewicz (1966) and Champion (1973).

Powell (1977) also stressed upon that the irritable bowel syndrome is the result of altered intestinal motor function. According to him, the cramping abdominal pain coincides with either small bowel or colonic hypermotility as measured with balloon open-tip catheters. These studies indicated that the abdominal pain can be of small intestinal as well as large intestinal origin, thus justifying use of the term "irritable bowel syndrome" as opposed to "irritable colon syndrome". Another abnormality demonstrated was an exaggerated response to the hormone, Cholecystokinin. In patients with irritable bowel disease,
particularly those who experience significant abdominal pain with meals, parenteral cholecystokinin induces colonic hypermotility which correlates with their symptoms. Even patients with the hypomotility of the colon associated with painless diarrhea may have a significant increase in colonic contractions with meals and this may be attributable to circulating cholecystokinin.

Flynn (1979) have found lower concentrations of the deoxycholic acid-secondary bile acid, in the feces of patients with IBS than in normals. The same workers have shown that deoxycholic acid causes increased colonic motility in normals as well as in IBS patients, but at lower concentrations in the latter. These findings suggest that deoxycholic acid is more readily absorbed by the colon in IBS patients, and therefore has greater exposure to the tissues of the colon wall where its detergent properties may interfere with neuromuscular activity.

Many gastrointestinal hormones are now known to have effects on motility and it is tempting to suggest that IBS may be related to abnormalities in production of or sensitivity to one or more of these hormones. Ohl (1980)
found that basal serum motilin was higher in IBS patients than in normals. Motilin is a hormone arising in the jejunal mucosa which influences the motor activity from the oesophagus to the terminal ileum. Its production is inhibited by feeding.

Latimer et al. (1981) presented a comparative study of colonic motor activity of normal subjects, psychoneurotic patients and patients with irritable bowel syndrome. Total 41 patients were taken up. Out of those, 16 were suffering from irritable bowel syndrome, 8 had psychoneurotic disorders and 17 persons were normal. Out of 16 patients of the IBS group, 3 had anxiety neurosis, 5 had primary effective disorder, 4 patients had some undiagnosed psychiatric illness. The IBS group had a greater number and duration of contractions at the proximal recording site than the normal group, but there was no difference among groups at the distal site. The means for the three groups at both sites fell in the same order as the psychometric inventory results, i.e., IBS > psychoneurotic > normal.

Neligan et al. (1982) postulated a luminal spasmogen as the cause of the irritable bowel syndrome. Such a
substance could be diluted or absorbed by a bulking agent such as bran, explaining the beneficial effect of bran and other sources of vegetable fiber on the symptoms of IBS.