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RESEARCH ARTICLE

ROLE OF OPEN SURGICAL DRAINAGE OR ASPIRATION IN MANAGEMENT OF AMOEBIC LIVER ABSCESS

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Abstract

Background: Since Hippocrates' time, liver abscesses have been recognised. Apart from postoperative care, advancements in diagnostic and therapeutic methods have greatly lowered the high mortality rate. The present study aimed to establish the role of open surgical drainage or aspiration in management of amoebic liver abscess.
Methodology: The present prospective observational study involved 30 patients aged over 18 years of both sexes who were hospitalised to the department of general surgery with symptoms consistent with liver abscess and were confirmed with amoebic liver abscess. Following enrollment, a complete clinico-medical and admission history, as well as a thorough physical examination, were obtained. Routine serological testing in addition to abdominal and pelvic ultrasonography are performed. Additional CECT abdominal procedures were conducted.
Results: Out of 30 enrolled patients, 70.00% were male, and 30.00% were female. Out of the 30 cases in this study, 5 patients who had percutaneous aspiration had many minor abscesses, and one patient with a solitary abscess required open surgery due to recurring liver abscess. Under antibiotic coverage, the majority of patients required USG-guided percutaneous aspiration or pigtail catheter drainage.
Conclusion: Surgical drainage or aspiration are both equally effective in treating patients with amoebic liver abscesses.

Introduction:-

Amoebiasis is a relatively prevalent disease that is also a significant cause of morbidity and mortality. An estimated roughly 100,000 individuals die each year from amoebic colitis and amoebic liver abscess [1]. Amoebiasis is caused by the protozoan parasite Entamoeba histolytica, which is prevalent in a wide variety of locations throughout the world. Trophozoites of the parasite Entamoeba Histolytica infect liver tissue, resulting in an abscess owing to necrosis. The active (trophozoite) stage is found exclusively in the host and fresh loose faeces; cysts can be found outside the host in water, soil, and food, particularly under moist environments. Cysts are easily killed by hot and freezing conditions and live outside the host for just a few months. [2]

The parasite is isolated from the liver lesion or faeces, and its type is confirmed by microscopy to diagnose liver abscess. Recent years have seen the development of sensitive and precise diagnostic methods for the diagnosis of

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intestinal Amoebiasis. These stool sample assays distinguish the genuine pathogen E. histolytica from the identical-appearing Entamoeba dispar. They use enzyme immunoassay (EIA) and polymerase chain reaction (PCR) to detect parasite antigen and DNA. [3,4] Untreated hepatic abscesses almost always result in death due to complications such as sepsis, empyema, peritonitis caused by rupture into the pleural or peritoneal regions, and retroperitoneal extension. Medical therapy of a hepatic abscess should be combined with percutaneous or surgical drainage.

Nowadays, with advancements in interventional radiology and modern radiographic studies, liver abscesses can be easily diagnosed and treated. Thus, due to advancements in treatment procedures, the death rate has decreased in recent years. Even though the sickness is easily treatable, if left untreated, the fatality rate is extremely high. With the advancement of various diagnostic procedures for liver abscesses, treatment also has advanced. There was a need for progress of the treatment because the surgical intervention was associated with increased rates of morbidity and mortality. Thus, general surgeons switched away from open surgical intervention and toward percutaneous drainage along with antimicrobial therapy. Percutaneous drainage in conjunction with antibiotic therapy has become the standard of care for most liver abscesses. [5]

Percutaneous drainage (needle aspiration and catheter drainage) has improved antibiotic response, shortened hospital stay, and lower overall treatment costs. Though this minimally invasive technique, it is connected with various risk factors such as bleeding, secondary infection, and catheter in situ pain. As a result, it becomes critical to ascertain the potential role of surgical and percutaneous intervention in the treatment of liver abscesses. The purpose of this study is to ascertain the prevalence of various clinical characteristics associated with liver abscesses and to compare the outcomes of patients treated with percutaneous drainage with open surgical drainage in terms of hospital stay, outcome, and complications.

Material And Method:-

The present Prospective observational study enrolled a total of 30 patients aged over 18 years of both sexes, admitted under the department of general surgery with symptoms of liver abscess and diagnosed to have an amoebic liver abscess. All enrolled patients were informed in full about the study's procedures, which were documented in the Patient Information Sheet and Informed Consent Form.

Following enrollment, a complete medical and entrance history, as well as a thorough physical examination, were obtained. On admission, demographic data and clinical presentation will be collected to aid in the identification of liver abscess signs and symptoms, co-morbidities, and chief complaints. For comparable concerns, a familyhistory was elicited.

The clinical presentation was assessed in terms of the location, duration, and kind of discomfort, as well as its link with vomiting, nausea, changes in bowel habits, meals, fever, weight loss, rectal bleeding, loss of appetite, hematuria, and other urinary complaints. The history contained references to previous incidences and co-morbidities. For comparable concerns, a family history was elicited. The abdomen was clinically examined to determine the precise location of the pain, the presence of palpable lumps, and the presence of any organomegaly.

Complete hemograms, alkaline phosphatase levels, transaminase levels, albumin levels, ESR, PT, APTT, indirect haemagglutination test, ELISA, and gel diffusion tests are all reliable serological diagnostics. Abdominal and pelvic ultrasonography was used as the major inquiry. Additional CECT abdominal procedures were conducted.

Statistical Analysis

Statistical analysis was performed using SPSS software (SPSS Inc., Chicago, IL, USA) for Windows program (15.0 version). The continuous variables were evaluated by mean (standard deviation) or range value when required. The dichotomous variables were presented in number/frequency and were analyzed using the Chi-square test. With 95% confidence interval, a p-value of < 0.05 or 0.001 was regarded as significant.

Results:-

We enrolled a total of 30 patients who were hospitalised to Dhiraj General Hospital's department of surgery with a liver abscess and required either open surgery or percutaneous aspiration during the study period. Out of 30 patients, 70% were male, whereas 30% were female.

Additionally, patients were classified into age groups of 20 years, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, and 60 years, and it was shown that about two- thirds of patients were between the ages of 30 and 50 years. In this study, 36.67 % of patients were aged 40 to 49 years, 33.33 % were aged 30 to 39 years, 16.67 % were aged 20 to 29, 6.67 % were aged less than 20 years, and 6.67 % were aged more than 50 years [Table-1].

The enrolled patients were divided into different age groups like <20 years, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years and ≥ 60 years according to gender, and we have found that in both gender majority of the patients were have age between 30 to 50 years [Figure-1]. In the Female group, 44.44% of patients were had an age between either 30 to 39 years or 40 to 49 years respectively, whereas similarly, in the male group, 33.33% were had an age between 40 to 49 years, and 28.57% of patients had an age between 30 to 39 years. In the female group, 11.11% were had an age between 20 to 29 years, 40 to 49 years and ≥ 60 years, respectively. In male patients, 19.05% patients had an age between 20 to 29 years followed by 9.52% had < 20 years, 4.76% had an age between 50 to 59 years or ≥ 60 years respectively.

Out of 30 enrolled patients, 73.33% were from rural areas, and 26.67% were from urban areas. From Madhya Pradesh, 83.33% were from the rural areas while 16.67% were from an urban area whereas, from Gujarat, 58.33% were from the rural areas while 41.67% were from urban areas. [Figure-2]

Amongst the patients, 70.00% were alcoholic, 36.67% were cirrhotic, 03.33% had a recent history of amoebic dysentery, 13.33% had anemia, and 10.00% had malnutrition, and 06.67% had a history of steroid therapy. [Figure-3]

Total 93.33% had pain in the abdomen, 80.00% had a fever, 63.33% had fever with chills and rigours, 16.67% had a loss of weight, 10.00% had a loss of appetite, 3.33% had a non-productive cough, 30.00% had jaundice, and 6.67% had shoulder pain.

Of the 30 patients who presented with liver abscess, 23.33% had a previous history of liver abscess, and 76.67% had developed liver abscess for the first time.

96.67% patients from the studied population had pain in the right hypochondrium, 86.67% had tenderness in the right hypochondrium, 70.00% had hepatomegaly, 66.67% had rigidity in the right hypochondrium, 50.00% had ascites, 33.33% had intercostal tenderness, 16.67% had splenomegaly, and 6.67% had abdominal wall oedema.

In the present study, 10.00% of patients had diabetes mellitus, 6.67% had hypertension, whereas 3.33% of patients had the cardiac disease or renal failure, respectively. Elevated Alkaline Phosphatase level was found in 86.67% of patients followed by leucocytosis was found in 76.67% of patients, Hypoalbuminemia was found in 76.67% of patients, Elevated Total Bilirubin was found in 63.33% of patients, Elevated SGPT was found in 63.33% of patients, Elevated SGOT was found in 60.00% of patients, Elevated prothrombin time found in 16.67% of patients and anaemia was found in 13.33% of patients. In comparison, 70.00% patients had Hb level between 8 to 10 mg/dL and 16.67% had Hb level more than 10 mg/dL. [Table-2]

Total 5 (16.67%) patients showed changes in Chest X-ray. Total 13.33% had pleural effusion while 3.33% showed tenting in diaphragm, whereas 83.33% had normal chest X-Ray. From USG Findings and CT scan findings, it has been confirmed that in the present study, out of 30 patients, 53.33% of patients had solitary abscesses whereas 46.67% had multiple abscesses. [Table-3] Total 66.67% had the volume of the liver abscess < 120 ml, while 33.33% had liver abscess ≥ 120 ml. In both surgical methods majority of the patients had liver abscess in the right lobe, whereas very few patients had a liver abscess in the left lobe or both lobes. Amongst the patients, 66.67% of patients had the size of the liver abscess ≤ 5 cm, and 33.33% had the size > 5 cm from the 30 patients studied. Out of the 30 patients, 66.67% had the volume of the liver abscess < 120 ml, while 33.33% had liver abscess ≥ 120 ml. In the present study, patients having multiple liver abscesses underwent open surgical method, whereas patients having solitary liver abscess underwent percutaneous aspiration method. The 43.33% of patients had liver abscess in the single segment, while 56.67% of patients had liver abscess in multiple segments. In the present study, all patients were given IV Metronidazole TID for 5 days. Amongst the enrolled patients, 22.22% had pleural effusion, 44.44% had rupture of abscess, 33.33% had peritonitis, 11.11% had retroperitoneal abscess, 11.11% had cardiactamponade, 22.22% had septicaemia, and

11.11% had liver failure. All the patients were initially started on Conservative management, following which a definitive procedure was done.

Total 66.67% of patients had been treated with percutaneous drainage, out of which 17 patients underwent pigtail aspiration, and 3 patients underwent needle aspiration, while 33.33% patients had open drainage. All three patients who underwent needle aspiration required open surgery due to complications. Out of the 15 (50.00%) patients who had open drainage 5 (33.33%) patients were earlier given a trial with percutaneous catheterization. In both surgical methods majority of the patients had liver abscess in the right lobe, whereas very few patients had liver abscess in the left lobe or both lobes.

Out of the 20 patients who underwent percutaneous drainage, 35.00% had tract pain, 20.00% patients had catheter block, 10.00% had catheter dislodgement & haemorrhage, respectively, and 05.00% had infection &peritoneal spillage, respectively. Of the 15 many patients who underwent open surgical drainage, 60.00% had bleeding and 06.67% had biliary peritonitis. [Table-4]

Out of the patients undergoing percutaneous drainage, 95.00% patients had hospital stay less than 10 days, and 05.00% had more than 10 days, and out of the patients who underwent open drainage, 30.00% had hospital stay less than 10 days, and 70.00% had hospital stay more than 10 days.

In present study 5 patients who underwent percutaneous drainage required open surgical drainage due to post-operative peritoneal spillage, recurrence of liver abscess. All of the patients who underwent percutaneous drainage to open drainage had hospital stays of more than 10 days. No recurrence of the liver abscess was found in follow up visits of the patients who underwent open surgical drainage. Whereas recurrenceof the liver abscess was found in 5 patients who underwent percutaneous drainage, and all of them underwent open surgical drainage, and in follow up visit, liver abscess was resolved.

Discussion:-

After the advent of imaging techniques and medications, the therapy of liver abscess has improved dramatically, with a dramatic decrease in mortality. Percutaneous implantation of an indwelling catheter enables continuous drainage; thus, the inconveniences associated with incomplete evacuation and re-accumulation are eliminated, and this treatment attained a high success rate in previous investigations.

In the present study, 70.00 % of patients were male, and 30.00 % were female, indicating that males are more prone to liver abscesses than females, whereas in the study conducted by T. Maheshwari et al., 81.87 % of patients were male and 18.13 % were female patients with liver abscess. [6] S. Christopher et al.[7] studied 91.40 % male patients and 8.60 % female patients with liver abscess and concluded that the male group had a greater incidence rate than the female population.

Numerous research investigations have also indicated that the incidence of liver abscess is higher in males than in females. This is owing to the increased prevalence of alcohol consumption in male patients, and while numerous research investigations have proven a favourable correlation between alcohol and liver abscess, the exact pathophysiology is unknown at this time. Total of 73.33 % of the 30 patients enrolled were from rural areas, whereas 26.67 % were from metropolitan areas.

In Madhya Pradesh, 83.33 % of the population lived in rural areas, while 16.67 % lived in urban areas. 58.33 % of Gujarat's population lived in rural areas, while 41.67 % lived in urban areas. The present research found that the incidence of liver abscess was significantly greater in the middle age group. The highest occurrence rate was discovered in the second to fifth decades of their lives. These findings are consistent with those of other research; T. Maheshwari et al.[6], S. Christopher et al.[7], and P Kathel et al.[8] all demonstrated a greater incidence rate in the middle age group.

Diabetes was the most common comorbidity associated with liver illness in our analysis, with three individuals having diabetes, followed by hypertension, ischemic heart disease, and renal failure. Similar findings were found in a study conducted by S. Christopher et al[7]. They found that 8.60 % of study participants had diabetes mellitus,

7.10 % had hypertension, 2.90 % had cardiac disease, and 1.40 % had renal failure. The characteristics of abscesses, such as site of abscess, location of abscess, and number of abscesses, were comparable between this study and other standard investigations.

The most prevalent indicators reported in the majority of patients were abdominal discomfort in 28 (93.33 %) instances and fever >102o F in 24 patients. Preeti Kathel et al.[8] noted that all patients complained of stomach discomfort, and the majority of patients reported right hypochondriac pain; some had epigastrium and widespread abdominal pain. As with this study, fever was also a more significant (97.0 %) symptom in Preeti Kathel et al study's. [8]

According to T.Maheshwari et al.[6], 96.90 % of patients reported abdominal pain, 88.80 % reported fever, and 15.60 % had jaundice. According to S. Christopher et al.[7], 95.71 % of patients experienced abdominal pain, 84.28 % experienced fever, and 35.71 % experienced jaundice. Alcoholism is prevalent in this study at 67 % and is especially prevalent in the age group of 31 to 40 years, particularly among males. Shyam Mathur and colleagues[9] found 70.0 % of cases were alcoholics, indicating a high link between alcoholism and liver abscess patients.

Elevated alkaline phosphatase was detected in 86.67 % of patients, followed by leucocytosis in 76.67 % of patients, hypoalbuminemia in 76.67 % of patients, elevated total bilirubin in 63.33 % of patients, elevated SGPT in 60.00 % of patients, elevated prothrombin time in 16.67 % of patients, and anaemia in 13 patients. According to T. Maheshwari et al.[6], elevated alkaline phosphatase levels were detected in 10.63 % of patients, followed by leucocytosis in 86.88 %, hypoalbuminemia in 28.10 %, elevated total bilirubin in 18.75 %, elevated SGPT in 85.00 %, elevated SGOT in 77.50 %, and anaemia in 55.60 % of patients.

According to P. Kathel et al.[8], elevated alkaline phosphatase levels were detected in 52.00 % of patients, followed by leucocytosis in 41.30 % of patients, hypoalbuminemia in 30.60 % of patients, elevated total bilirubin levels were detected in 60.00 % of patients, elevated SGPT levels were detected in 82.60 % of patients, elevated SGOT levels were detected in 73.30 % of patients. All patients had normal bleeding and clotting times. In 14 (20%) patients, the prothrombin time and INR were abnormal. Patients with abnormal INR values were treated with a stat dose of vitamin K 30 mg i.v. followed by fresh frozen plasma transfusion. The present study used liver function tests to determine the levels of liver enzymes that serve as indicators of liver function.

In this study, 16 cases (53.33 %) had a single abscess and 14 cases (46.67 %) had multiple abscesses, in contrast to previous studies by Tiwari et al. [10] (67.2 % solitary and 32.8 % multiple), Sharma et al. [11] (79 % solitary and 21% multiple liver abscesses)[12,13], and Rajak et al. [14] (80.00 % solitary and 20.00 % multiple). In both surgical methods, the majority of patients had liver abscesses in the right lobe, whereas only a few had liver abscesses in the left lobe or both lobes; these findingsare consistent with those of P Kathel et al. [8] and S. Christopher et al. [7]. According to USG and CT scan findings, 53.33 % of patients in this study had a solitary abscess, 46.67 % had numerous abscesses, 66.67 % had a liver abscess with a volume of 120 ml, and 33.33 % had a liver abscess with a volume of 120 ml. In all surgical methods, the majority of patients had liver abscesses in the right lobe, while just a handful had liver abscesses in the left lobe or both lobes.

All participants in this trial received Invasive Metronidazole TID for 5 days. 66.67 % of patients received percutaneous drainage, of whom 17 received pigtail aspirationand 3 received needle aspiration, while 33.33 % received open drainage. Due to complications, all three patients who underwent needle aspiration required open surgery. Out of the 15 (50.00%) patients who received open drainage, 5 (33.33%) were previously treated with percutaneous catheterization, whereas in the T. Maheshwari et al[6] study, 80.01 % of patients received percutaneous drainage and 06.25 % received open drainage.

Nonetheless, there are disagreements on the therapy of hepatic abscess. For long years, interventional draining of liver abscesses was considered standard therapy. Due to advancements in imaging technology, the diagnosis and treatment of liver abscess have changed. Five patients who had percutaneous aspiration had many minor abscesses, and one patient with a solitary abscess required open surgery due to recurring liver abscess. In comparison to Hyo Min Yoo et al.[12], where 100.00 % of patients had intervention, 62 patients out of 75 were subjected to intervention regardless of the quantity and number of aspirable contents. Percutaneous aspiration was performed in 50.00 % of cases in the current study, which is comparable with prior findings published by Preeti Kathel et al. 8] and Hyo Min

Yoo et al. 12,15. Preeti Kathel et al.[8] reported that 1/3 of patients received percutaneous aspiration, but Hyo Min Yoo et al.[15] reported that 79.00 % of patients underwent percutaneous aspiration.

Thus, in most cases in our analysis, USG-guided percutaneous aspiration or pigtail catheter drainage was used as the primary mode of treatment when antibiotic coverage was available. All patients were started on antibiotics and were kept on them for ten to fourteen days, depending on their progress.

The majority of patients reacted admirably to percutaneous aspiration and pigtail catheter drainage while receiving antibiotics, with a mean hospital stay of two days fewer than when receiving antibiotics alone. While patients with several tiny abscesses or abscesses of any size with non-aspirable contents might be adequately treated with antimicrobial therapy alone, the hospital stay was longer. Even in immunocompromised patients, percutaneous drainage and antibiotics are frequently successful in treating moderate-sized collections

Surgical drainage or resection (in conjunction with antibiotic therapy) may result in better clinical results for extensive multiloculated abscesses than percutaneous drainage. Surgery may be essential in the following situations: patients with abscess rupture and peritonitis; patients with large multiloculated abscesses > 5 cm; patients who do not respond to antibiotics or percutaneous drainage; patients with concurrent biliary pathology. The liver abscess was surgically removed. One of the study's drawbacks was its single-centre design. To increase the generalizability of the results, the author suggested a study with larger sample size.

Conclusion:-

In the present study, the majority of patients were treated using USG-guided percutaneous aspiration or pigtail catheter drainage when antibiotic coverage was available. Both percutaneous aspiration and open surgery were determined to be equally significant, although neither was regarded as the gold standard of treatment.

Additionally, it was found that while the hospital stay was shorter in the percutaneous aspiration group than in the open surgery group, a more significant number of follow- up visits were required in the percutaneous aspiration group since pus drained thoroughly in patients undergoing open surgery. Thus, our study indicated that both methods have their own set of advantages and disadvantages and are equally necessary for treating patients with amoebic liver abscess.

Tables & Figures

Table 1:- Age Group Distribution.

Age Distribution	N	%
<20	2	6.67%
20 - 29 Years	5	16.67%
30 - 39 Years	10	33.33%
40 - 49 Years	11	36.67%
50 - 59 Years	1	3.33%
≥ 60 Years	1	3.33%
Total	**30**	**100.00%**

Table 2:- Lab Investigation.

Abnormal Lab Investigation		N	%
Hb	**< 8 mg/dL**	4	13.33%
	8 – 10 mg/dL	21	70.00%
	>10 mg/dL	5	16.67%
WBC (>11000 cumm)		23	76.67%
Elevated Total Bilirubin		19	63.33%
Hypoalbuminemia		23	76.67%
Elevated Prothrombin Time		5	16.67%
Elevated Alkaline Phosphatase		26	86.67%
Elevated SGOT		18	60.00%
Elevated SGPT		19	63.33%

Table 3:- Intervention according to Site.

Surgical Method	Site						Total
	Right Lobe	%	Left Lobe	%	Both Lobes	%	
Open Surgery	12	80.00%	2	13.33%	1	6.67%	15
Per cutaneous Aspiration	11	73.33%	2	13.33%	2	13.33%	15
Total	23	76.67%	4	13.33%	3	10.00%	30

Table 4:- Post Percutaneous Drainage Complications.

Complications of Percutaneous Drainage	N	%
Catheter block	4	20.00%
Catheter dislodgement	2	10.00%
Tract pain	7	35.00%
Infection	1	5.00%
Haemorrhage	2	10.00%
Perforation of hollow viscus	0	0.00%
Peritoneal spillage	1	5.00%

Table 5:- Post-Surgical Drainage Complications.

Complications of Open Drainage	N	%
Bleeding	9	60.00%
Intraperitoneal abscess formation	0	0.00%
Biliary peritonitis	1	6.67%
Biliary fistula	0	0.00%

Figure 1:- Age distribution according to gender.

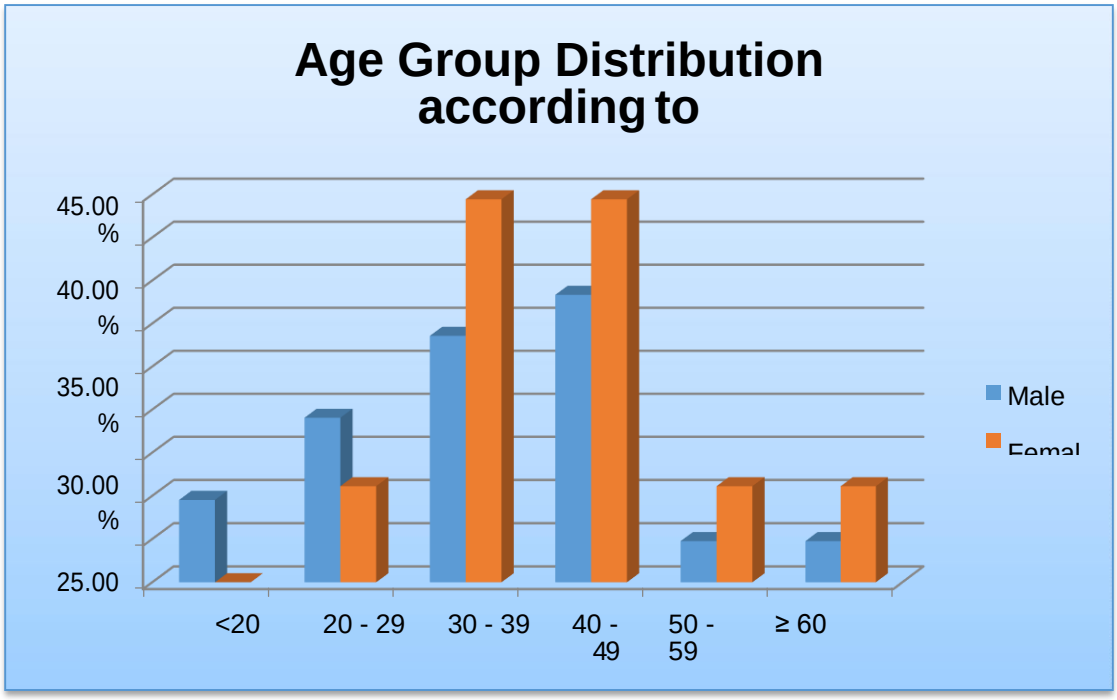


Figure 2:- Residence.

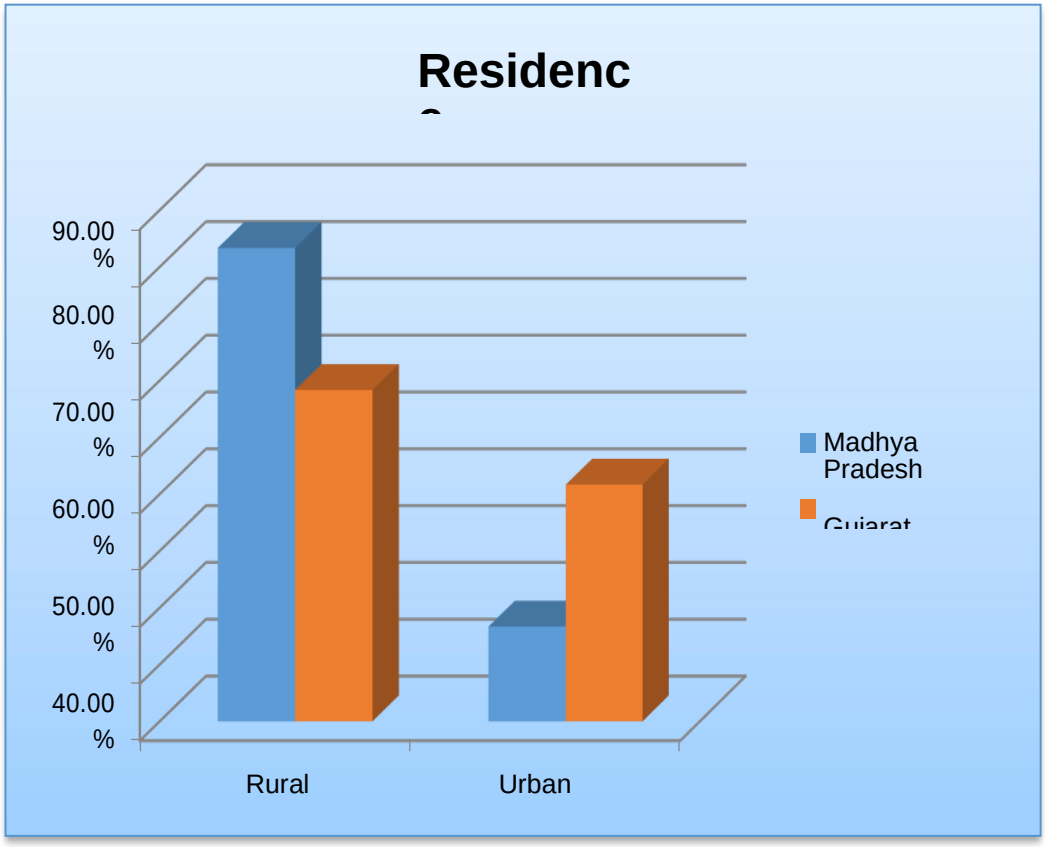
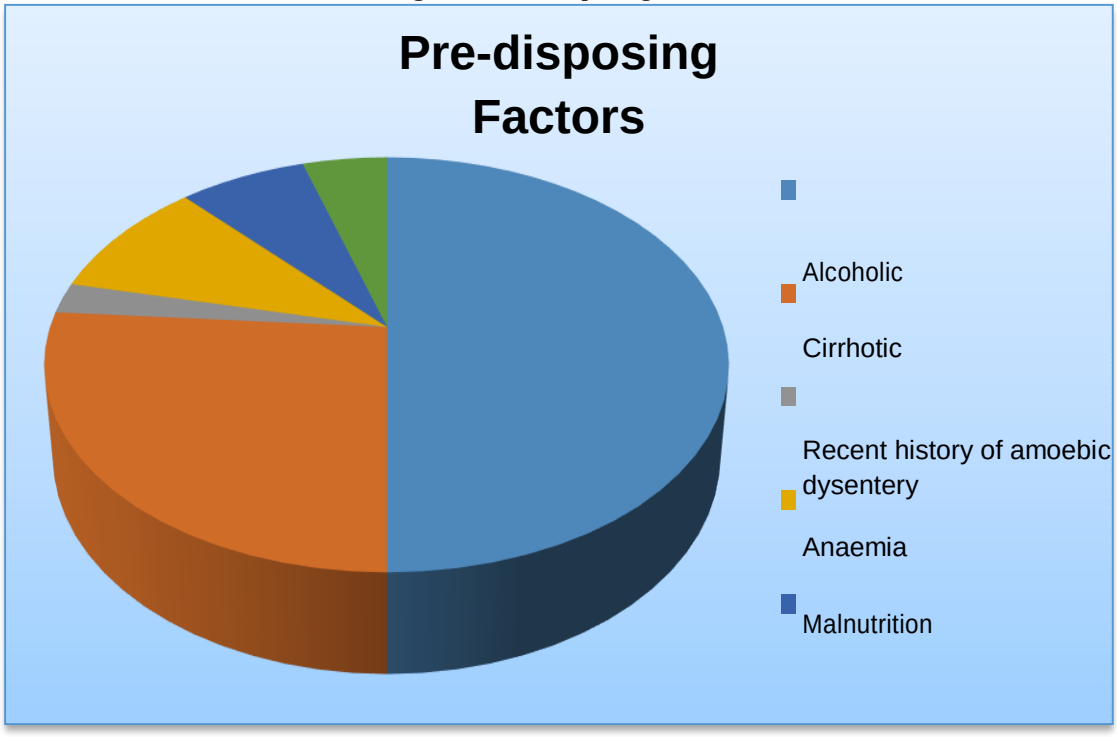


Figure 3:- Pre disposing factor.



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