

# Demographic and Etiological Patterns of Gastric Outlet Obstruction in Kerala, South India

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## Abstract

**Background:** In the modern era, the major cause of gastric outlet obstruction (GOO) is known to be a malignancy, especially in the developed world. Many books and articles do suggest that the benign causes continue to be the major cause of GOO in the developing world however, there is growing evidence proving the contrary. Males were (more commonly) affected females and individuals in their fifth and sixth decade have been the predominant age group in the majority of studies. There is a minimal data of GOO from South India. **Aims:** A retrospective analysis of the endoscopic findings of patients presenting with features of GOO to determine the demographic and etiological patterns. **Materials and Methods:** A retrospective study of the endoscopic findings of patients with GOO from January 2005 to January 2014 was done. The diagnosis of GOO was based on clinical presentation, and an inability during the upper endoscopy to enter the second portion of the duodenum as documented in the endoscopy registers. Patients who have already been diagnosed with malignancy prior to the endoscopy were excluded from the study; so were the patients with gastroparesis. **Results:** A total of 342 patients with GOO underwent the endoscopy during the study period. The causes for benign obstruction were predominantly peptic ulcer disease. The major cause for malignant obstruction was carcinoma of stomach involving the distal stomach. The male to female ratio was 3.2:1. The patients with malignancy were older than patients with benign disorders. Most of the patients were in the sixth and seventh decade. The risk of malignancy was higher with increasing age, especially in women. A fourth of all carcinoma stomach presented with GOO. **Conclusion:** The study demonstrates that the cause for GOO in Kerala, South India is predominantly malignancy. The etiological and demographic patterns were similar to the studies conducted in the developed nations.

**Keywords:** Causes, demographic pattern, gastric outlet obstruction, India

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## Introduction

Gastric outlet obstruction (GOO) is a term used to describe a condition characterized by the inability of gastric contents to go beyond the proximal duodenum. The obstruction may be partial or complete.<sup>[1-3]</sup> Apart from the mechanical impediment of the flow of gastric contents; there are other concerns in patients with GOO such as malnutrition and electrolyte imbalance.<sup>[4]</sup>

The incidence of GOO is not precisely known. Until the discovery of proton pump inhibitors and H<sub>2</sub> blockers, the major cause of GOO was peptic ulcer disease (PUD). The discovery of *Helicobacter pylori* and developing an effective treatment for the same has resulted in fewer cases of PUD presenting with GOO (<5%); however, in the modern era, the major cause is known to be malignancy, especially in the developed world.<sup>[5]</sup> The prevalence of *H. pylori* has been reported to be high

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with about 80% of the population being affected<sup>[6]</sup> and the prevalence of peptic ulcer and gastric carcinoma are 8.0/100,000 and 3.0/100,000, respectively.<sup>[7,8]</sup> There are no studies to suggest whether there has been a change in the statistics during the course of this study. Many books and articles do suggest that the benign causes continue to be the major cause of GOO in the developing world, however, there is growing evidence proving the contrary.<sup>[9]</sup> Peripancreatic malignancy has been reported as the foremost malignant cause for obstruction in studies, whereas gastric carcinoma has been implicated as the most common malignant cause in other studies.<sup>[10]</sup>

Males are more commonly affected than females which may vary from 3:1 to 4:1 ratio. The sex ratio was similar in both malignant and benign causes. Most patients with GOO are in the middle age group.<sup>[11]</sup>

This study is undertaken to understand the etiological spectrum of GOO in our center in Kerala, Southern India.

## Materials and Methods

This is a retrospective analysis of patients who presented to the Department of Surgery at Thrissur Medical College, Kerala, India from January 2005 to December 2014 with features of GOO. The ethical approval was obtained from the Ethics and Institutional Review Board at Thrissur Medical College and informed consent obtained from the patients. Our center is a tertiary care center and a teaching hospital with a capacity of about 1000 beds. The data were collected from the endoscopy registers maintained by the Department of Surgery. The patients included in the study were over the age of 18, with clinical features of GOO such as upper abdominal distension after food intake and nausea and vomiting; with vomitus containing undigested food particles along with the inability to pass the endoscope beyond the second part of the duodenum. The patients with gastroparesis and previous diagnosis of malignancy were excluded. The procedure was done at the endoscopy suite of the Department of Surgery. The patients were kept nil by mouth for over 4 h, and endoscopy was done after correction of electrolyte abnormalities and maintaining adequate hydration. In the postprocedure period, the patients were monitored and discharged on the same day after observation.

## Statistical analysis

The statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 17.0 for Windows (SPSS, Chicago, IL, USA). The median and ranges were calculated for continuous variables, whereas proportions and frequency tables were used to summarize the categorical variables. Continuous

variables were categorized. The chi-square ( $\chi^2$ ) test was used to test for the significance of the association between the independent (predictor) and dependent (outcome) variables in the categorical variables. The level of significance was considered as  $P < 0.05$ .

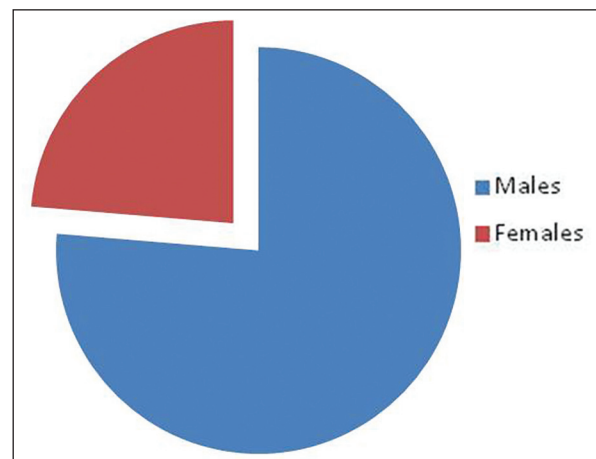
## Results

During the study period from January 2005 to December 2014, a total of 342 patients presented with features of GOO.

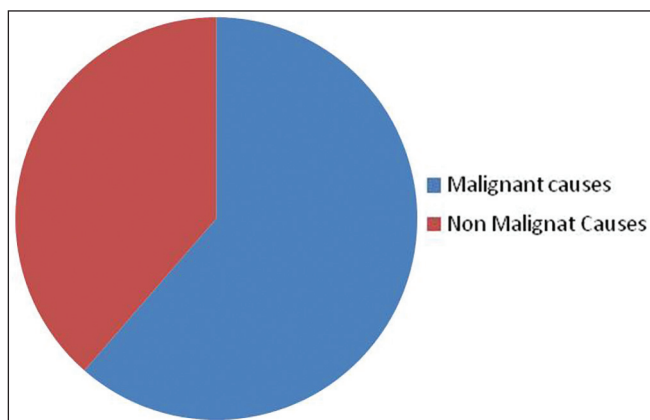
The male to female ratio was 3.2:1 with 261 males and 81 females [Figure 1]. 210 patients (61.40%) had malignant cause for GOO and 132 (38.60%) had nonmalignant causes [Figure 2].

Malignancy was the predominant cause both in males and females. Among males, 56.32% (147) had a malignancy, and 43.68% (114) had nonmalignant causes, whereas in females 77.78 (63) had malignant causes with 22.22% (18) had nonmalignant causes for GOO. The females with malignant obstruction presented significantly ( $P < 0.006$ ) at an older age (mean age of  $59.79 \pm$  standard deviation [SD]: 13.52, range: 19–88) compared to patients with nonmalignant pathology (mean age of  $49.67 \pm$  SD: 13.36, range: 23–73). As seen in females in males too, the malignant causes appeared at an older age (mean age of  $60.99 \pm$  SD: 10.30) as compared to the nonmalignant causes (mean age of  $53.25 \pm$  SD: 13.25). The maximum numbers of patients were in their sixth and seventh decade [Figure 3].

The causes for benign obstruction were 130 of the 132 patients were diagnosed with PUD with one case of duodenal polyp and another case of duodenal diverticulum. The major cause for malignant obstruction was carcinoma of stomach accounting for 204 cases and



**Figure 1:** Gender distribution of the study sample. The majority of the study population were males with a male to female ratio of 3.2:1



**Figure 2:** Malignant versus nonmalignant causes of gastric outlet obstruction. The malignant causes of gastric outlet obstruction accounted for 61.40% of the study population and remaining 38.60% of the study population had gastric outlet obstruction due to nonmalignant causes

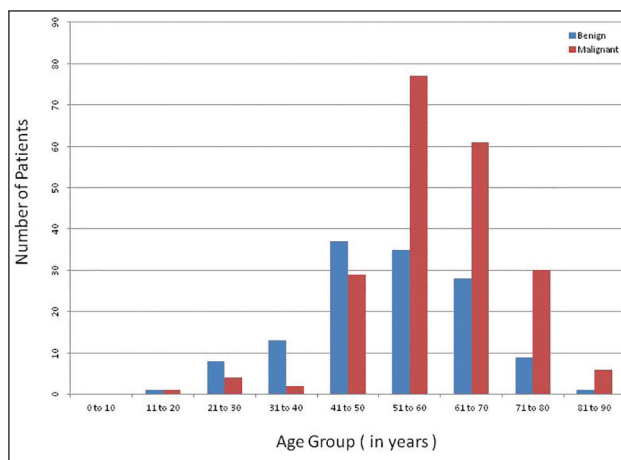
the remaining six cases of malignant GOO being caused by peripancreatic cancer.

During the same time period, the total number carcinoma of stomach detected during the same time period (2005-2014) were 835; of which 204 (24.43%) presented with features of GOO.

## Discussions

The study involved 342 patients who presented with GOO and were evaluated in our center. The numbers of males were more than females at a ratio of 3.2:1. The finding was concurrent with studies which suggested males are more commonly affected with GOO and the outnumber females.<sup>[10,11]</sup> The age at which malignancy was diagnosed was higher than nonmalignant conditions which were statistically significant in females. The age of presentation was the sixth and seventh decade accounting for the majority of the patients. The age at which GOO was demonstrated varied from the fifth and sixth decade in Africa and the eighth decade in the UK.<sup>[12]</sup>

The study demonstrates that the cause for GOO in Southern India is predominantly malignancy which accounts for about 61.40% of the total number of cases with outlet obstruction. The results of the study contradicts the concept of developing countries like India having more cases of benign GOO than malignant GOO and concurs with findings of Misra *et al.* from Northern India that malignancy is the major cause of GOO.<sup>[9]</sup> The cause of malignant obstruction was predominantly gastric cancer as was the case with studies from other developing nations. Peripancreatic cancer accounted for only 2.86% of the malignant GOO. The peripancreatic



**Figure 3:** Age-wise distribution of the study population. The majority of the study population were between the age group of 40 and 80 years with a maximum number of individuals falling in the group of 51-60 years. The figure shows that the causes of gastric outlet obstruction in the younger age group is predominantly nonmalignant and as the age increases the causes are mostly malignant

cancers have been described as the major cause<sup>[3]</sup> but in our center gastric cancer is the most common cause of malignant obstruction. About one-fourth of all gastric cancers presented with GOO.

Among the benign causes, PUD continued to be the predominant cause and only one case each of duodenal polyp and duodenal diverticulum. PUD continues to be the most common benign cause worldwide.<sup>[13]</sup>

## Limitations

The study evaluated the endoscopic findings of patients with GOO and studied age, sex, and etiological causes. The study did not evaluate the further course of these patients, the surgeries or procedures, they underwent and the follow-up. However, the study may be used for a follow-up study.

## Conclusion

The etiology of GOO in Kerala, Southern India is predominantly malignancy which is similar to trends in developed nations. Gastric cancer is the major malignant cause and about one-fourth of all gastric cancers presented with GOO. Males were more commonly affected than females, and the middle age individuals were more commonly affected.

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## Conflicts of interest

There are no conflicts of interest.

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