

# Frequency of Pyloric Stenosis in Patients Presenting with Persistent Vomiting

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## ABSTRACT

**Introduction:** Pyloric stenosis is an uncommon condition in infants characterized by abnormal thickening of the pylorus muscles in the stomach leading to gastric outlet obstruction. Clinically infants are well at birth. Then, at 3 to 6 weeks of age, the infants present with "projectile" vomiting which can lead to dehydration and weight loss.

**Objective:** To determine the frequency of pyloric stenosis in patient presenting with persistent vomiting.

**Material and Method:** This Cross Sectional Study was conducted in the department of Gastroenterology, ATH, Abbottabad from 5<sup>th</sup> October 2020 to 5<sup>th</sup> April 2021. A total of 115 patients of both gender with persistent vomiting for more than 5 days were included in the study. Abdominal ultrasound was done by a consultant gastroenterologist of three years post fellowship experience. Pyloric stenosis was noted.

**Results:** Age range in this study was from 1 to 40 years with mean age of 6.226±6.62 years and mean duration of complaints was 9.869±3.76 days. Male patients were 88.7% and females were 11.3%. Pyloric Stenosis was observed in 93% patients.

**Conclusion:** Our study concluded that that pyloric stenosis is 4 times more common in males compared to females and is more common among younger age groups as compared to adult patients.

**Keywords:** Persistent vomiting, pyloric stenosis, Ultrasound, Frequency

## INTRODUCTION

Pyloric stenosis is an uncommon cause of gastric outlet obstruction. It is characterized by an abnormal hypertrophy of the pyloric muscles.<sup>1</sup> The overall incidence of this disease is around 2 – 5 patients per thousand live births per year. It almost exclusively in infants with 3 – 6 weeks of age being the most common age of presentation.<sup>1</sup> Moreover, it occurs almost four times more commonly in the males compare to females. White race is being the most commonly affect ethnicity.

The exact etiology is not known, however familial link has been described to be involved in its etiology. It is less commonly seen in Indian, Asian, and Black populations.<sup>2</sup>

Pyloric stenosis is caused by abnormal thickening of pyloric muscles of the stomach.<sup>3</sup> Moreover edema develops in the mucosa, and the muscularis layer also undergoes hyperplasia. These abnormal changes leads to the narrowing of the lumen of the gastric antrum. This in turn leads secondarily to lengthening of the pyloric canal and dilatation of the stomach. These structured changes are main reason being immediate postprandial, nonbilious, projectile vomiting, which is the most common symptom seen in these patients.<sup>3</sup> Moreover, severe and profound emesis in turn causes hypochloremia and hypokalemia.<sup>4</sup> Indeed the most common biochemical abnormality seen in hypertrophic pyloric stenosis is hypochloremic, hypokalemic metabolic alkalosis.<sup>4</sup> In a study by Ndongo R, et al. has shown that frequency of pyloric stenosis was 100% in patient presenting with persistent vomiting.<sup>5</sup> In a study by Taylor ND, et al. has shown that frequency of pyloric stenosis was 99.7% in patient presenting with persistent vomiting.<sup>6</sup> No such study has been done before in adult population with persistent vomiting. Pyloric stenosis is a common condition affecting young infants; despite its frequency, it has been recognized only for a little over a century. So it's a dire need to get data in adult population too. Therefore I have planned to determine the frequency of pyloric stenosis in patient presenting with persistent vomiting. Results of my study will help to estimate the real burden of this morbidity in our general population.

## MATERIAL AND METHODS

This cross sectional study was conducted from 5<sup>th</sup> October 2020 to 5<sup>th</sup> April 2021 in the department of Gastroenterology, ATH, Abbotabad. A total of 115 patients were enrolled in the study through non probability consecutive sampling. Sample size was

calculated using WHO sample size software with 95% confidence level, 1% margin of error and expected prevalence of pyloric stenosis of 99.7% in patient presenting with persistent vomiting.<sup>6</sup> Patients aged 1 to 40 years, both genders and patients with persistent vomiting for more than 5 days were included in the study. Patients with history of diarrhea, anemia, gastritis or surgery were excluded from the study.

After getting approval from the hospital ethics' committee to conduct the study, data was collected from all those patients with persistent vomiting presenting to the Out-patient Department of Gastroenterology, ATH, and Abbottabad. An informed written consent was taken from those patients fulfilling the inclusion criteria. Basic demographics like age, gender, duration of complain was noted.

Abdominal ultrasound was done by a consultant gastroenterologist of three years post fellowship experience. Pyloric stenosis was noted as per operational definition and recorded on especially designed proforma.

Data was analyzed by the statistical program SPSS 23. Frequencies and percentages were calculated for qualitative variables like gender and pyloric stenosis. Quantitative variables like age, duration of complaints was analyzed for mean ± standard deviation. Pyloric stenosis was stratified among age, gender, duration of complaints. Data was stratified among age, gender, duration of complaints Post stratification chi-square test with  $p \leq 0.05$  was considered as significant.

## RESULTS

Age range in this study was from 1 to 40 years with mean age of 6.226±6.62 years and mean duration of complaints was 9.869±3.76 days. Male patients were 88.7% and females were 11.3% in our study. Pyloric Stenosis was observed in 93% patients. Stratification of Pyloric Stenosis with respect to age, gender and duration of complaints are shown in Tables-I, II and III respectively.

Table-1: Stratification of Pyloric Stenosis with respect to age.

Age (years)	Pyloric Stenosis		p-value
	Yes	No	
1-20	104(100%)	0(0%)	0.000
21-40	3(27.3%)	8(72.7%)	
Total	107(93%)	8(7%)	

Table-2: Stratification of Pyloric Stenosis with respect to gender.

Gender	Pyloric Stenosis		p-value
	Yes	No	
Male	96(94.1%)	6(5.9%)	0.205
Female	11(84.6%)	2(15.4%)	
Total	107(93%)	8(7%)	

Table-3: Stratification of Pyloric Stenosis with respect to duration of complaints.

Duration of complaints (days)	Pyloric Stenosis		p-value
	Yes	No	
5-10	82(93.2%)	6(6.8%)	0.916
>10	25(92.6%)	2(7.4%)	
Total	107(93%)	8(7%)	

## DISCUSSION

In our study, we evaluated the frequency of pyloric stenosis in patient presenting with persistent vomiting at Ayub Teaching Hospital, Abbottabad and found that it was observed in 93% patients.

In our study, we observed that pyloric stenosis was more common in males compare to females with a ratio of 4.25 to 1. These findings are similar to other studies performed in other parts of the world, which reported male to female sex ration of 4 – 6:1.<sup>8-10</sup>

According to the literature, pyloric stenosis has been observed to be more common in the young children with highest incidence occurring in the first 2 months of life. Tadesse and Gadisa in their study observed that 56.4% of patients with pyloric stenosis were first born infants.<sup>9</sup> Similarly, other studies have mentioned that the average age of pyloric stenosis presentation is 5.2 week.<sup>10-12</sup> in our study, though we did not categorized the age of our study population based on months or weeks, but we also observed that majority of patients were young.

In our study, the most common symptom of our study population was persistent vomiting. This is in accordance with other studies that observed that the most patients with pyloric stenosis had gastric outlet obstruction leading to non-bilious vomiting.<sup>12</sup>

We observed that the duration of complaints of majority of patients were 5 – 10 days accounting for 71.13% (82 out of the total 115) of all patients. This was also in accordance with other studies performed elsewhere.<sup>10</sup>

In patients with pyloric stenosis, an olive mass can be felt on palpation in the epigastric region in nearly one third of all patients. However, this sign has low negative predicted value as nearly 67% of patients with pyloric stenosis do not have such findings on examination of their abdomen, hence reducing its clinical diagnostic probability.<sup>9,10</sup> Preoperatively, Pyloric stenosis is usually complicated by dehydration, weight loss and a characteristic hypochloreaemic hypokalaemic metabolic alkalosis.<sup>13-15</sup> Another study conducted in Africa also reported similar electrolytes abnormalities<sup>10</sup>. Moreover it has observed that patients with pyloric stenosis who has hypokalemia at presentation had twice more mortality postoperatively compared to those with normal serum potassium levels. This was also mentioned by a study conducted in Tanzania in 2015<sup>10</sup>. Though pyloric stenosis is known to cause other electrolytes abnormalities, however they do not increase overall mortality.

Pyloric stenosis is managed with surgery which was first reported by Ramstedt in 1912. The procedure described is now known as Fredet-Ramstedt extra-mucosal pyloromyotomy<sup>16,17</sup>. Traditionally this was done through laparotomy technique however now it can also be performed laparoscopically<sup>18</sup>.

Our study was not without limitations. Firstly, our study population was small and we recommend studies with larger study population. Secondly we did not further stratified our population into small age groups. Indeed according to the literature much of the pyloric stenosis occur in the first year of life. Thirdly, we did not looked into the biochemical abnormalities which are very common in these patients. Their frequency and association with mortality

would have been important findings that we missed reporting. And finally we did not take into account endoscopic and biopsy findings and that would have further added information to our study.

Our study on pyloric stenosis was the first study ever conducted in the Hazara district and we observed a very high frequency of pyloric stenosis in patients with persistent vomiting. We therefore recommend that every patient with persistent vomiting should be seen with vigilance keeping in mind the diagnosis of pyloric stenosis. We also recommend to the higher authorities for arranging larger studies in this field so that guidelines should be made in order to diagnose the pyloric stenosis early and therefore prevent any possible mortality and morbidity

## CONCLUSION

Our study concluded that that pyloric stenosis is 4 times more common in males compared to females and is more common among younger age groups as compared to adult patients.

### Authors' Contributions:

**Zabih ullah:** Literature Review, manuscript drafting.

**Rania hidayat:** Data collection & statistical analysis

**Hafizullah khan:** Data Interpretation

**waqar zulfiqar :** Proof reading

**Adil naseer:** Manuscript drafting,

**shawan asad:** Expert opinion and manuscript revision.

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