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Research Article

**GES (GASTRIC EMPTYING SCINTIGRAPHY) AMONG  
PATIENTS SUFFERING FROM POST-PRANDIAL DISTRESS  
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**Abstract:**

**Objective:** This research work aimed to determine the GES (Gastric Emptying Scintigraphy) pattern among patients present with PDS (Post-prandial Distress Syndrome).

**Methodology:** This research work carried out in Mayo Hospital, Lahore from March 2018 to September 2019. Patients suffering from dyspepsia of post-prandial distress from more than 6 months were the part of this research work. We excluded the patients suffering from dyspepsia because of epigastric pain syndrome and other abnormalities. We performed the gastro-intestinal endoscopy in all the patients to determine the organic reasons. Four-hour GES carried out in our institute. We compiled the outcomes and used the SPSS V. 23 for the statistical analysis of the collected information.

**Results:** We included 38 patients in this research work having range of age from 15 to 72 years with an average age of  $37.050 \pm 13.50$  years. There were 73.70% (n: 28) male and 26.70% (n: 10) female patients in this research study. Average gastric retention with standard deviations at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> hours were  $63.0 \pm 19.04\%$ ,  $37.0 \pm 20.62\%$ ,  $19.0 \pm 16.66\%$  &  $10.0 \pm 12.73\%$  respectively. We found the early gastric emptying in 7.890% (n: 3) patients and late gastric emptying at 2<sup>nd</sup> and 4<sup>th</sup> hours was present in 10.52% (n: 4) and 32.0% (n: 10) patients respectively. Total 44.0% (n: 17) patients were present with normal gastric emptying regardless of the classical PDS symptoms.

**Conclusion:** We observed the gastric dysmotility in GES in fifty percent patients as well as visceral hypersensitivity among patients present with PDS.

**Keywords:** PDS, GES, statistical, SPSS, methodology, distress, dyspepsia, syndrome, hypersensitivity.

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**INTRODUCTION:**

Dyspepsia is combination of 2 words; “Dys” & “Pepsis” means bad digestion. There can be different symptoms in patients as early satiety, bloating, epigastric discomfort and anorexia. Non-ulcer dyspepsia is the epigastric symptom in non-availability of the structural abrasions [1]. This is in accordance with the Rome-3 standard [2]. Various contrivances of non-ulcer dyspepsia include late gastric emptying, visceral hypersensitivity & psychological stress [3]. In IBS (Irritable Bowel Syndrome), there was same upper & lower gut dysmotility [4]. One of the well-organized non-invasive & quantitative procedure for the purpose of gastric emptying is GES [5].

Anomalous gastric emptying has link with the post-prandial fullness, vomiting & nausea [6]. There is recommendation of the 4 hours GES now a days due to variable patterns being examined at 2<sup>nd</sup> and 4<sup>th</sup> hours on radionuclide gastric emptying research works [7]. Late gastric emptying is most common stated pathophysiological mechanisms in the patients present with the post-prandial distress [8, 9]. This research work carried out to determine the percentage of food retention in the stomach at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> hours among patients suffering from PDS.

**METHODOLOGY:**

This research work carried out in Mayo Hospital, Lahore from March 2018 to September 2019. The ethical committee of the institute gave the permission to conduct this research work. We included total thirty eight patients in this research

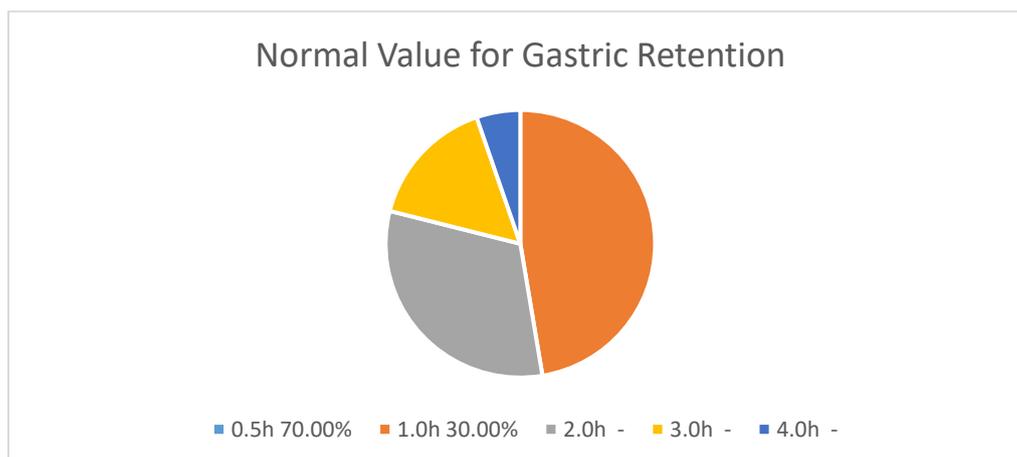
work. We selected the patients on the basis of Rome-3 standard. We took the written consent from every patient after describing them the purpose of this research work. Patients suffering from other serious diseases were not the part of this research work. In female patient, we performed GES in 1<sup>st</sup> week of menstrual cycle to prevent impact from misbalance of hormones. We performed the upper GI endoscopy in all the patients after overnight fasting. We performed the GES in our institute. This research work carried out in accordance with the standard protocols of GES. We performed the imaging with the utilization of the large field of view of gamma camera with dual head. The internationally accepted normal values for low fat, egg-white GES are present in Table-1 [10]. Severity grading of late gastric emptying depending on the 4<sup>th</sup> hour values in all groups have relation to SD of normal findings [11].

1. Grade-1 (Mild): 11.0% to 20.0% retention at four hours
2. Grade-2 (Moderate): 21.0% to 35.0% retention at four hours
3. Grade-3 (Severe): 36.0% to 50.0% retention at four hours
4. Grade-4 (Extremely severe): greater than 50%.0 retention at four hours

SPSS V.23 was in use for the statistical analysis of the collected information. We used the descriptive statistics for the description of the data. We used the Chi-square method for the comparison of the qualitative variables. P value of less than 0.050 was the significant value.

**Table-I: Normal value for Low-Fat, Egg-White Gastric retention.**

Time Point	Lower limit	Upper limit
0.5h	70.00%	-
1.0h	30.00%	90.00%
2.0h	-	60.00%
3.0h	-	30.00%
4.0h	-	10.00%

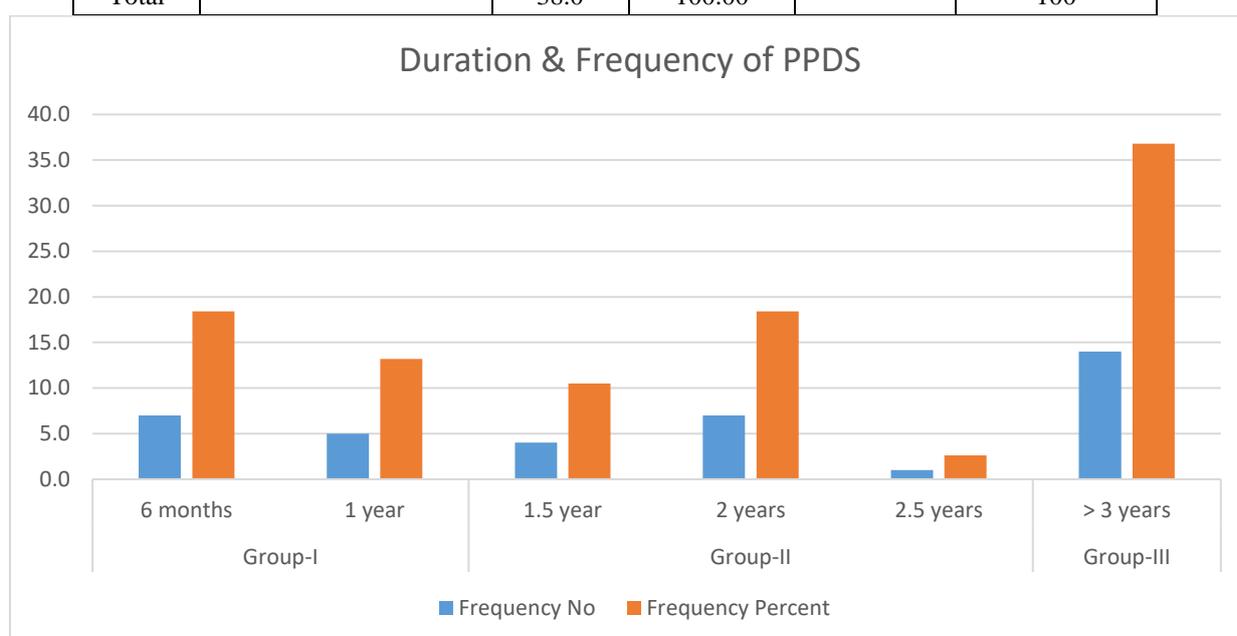


**RESULTS:**

We included total 38 patients in this research work with a range of age from 15.0 to 72.0 years with an average age of  $37.050 \pm 13.50$  years. There were 73.30% (n: 28) male and 26.70% (n: 10) females in this research work. The symptoms of duration of these thirty-eight patients are present in Table-2.

**Table-II: Duration of post prandial distress syndrome with frequency.**

Groups	Duration of Symptoms	Frequency		Group	
		No	Percent	Frequency	Percentage
Group-I	6 months	7.0	18.40	12.0	31.580
	1 year	5.0	13.20		
Group-II	1.5 year	4.0	10.50	12.0	31.580
	2 years	7.0	18.40		
	2.5 years	1.0	2.60		
Group-III	> 3 years	14.0	36.80	-	36.840
Total		38.0	100.00		100

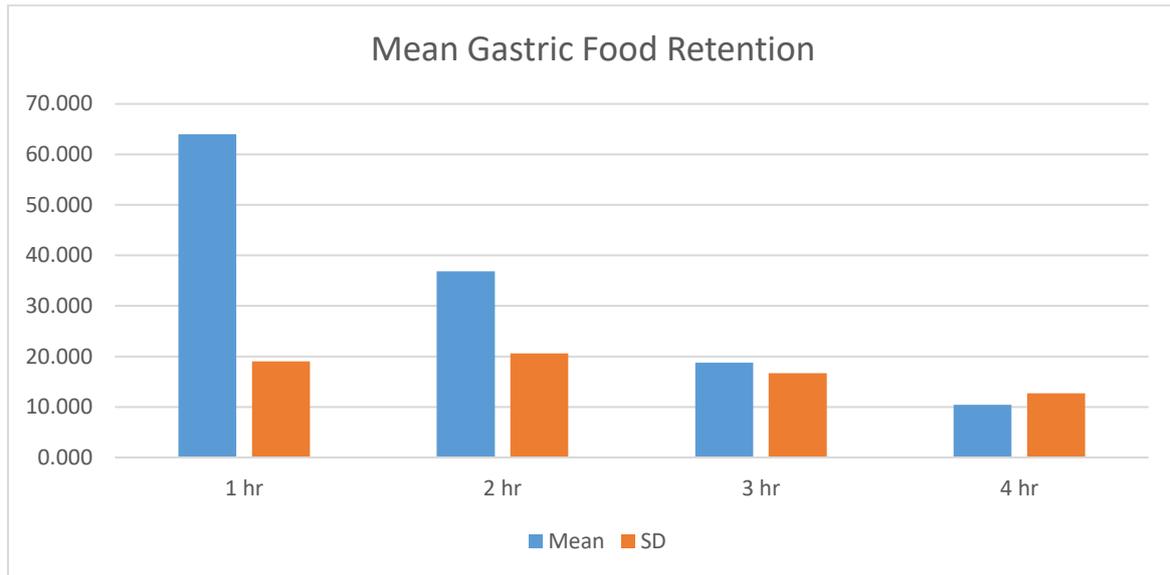


The comparison of the gastric retention separated the patients into 3 groups depending upon their symptoms (Table-2). There were twelve patients in Group-1 who were present with symptoms of 1 year duration, Group-2 consisted twelve patients with 2 to 3 year duration and Group-3 consisted fourteen patients present with the symptoms of greater than 3 years of duration.

In current research work, stomach counts at intervals of hours show the percentage food retention amount in stomach. At 1 hour post intake, the range of gastric retention was from 15.0% to 98.0% with average retention of  $62.30 \pm 18.60\%$ . At 2 hours, the range was from 2.0% to 75.0% with an average value of  $36.940 \pm 20.490\%$ . There was 1.0% to 60.0% and 0.0% to 48.0% retention of food in the stomach at 3<sup>rd</sup> and 4<sup>th</sup> hours post intake correspondingly with an average retention of  $18.730 \pm 16.70\%$  and  $10.40 \pm 12.74\%$  respectively. This summary of this information is present in Table-3. In the population of this research work, the findings showed that from 1<sup>st</sup> to 3<sup>rd</sup> hours, we found low retention of food in stomach as compared to the accepted international values of 90.0%, 60.0% and 30.0%. But at 4<sup>th</sup> hour, the findings were comparable with international specimens [7].

**Table-III: Mean gastric food retention hourly in total population.**

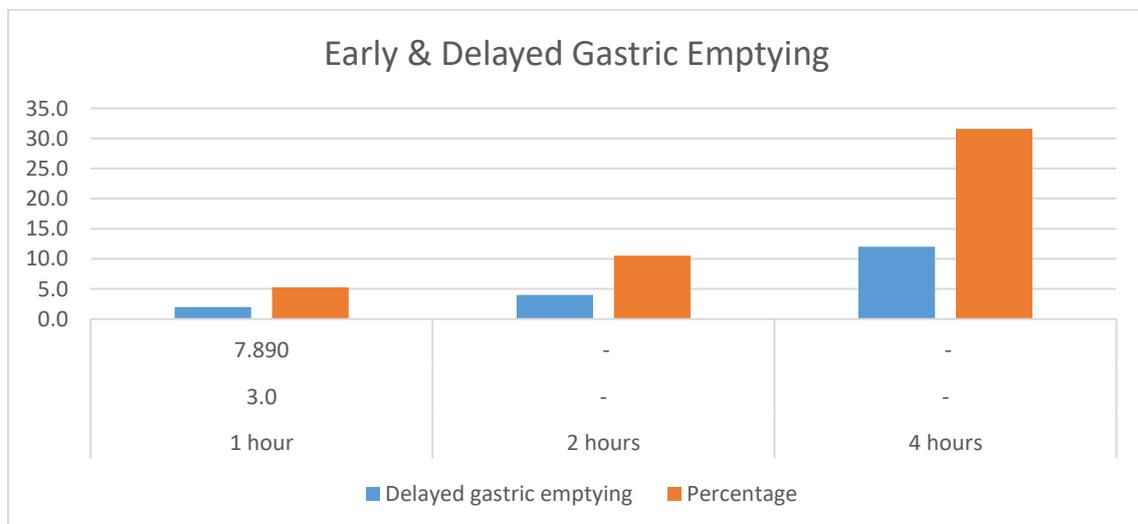
Gastric retention at	Mean	SD	p-value
1 hr	63.980	19.040	<0.0100
2 hr	36.870	20.620	<0.0100
3 hr	18.770	16.660	<0.0100
4 hr	10.420	12.730	0.839



There were 3 patients of early gastric emptying among total thirty eight patients who were present with lower than 30.0% retention of food at 1 hour post-intake. Late gastric emptying with retention of food of greater than 90.0% at 1<sup>st</sup> hour was present in 2 patients and at 2 hours, greater than 60.0% retention of food was present in 4 patients. However, we noted the late gastric emptying at 4<sup>th</sup> hours with greater than 10.0% food retention in stomach of twelve patients. Among these twelve patients, 5 were present with mild, 4 were moderate and 3 had severe late gastric retention depending upon the grades of severity in methods and materials. The summary of the percentage values are present in Table-4.

**Table-IV: Early or delayed Gastric Emptying and number of cases.**

Time after intake	Early gastric emptying	Percentage	Delayed gastric emptying	Percentage
1 hour	3.0	7.890	2.0	5.260
2 hours	-	-	4.0	10.520
4 hours	-	-	12.0	31.570



We divided the patients of this research work 3 groups depending upon the symptoms duration as presented in Table-2. The symptoms duration has correlation with the gastric retention. There is no significant disparity in average gastric retention between Group-1 & Group-2 at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> hours. We found significant difference in average gastric retention between Group-3 & rest of the 2 Groups at 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> hours post intake.

**DISCUSSION:**

Patients with symptoms of early gastric emptying appear in same way as in late gastric emptying. We examined one hour EGE (Early Gastric Emptying) in 7.89% (n: 3) & DGE (Delayed Gastric Emptying) in 5.26% (n: 2) patients. This reported value is very much low as stated by Delgado in which there was presence of EGE in 41.0% patients [12]. At 4 hours mild, moderate & severe retention of food was available in 13.150%, 10.520% and 7.890% respectively with 32.0% (n: 12) total patients. This outcome is much close to a research work conducted in Japan by Asano H where there was presence of 25.50% presence of gastric emptying in group of PDS [13]. Ochi M was not able to find any association of DGE in 2 groups present with functional dyspepsia pointing to various mechanism for the PDS [14]. Vanheel also supported this very finding [15], in which there was close association between visceral hypersensitivity with the PDS. He did not find any disparity between Rome-3 subgroups in occurrence of the gastric hypersensitivity, DGE and imbalanced gastric accommodation.

There is also support of the hypersensitivity's concept with PDS in research work conducted by Tack

J [6] as well as in one research work conducted by Di Stefano [17]. In this research work, we presented the association of the symptoms with the retention of food. The present information showed that there is linear association of the symptoms duration with the amount of retention of food in stomach. There was participation of few patients in this research work due to the large duration of procedural time.

**CONCLUSION:**

Visceral hypersensitivity may be the pathophysiological contrivances other than the late gastric emptying in patients present with PDS. There is need of more research works to consolidate the findings of this research study.

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