

## Serum Amylase Levels with Respect to Different Clinical Disorders: A Hospital-based Observational Study from Kashmir

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### Abstract

**Background:** Amylase- an enzyme produced by the pancreas and salivary glands facilitates the breakdown of dietary starch. Many clinical manifestations are caused by abnormal blood serum amylase levels. Hence, the idea of this retrospective study was to investigate the serum amylase levels among subjects visiting the main tertiary care hospital.

**Methods:** A total of 1578 patients tested for different investigations including serum amylase were recruited in the Outpatient/In-patient sections of Sher-I-Kashmir Institute of Medical Sciences (SKIMS), Srinagar for various ailments between March to November 2020.

**Results:** The average value documented for Serum amylase levels was  $110.73 \pm 85.0055$  that is considered as within the acceptable limits. The average age recorded for the patients was  $46.58 \pm 19.73$  years. There was no statistical significance between amylase levels and gender groups. However, there was a statistical significance between amylase levels and different age groups ( $p = 0.000$ ).

**Conclusion:** There was a concordant increase of serum amylase levels with an increase in age.

**Keywords:** Amylase; Pancreatitis; Kashmir

### Introduction

Serum amylase (serum amylase) levels though regarded as an indicator of pancreatic illness, can also be deranged in other diseased states as well [1]. In respiratory disorders such as pneumonia and tuberculosis, an inexplicable increase in serum amylase might occur [2,3]. Benign Pancreatic Hyperenzymemia or Gulló's Syndrome is featured by abnormally high serum amylase levels in the absence of clinical or pathological evidence of pancreatitis [4]. Similarly, studies have reported altered levels of serum amylase in different malignancies like ovarian, lung, and breast [5-8]. Considering the wide range of importance of serum amylase level in disease diagnosis, it could be used as a prognostic marker in better management of patients at various disease states.

Kashmiri population is considered as a high-risk area for many of the most common malignancies like gastrointestinal malignancies (GIM) [9] as well as gastrointestinal disorders [1]. Incidentally, under these diseased conditions elevated levels of serum amylase have been observed throughout the globe. Therefore, this hospital-based observational study was aimed to calculate the serum amylase levels and find out any possible link to different diseases common in the study population.

### Materials and Methods

This retrospective analysis included all patients who visited the Sher-I-Kashmir Institute of Medical Sciences (SKIMS), Srinagar hospital for clinical consultation. The subject samples were collect-

ed from March to November 2020 in the collection center of SKIMS and transported to the Department of Clinical Biochemistry for analysis. Beckman Coulter Ireland Inc. auto-analyzers (BECKMAN COULTER AU5800) were used for the estimation of all the advised Biochemistry parameters including serum amylase. International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) method was used to calculate serum amylase levels using commercially available reagent kits (dedicated reagents).

**Statistical analysis**

Statistical data analysis was performed using SPSS 21.0 statistical software (SPSS Inc. Chicago, IL). Pearson’s chi-square test was used to identify the association between serum amylase levels with age and gender. P-value <0.05 was considered statistically significant.

Furthermore, to check the correlation between studied variables with serum amylase we employed spearman’s and Pearson’s correlation tests to determine which age groups have the higher amylase levels as compared to the others.

**Results**

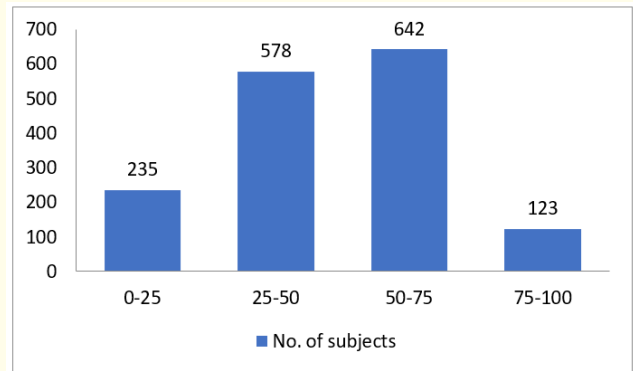
The acceptable average value recorded for serum amylase was 110.73 ± 85.01. Out of 1578 subjects, 1153 (73.1%) were having normal amylase levels, 409 (25.9%) were having elevated serum amylase values and 16 (1%) had values that were below the normal ranges (Table 1).

Amylase	Frequency	Percentage
Low (<20 U/L)	16	1.0
Normal (20-110 U/L)	1153	73.1
Above (>110 U/L)	409	25.9

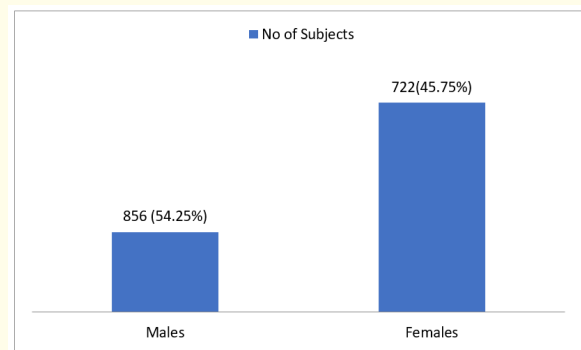
**Table 1:** Frequency table showing the distribution of Amylase Levels.

Among the various age groups of the recruited subjects, the maximum numbers of subjects (642) were in the age group of 50-75years (Graph 1). Most of the participants were male (54.25%) as compared to their female (45.75%) counterparts (Graph 2). Elevated amylase levels were found in 225 males and 184 females. The P- value for the test between gender and serum amylase level was 0.739. Thus, there is no significant association between gender and amylase level. This practically implies that gender does not

have a significant effect on the amylase level of an individual as per our collected data (Table 2).



**Graph 1:** A bar graph showing the Distribution of Age.



**Graph 2:** A bar graph showing the participants of genders.

Association between Gender and Amylase Level				
Gender	Amylase Levels			p-value
	Low	Normal	Above	
Male	10	621	225	0.739
Female	6	532	184	

**Table 2**

However, with age, the maximum numbers of elevated amylase levels were found in the age group of 50-70 years (198) and the 2-sided p-value is 0.000 which is below 0.05. This hints at a significant association (or relationship) between age and serum amylase

levels. Practically, in our case, this implies that age has a significant effect on the amylase level of an individual.

Both the Pearson’s R and the Spearman Correlation coefficient show a positive correlation between age and sr amylase levels (Table 4).

Association between Gender and Amylase Level				
Age Group	Amylase Levels			p-value
	Low	Normal	Above	
0-25	5	191	39	<0.05
25-50	3	446	129	
50-75	6	438	198	
75-100	2	78	43	

Table 3

Correlation coefficients between Amylase levels and Age	
Pearson’s R	0.129
Spearman Correlation	0.131

Table 4

**Discussion**

The fact that serum amylase levels raise in conditions other than pancreatic disease complicates the diagnosis of abdominal issues, especially when it happens in acute upper abdominal problems such as cholecystitis and peptic ulcers. Serum amylase levels have been observed to be elevated in non-pancreatic illnesses in studies [2,4-6,8]. As a result, efforts to monitor this frequently high serum amylase levels in non-pancreatic illness circumstances are required. Hyperamylasemia that lasts for weeks or months with no apparent cause is often difficult to treat and is not uncommon in clinical practice. Hyperamylasemia of less than three times the normal upper reference limit has been reported in hospitalized non-pancreatic disease patients. It is frequently requested as part of a general laboratory workup or when there are nonspecific symptoms in a population with a low pre-test probability. If such patients are asymptomatic or present with nonspecific abdominal pain, which may have triggered the workup they may be subjected to unnecessary and sometimes invasive investigations. This could be one of the reasons for the prognostic importance of this investigation in better disease diagnosis.

The maximum number (73.1%) of recruited subjects were having normal levels of serum amylase. However, a good proportion (25.9%) of subjects presented with elevated levels. The higher level of subjects with elevated serum levels were incidentally falling in the higher age group of 50-75 years and this combination showed a statistically significant correlation.

The study being a hospital-based observational study, cannot rule out the possible ailments with deranged serum amylase. However, the elevated levels of serum amylase in the current study could tell us about the possible role of this particular investigation in the prognosis of diseases like non-pancreatic gastrointestinal disorders and malignancies [1,2,6,8]. The study population is considered as one of the regions with higher incidences of old age diagnosed gastrointestinal malignancies [10], thus validating our obtained results of higher serum amylase levels in higher age groups. These combinations could hint at possible prognostic implications of serum amylase levels. The prognostic importance of serum amylase could also be given by the presence of elevated levels among ovarian cancer subjects [5,6]. We have been witnessing a substantial increase in the incidence of ovarian cysts in our populations since the last decade [11]. These cysts having a chance of turning into malignant tumors [12] could predict the importance of serum amylase in such cases.

Reports are available regarding the importance of serum amylase levels in subjects with renal insufficiency or nephrectomy. It has been observed that such patients have 50% higher average serum amylase activity than healthy individuals [13].

**Conclusion**

Thus analyzing the patient at the initial stages with serum amylase in combination with other kidney function tests could be handy in better disease diagnosis.

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