

# Frequency with Risk Factors for Glucose Intolerance in Hepatitis C Patients

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## ABSTRACT

Co-existence of glucose intolerance and hepatitis C is a phenomenon on rise in underdeveloped countries. Diabetic patients with hepatitis C are more likely to have severe fibrosis than non-diabetic patients.

**Aim:** To determine the frequency of glucose intolerance among patients of chronic hepatitis C presenting to hospital.

**Methodology:** Current survey held at Jinnah Hospital, Lahore, from 21<sup>st</sup> October 2014 to 20<sup>th</sup> April 2015. Total 190 patients of chronic hepatitis C without signs of decompensation were included in the study. Glucose intolerance was determined by measuring 12 hour fasting blood sugar level and blood sugar level two hours after administration of 75g glucose in solution form. Body mass index was measured and used as effect modifier. Collected data was analyzed by SPSS vR 20. Mean  $\pm$  SD was given for age. Percentage was given for gender.

**Results:** Mean age was  $46.93 \pm 7.18$  years ranging from 40 to 66 years. Eighty six patients (45.3%) were male and 104 patients (54.7%) were female. 45 patients (23.7%) had glucose intolerance in our study sample (n=190).

**Conclusion:** We concluded that the frequency of glucose intolerance in chronic hepatitis C is quite high (23.7%) so every patient of chronic hepatitis C should be screened.

**Keywords:** Glucose Intolerance, Diabetes, Chronic Hepatitis C

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## INTRODUCTION

Hepatitis C infection has affected 150 million people and had caused 350,000 deaths so far as updated by world health organization on July 2013<sup>1</sup>. Physicians come across chronic hepatitis C more frequently than any other disease in tertiary care teaching hospital due to its high prevalence i.e. ranging from 4.8% to 12% in Pakistan<sup>2</sup>. Due to changing lifestyle and dietary habits, diabetes and glucose intolerance are also on the rise in our population. It appears only as the tip of iceberg to us. The world prevalence of glucose intolerance among adults was 6.4%, affecting 285 million adults in 2010 to 7.7% and is expected to affect 439 million adults by 2030<sup>3</sup>. Pakistan has an alarming situation with prevalence of glucose intolerance among males (12.14%) and females (9.83%) respectively<sup>4</sup>.

Interestingly, a prevalent co-existence of glucose intolerance and hepatitis C has been reported throughout the world<sup>5</sup>. In a Japanese study the prevalence of glucose intolerance in the chronic hepatitis C patients came out about 13.6% which is greater than the prevalence in their normal population<sup>6</sup>.

Diabetic patients with hepatitis C are more likely to have severe fibrosis than non-diabetic patients<sup>7</sup>. Ultimate response of hepatitis C treatment (sustained viral response) is highly dependent on status of glucose intolerance<sup>8</sup>. This double burden of disease i.e., co-existence of glucose intolerance and hepatitis C is a phenomenon on rise in underdeveloped countries like Pakistan<sup>3</sup>.

Literature review for local prevalence of glucose intolerance in hepatitis C patients showed scanty data.

Although glucose intolerance is a factor affecting sustained viral response yet checking every patient for glucose intolerance before start of treatment for hepatitis C is not a routine. Glucose intolerance can easily be managed by simple life style modification measures. Early detection of glucose intolerance before the start of treatment will not only reduce the morbidity associated with diabetes but also help us achieve the desired results i.e. sustained viral response.

We planned this study because not much data available locally for Pakistani population regarding prevalence of glucose intolerance in chronic hepatitis C patients. There is strong evidence of inverse correlation between glucose intolerance and response to hepatitis C treatment. Local screening for glucose intolerance with hepatitis C patients is important because our population is different from others genetically and in the trends of diabetes.

## METHODOLOGY

The sample size of 190 was estimated by 95% confidence level with 6% margin of error and taking proportion of glucose intolerance among chronic hepatitis C 13.6% in poorly controlled diabetic patients<sup>6</sup>. This study was conducted in Department of Medicine, Jinnah Hospital, Lahore for 6 months (21-10-2014 to 20-04-2015). Approval from the ethical committee of hospital was taken. Patients were enrolled by non-probability consecutive sampling. Cases fulfilling the inclusion criteria were enrolled throughout project. Both male and female were included with age range of 40 to 70 years. Demographic history was

taken and both genders were included. Written informed consent was taken from the patient. Exclusion criteria included body mass index more than 30 kg/m<sup>2</sup>, previously treated for hepatitis C, any other connective tissue disorder like rheumatoid arthritis and SLE and patients with history of previous stroke. All variables of interest like age, gender, fasting and pre & post load blood sugar levels were recorded on a standard questionnaire. Glucose intolerance was determined by measuring 12 hour fasting blood sugar level and blood sugar level two hours after administration of 75g glucose in solution form. Glucose levels were measured by strip method. Body mass index was measured and BMI > 25kg/m<sup>2</sup> was used as effect modifier.

All the data collected was analyzed by SPSS version 17.0. Mean with standard deviation described the variables like age, body mass index and blood glucose level. Frequency and percentages were calculated for gender and glucose intolerance. Data was stratified by age, gender and BMI > 25kg/m<sup>2</sup> to determine the effect modification. Chi square test was used post stratification and p value ≤ 0.05 was taken as statistically significant.

## RESULTS

In this study, 190 hepatic patients were included. Demographic parameters like gender, age and duration of hepatitis C were noted at the time of enrollment (Table:1). Mean age among patients enrolled was 46.93±7.186. Total 139 patients (73.2%) were below 50 years of age and remaining 51 patients (26.8%) were either equal or above 50 years of age.

Results regarding body mass index and glucose intolerance among enrolled patients (n=190) were described as frequencies and percentages in Table-2.

When we cross tabulated parameters like body mass index, gender and duration of hepatitis with glucose intolerance, results came out to be significant with p value ≤ 0.05 (Table-3). Out of 190 patients screened for glucose intolerance, 45 patients were found positive. Out of them (45), 32 patients were female and 13 patients were male.

Table-1: Results of Demographic Parameters among enrolled patients (n=190)

Gender	Frequency	Percent
Male	86	45.3%
Female	104	54.7%
Total	190	100.0%
<b>Age Groups</b>		
Below 50 years	139	73.2%
Above 50 years	51	26.8%
Total	190	100.0%
<b>Duration of Hepatitis C (years)</b>		
less than 3 years	67	35.3%
3-6 years	64	33.7%
More than 6 years	59	31.1%
Total	190	100.0

Table-2: Body mass index and glucose intolerance among enrolled patients (n=190)

Body mass index	Frequency	Percent
Below 24.9 kg/m <sup>2</sup>	178	93.7%
Above 24.9 kg/m <sup>2</sup>	12	6.3%
Total	190	100.0%
<b>Glucose Intolerance</b>		
No	145	76.3%
Yes	45	23.7%
Total	190	100.0%

Table-3: Cross tabulation of gender, BMI and duration of hepatitis with glucose intolerance

Variables	Glucose Intolerance				p-value
	NO		YES		
	Frequency	Percentage	Frequency	Percentage	
Body mass index					
Above 24.9 kg/m <sup>2</sup>	0	0%	12	100.0%	0.001*
Below 24.9 kg/m <sup>2</sup>	145	81.5%	33	18.5%	
Gender					0.012*
Female (n=104)	72	62.9%	32	30.8%	
Male (n=86)	73	84.9%	13	15.1%	
Duration of Hepatitis					0.001*
More than 6 years (n=59)	31	52.5%	28	47.5%	
3-6 years (n=64)	55	85.9%	9	14.1%	
less than 3 years (n=67)	59	88.1%	8	11.9%	

\*significant p-value ≤ 0.05

## DISCUSSION

The prevalence of hepatitis C infection has been a problem for mankind since centuries and has affected many lives over years causing 350,000 deaths till 2013<sup>1</sup>. Studies have shown a strong association between glucose intolerance and hepatitis C with adverse outcome<sup>9</sup>. Changing dynamics in life styles of population has led to an epidemic of glucose intolerance and diabetes in our population.

In our study, 45 patients of chronic hepatitis C (23.7%) had glucose intolerance. This frequency is quite high as compared to studies in other countries. In a Japanese study the prevalence of glucose intolerance in the chronic hepatitis C patients came out about 13.6%<sup>6</sup>.

The resultant difference may be secondary to delay in treatment and increased duration of untreated chronic hepatitis C infection in our population.

In our sampled population, mean age of patients was 46.93±7.1 years. It implies that a relatively younger cohort is still suffering from potentially treatable disease. 139 patients (73.2%) were below 50 years of age and remaining 51 patients (26.8%) were either equal or above 50 years. Among 45 patients were with glucose intolerance as the results showed so it implies that in our sample, age is not a contributory factor to develop glucose intolerance.

More female presented with chronic hepatitis C infection. 86 patients (45.3%) were male and 104 patients

(54.7%) were female. Out of 45 patients with glucose intolerance 32 patients were female and 13 patients were male. When we applied Pearson chi square test results were significant ( $p=0.012$ ). It means women are at higher risk of developing glucose intolerance as compared to male counterparts.

Similarly overweight patients of chronic hepatitis C were found to be at higher risk of developing glucose intolerance. 12 patients with glucose intolerance had BMI above 24.9 to 29.9 kg/m<sup>2</sup> and 33 patients had BMI below 24.9 kg/m<sup>2</sup> ( $p=0.01$ ).

## CONCLUSION

Frequency of glucose intolerance is quite high (23.7%) so every patient of chronic hepatitis C should be screened for glucose intolerance. Policies are required to overcome this health issue.

**Limitations:** It included too small sample size and financial constrains with lack of resources.

**Conflict of interest:** None.

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