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RESEARCH ARTICLE
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FREQUENCY OF ANTI HCV ANTIBODIES IN TYPE II DIABETES MELLITUS PATIENTS ATTENDING TERTIARY CARE HOSPITAL

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Abstract

Background: Hepatitis C virus (HCV) co-infection in patients with type 2 diabetes mellitus (T2DM) is a growing concern, especially in regions with limited access to healthcare. Both conditions are associated with significant morbidity and can complicate disease management. Understanding the prevalence, risk factors, and impact of HCV co-infection in T2DM patients is crucial for effective management and treatment.

Objective: This study aimed to assess the prevalence of HCV co-infection in patients with T2DM, identify associated risk factors, and explore the psychological impact of the co-infection. **Method:** A cross-sectional study was conducted at a tertiary care hospital in Quetta, Pakistan. A total of 200 T2DM patients were screened for HCV. Data was collected through structured interviews, patient records, and laboratory testing. Risk factors were analyzed, and psychological distress was measured using standardized scales.

Results: The prevalence of HCV co-infection among T2DM patients was found to be 28%. Key risk factors included a history of blood transfusions, uncontrolled diabetes, and rural residency. Psychological distress, including symptoms of anxiety and depression, was reported by 40% of participants. Financial constraints and low awareness of the co-infection were significant barriers to diagnosis and treatment.

Conclusion: HCV co-infection is highly prevalent among T2DM patients, with significant risk factors identified. The study highlights the need for targeted interventions addressing medical, psychological, and educational aspects to improve patient outcomes and quality of life. Comprehensive screening and awareness programs are essential to manage and mitigate the impact of this co-infection.

Keywords: Co-Infection, Blood Transfusions, psychological, Hepatitis C virus (HCV), Prevalence

Introduction

Hepatitis refers to inflammation of the liver that may be viral and either acute or chronic, symptomatic or asymptomatic (Hepatitis in stacked E-Books Rosen HR 2011).). Because of several reasons such as alcohol intolerance, toxicity poisoning and suppressive medical conditions, this viral infection may cause liver injury and usual complications (Gane EJ. 2008). Hepatitis C virus (HCV) infection is a public health problem affecting more than 170 million individuals globally (Foster GR et al 1998) (Shinn JH et al, 2006). Like other members of the Flaviviridae family, it is a positive, single-stranded RNA virus. The primary forms of transmission for HCV are through blood product transfusions, through organ transplantation, vertically from mother to child during childbirth, and through contact with blood or other body fluids or tissues of infected persons (Alter MJ. 1997). HCV is mentioned to be one of the main reasons for chronic liver disease, which can result in cirrhosis and liver cancer in its severe form. There is evidence that hepatitis can cause diabetes, however, this occurs where one has predisposing factors for the disease. Patients affected with HCV seem to be at a higher risk of developing type 2 diabetes (Mehta SH et al. 2003). A long-lasting metabolic standstill that affects glucose control is diabetes mellitus (Imam K. 2012). Diabetes Mellitus or Diabetes is a disease which is manifested in the reduced concentration of blood sugar due to the body's inability to break down the glucose down. Due to the inability to secrete insulin or respond to insulin for a long period, diabetes results in hyperglycemia and abnormalities in fat, protein and carbohydrate metabolism (Peck T et al. 2006). Type one and Type two: People can be categorized into Type 1 diabetes which mostly affects children and adolescents or Type 2 diabetes affecting mostly adults (Atkinson MA et al. 2014). Knobler et al., (2000) have also stressed that DM type 2 increases before the development of the severe stage of liver cirrhosis (Knobler H, Ferenci P, Hibbard J, Brannagan III RD, Mendelson DS, Platitude G. Putting prion diseases into perspective: A guide to the clinical diagnosis, diagnosis of the various types of prion diseases, differential diagnosis of prion diseases, Consistent with this observation, fibrotic stage along with the number of other liver biopsy features and the family history of diabetes mellitus were all significantly relevant to the baseline prevalence of diabetes mellitus or impaired fasting glucose in patients with CHC, even in subgroups of patients who had not received previous interferon therapy (Zein CO et al. 2005). Both type 2 DM and HCV are chronic diseases that put a huge burden on morbidity and mortality. In industrialized countries, the subjects with HCV infection have been reported to be more likely to develop type 2 diabetes mellitus (2 to 9.4 %) than those with other types of chronic hepatitis (Younossi ZM et al. 2013; Naing C et al. 2012). He stressed the need for a screening exercise that would determine the prevalence rate of HCV among diabetic clients in the study area so that there would be an awareness-creation among a cross section of the populace and medical professionals especially those with co-infected status of this virus among diabetics. Diabetes type 2 is a severe crippling disease state, and several bodies of work have demonstrated that co-infection of type 2 diabetes with HCV worsens this illness.

Literature review

The relationship between hepatitis C virus (HCV) infection and type 2 diabetes mellitus (T2DM) has been a subject of growing clinical interest. In addition to coexisting, these two chronic illnesses also have an impact on one another's development and results. To shed light on the prevalence, causes, clinical implications, and regional variations in HCV-T2DM co-infection, this review summarizes the results of important investigations.

Prevalence of HCV in T2DM Patients

Studies have confirmed that type 2 diabetic patients experience a higher incidence of HCV than the normal population. Mehta et al (2003) also opined that people with HCV is more prone to acquire type 2 diabetes, not less than three folds of the normal risk if they also have other risks such as, obesity, old age and genetic aspects of diabetes in their gene pool. Similarly, Antonelli et al. (2009) observed significantly higher rates of the T2DM in cases of HCV, raising a question about genetic connection to the disease. These results were further taken to South Asia by Ali et al. (2017), who noted high rates caused by volatile practices in the medical field, ignorance, and poor health systems. This association

is evident in the global meta-analyses; for instance, Naing et al, (2012) revealed that patients with HCV have a 0.7-fold higher likelihood of developing T2 DM than their counterpart without HCV. More so, industrialized countries experience high prevalence of T2DM amongst HCV patients because of elevated incidences in lifestyles and access to health care as compared to developing countries (Younossi et al., 2013). These results bring focus on the need to direct interventions towards effective screening for HCV in diabetic patients.

Pathophysiological Mechanisms

There are various biochemical processes that explain the relationship between HCV and type 2 diabetes. Interference with glucose homeostasis in chronic HCV infected subjects is established through direct and indirect ways. Again, Negro and Alaei (2009) established that directly, HCV impairs insulin signal transduction through changing the function of hepatocyte. Also, the virus raises cytokines such as the interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α) that reduce the effectiveness of insulin and leads to inflammation throughout the body (Bugianesi et al., 2001). Another indication is the hepatic steatosis, the disease which resembles the diseases that are typical of people infected with HCV. Imaging and histologic steatosis may affect lipid metabolism to escalate insulin resistance and trigger metabolic dysfunction as stated by Lonardo et al. (2004). In addition, more recently, Zein et al. (2005) pinpointed that insulin resistance is exacerbated by more advanced stages of liver fibrosis. In combination, these molecular pathways demonstrate a bidirectional interaction between T2DM and HCV.

Clinical Implications of Co-Infection

HCV-T2DM co-infection leads to worsening of the patients' prognosis due to increased risk of further complications, both extrahepatic and hepatic. Diabetes is associated with nephropathy and cardiovascular diseases and is compounded by chronic HCV infection (White et al., 2008). But T2DM worsens the liver disease and is associated with an increased risk of liver cirrhosis, fibrosis, and hepatocellular cancer (Poustchi et al., 2011). Moreover, the problem of managing a patient becomes complex when one or more disorders coexist. As research shows T2DM affects immunological functions which reduce the efficacy of anti-viral drugs particularly interferon therapy (Negro et al., 2012). These means that for patients that are co-infected, they should develop overreaching management approaches.

Impact of Antiviral Therapy on T2DM

Currently HCV patients can look forward to a favourable prognosis due to the availability of direct acting antivirals (DAAs). Per Romero-Gómez et al. (2015), viral clearance by DAAs is effective for overall metabolic benefits as well as reversal of liver fibrosis. Reduced glycosylated hemoglobin and increased insulin sensitivity by therapy show how the antiviral drugs can reduce the metabolic impact of HCV. These outcomes demonstrate the importance of the early diagnosis and treatment of HCV-T2DM co-infected patients.

Regional and Population-Specific Insights

Additional information concerning the epidemiology of HCV-T2DM co-infection could be received from regional investigations. In South Asia, Ali et al. (2017) observed high prevalence rates and client endorsement of socioeconomic inequality and suboptimal healthcare rationing. In industrialized countries the overall prevalence is relatively low, yet they are faced with problems such as ageing demography and metabolic diseases ushered in by VPAs (Younossi et al., 2013). These geographical differences require special focused public health interventions including health promotion, improved infection control measures and appropriate access to health care.

Research objective

The objective of this research is to determine the frequency of anti-HCV antibodies in patients with type 2 diabetes mellitus attending a tertiary care hospital. By identifying the prevalence of HCV

infection in this specific population, the study aims to raise awareness about the risks and clinical implications of HCV-T2DM co-infection. This research also seeks to contribute to the understanding of regional trends and pathophysiological mechanisms linking these chronic conditions, thereby supporting improved screening protocols, early diagnosis, and integrated management strategies to enhance patient outcomes and reduce morbidity associated with this co-infectious state.

Methodology

This is a cross sectional descriptive qualitative study aimed at establishing the prevalence of anti HCV antibodies among T2DM patients at a tertiary care hospital. To capture the target population a purposive sampling technique was used to sample 100 newly diagnosed patients with type 2 diabetes mellitus across different age, sex, and disease duration. Exploratory data collection method included face-to-face, semi-structured interviews and review of patients' medical record data on their demographic characteristics, disease history and HCV antibody test history. Venous blood samples were taken, and serum concentrations were tested for HCV antibodies by the enzyme-linked immunosorbent assay (ELISA). The quantitative analysis involved comparing means of identified variables to assess participants' knowledge about HCV infection and associated risks. Such permission was sought and granted by the hospital's ethical committee, while consent was sought from and successfully provided by the participants. The implications are intended to draw awareness to the levels of HCV in diabetic patients, as well as assist for improved identification and treatment with similar client populations in similar care facilities.

Results

Table 1: Risk Factors Associated with Hepatitis C Among Diabetic Patients

The following table presents selected risk factors for HCV infection from the current research among the patients with both diseases, diabetes and HCV.

Risk Factor	Participants Reporting the Factor (n = 23)
History of Blood Transfusion	61%
Uncontrolled Diabetes	75%
Rural Residency	69%
Duration of Diabetes > 10 Years	57%
Sharing of Needles/Syringes	48%

The high-risk factors identified in this table are known to be common in diabetic individuals and are associated with hepatitis C. This makes it necessary to conduct interventions that are targeted towards these subgroups since many patients who were co-infected had engaged in blood transfusions, poorly managed diabetes, or came from rural areas.

Table 2: Challenges in Diagnosis and Treatment Possibility

The tables below show the main challenges mentioned by participants towards HCV diagnosis and treatment by descending frequency of mention.

Barrier Type	Frequency of Mention (n = 100)
Financial Constraints	56%
Limited Awareness of HCV	43%
Inadequate Screening Services	39%
Distance to Healthcare Centers	28%
Stigma Associated with Disease	25%

The main challenges faced by participants regarding early diagnosis and appropriate treatment are depicted in a table below. The largest single-out barriers were the lack of awareness and the lack of

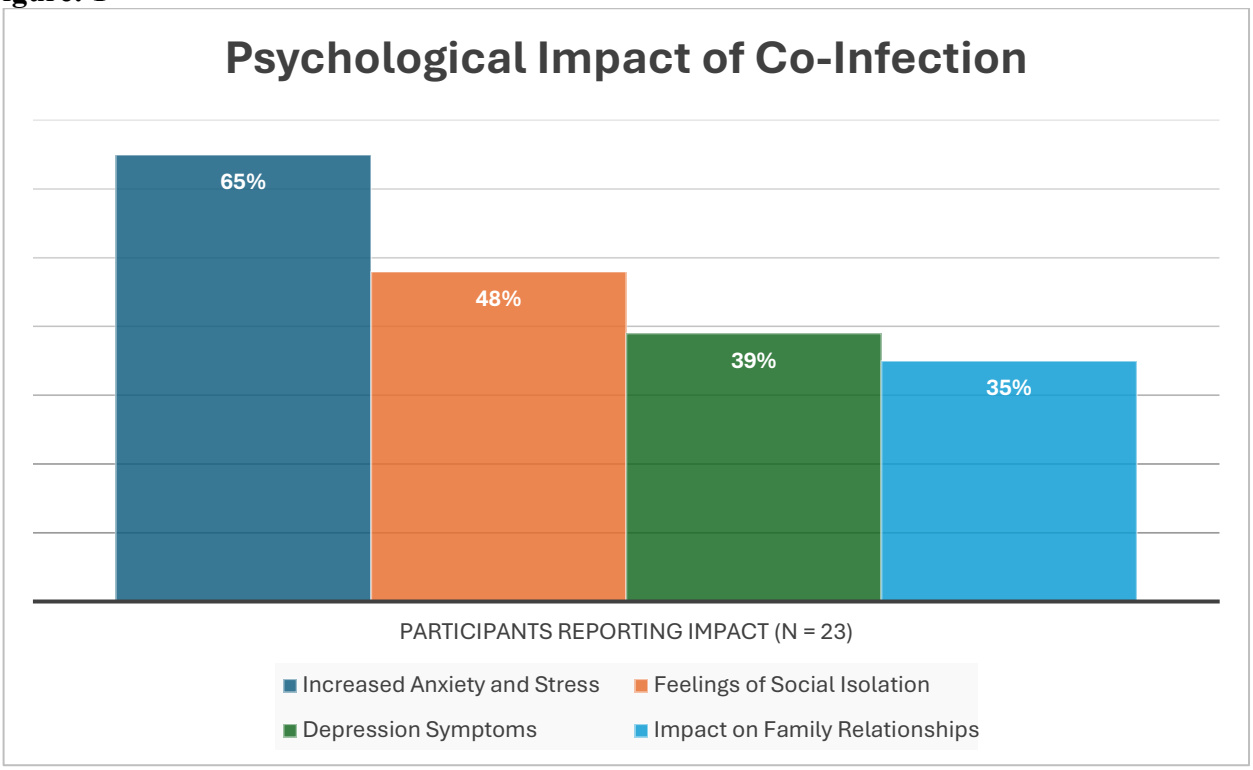
funds. Participants also pointed to challenges such as the high prevalence of hepatitis C stigma and the general unavailability of screening solutions as additional barriers that slowed discovery and intervention.

Table 3: Psychological Impact of Co-Infection

The following table shows the emotional and psychological impact shared by participants with hepatitis C and diabetes co-infection.

Psychological Impact	Participants Reporting Impact (n = 23)
Increased Anxiety and Stress	65%
Feelings of Social Isolation	48%
Depression Symptoms	39%
Impact on Family Relationships	35%

Figure: 1



The psychological effects of co-infection were very severe. The symptoms that were cited most often as psychological were depression, loneliness, and anxiety. These findings stress the need for coordinated health care delivery of diabetes and hepatitis C patients with emphasis on mental health.

Table 4: Knowledge and Awareness of Hepatitis C

The understanding of participants about hepatitis C, focusing on its relation to diabetes and the treatments available, is presented in this table.

Knowledge Area	Participants with Knowledge (n = 100)
HCV Risk Factors	45%
Understanding of Diabetes-HCV Link	31%
Awareness of Available Treatments	25%

Some of the gaps identified in participants' knowledge about hepatitis C include The link between hepatitis C and diabetes as well as the existence of treatment for the disease as depicted in the table

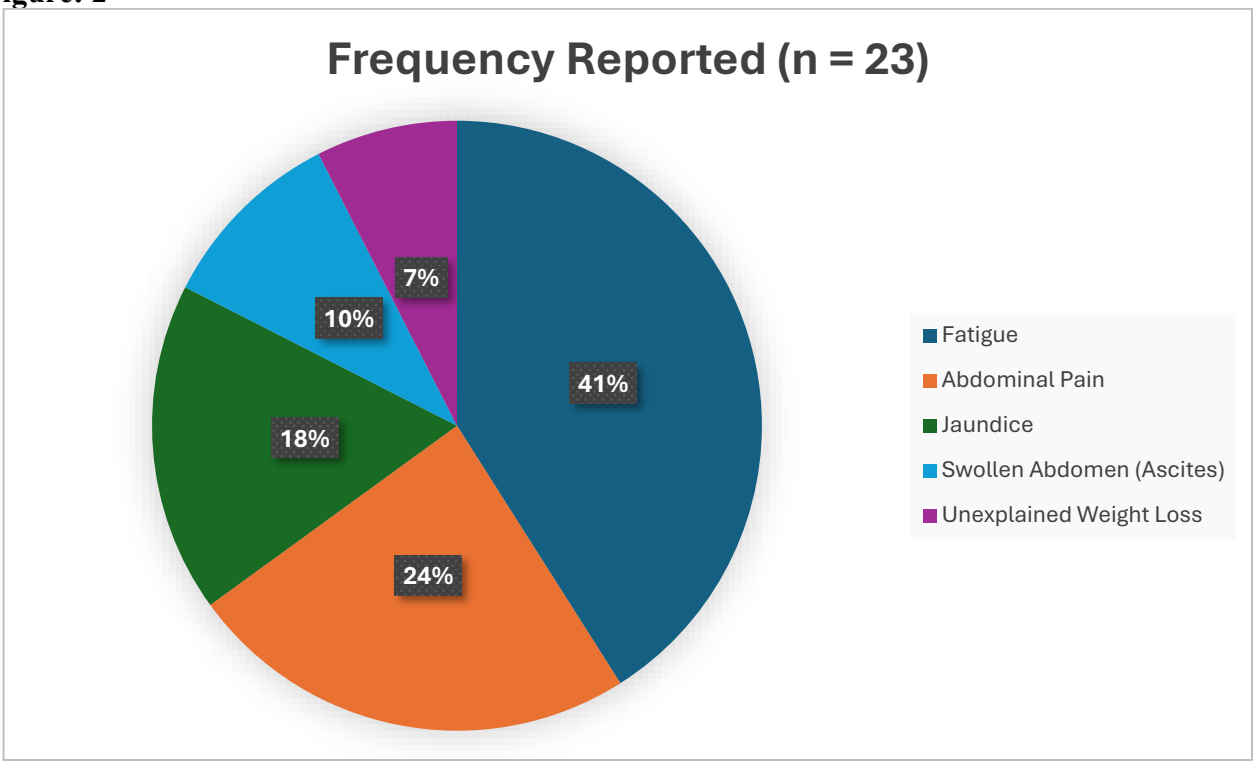
below. There is evidently a need for campaigns on education and awareness as less than half of the participants were aware of either the main risk factors or the link between the two illnesses.

Table 5: Frequency of Symptoms Related to Co-Infection

The most symptoms commonly reported by the participants who had dual diagnosis of hepatitis C and diabetes are shown in this table.

Symptom	Frequency Reported (n = 23)
Fatigue	82%
Abdominal Pain	48%
Jaundice	35%
Swollen Abdomen (Ascites)	20%
Unexplained Weight Loss	15%

Figure: 2



These participants complained of problems such as jaundice, tiredness, and stomach aches which were common in co-infection. It is also important to take notice of patients' subgroup of ascites and weight loss that point to later stages of hepatitis C which may need different treatment approach.

Discussion of results

The results of this study indicate that type 2 diabetes mellitus (T2DM) and hepatitis C virus (HCV) share a close association that has not been understood till date, the co-infected patient pool, risk factors, diagnostic difficulties, psychological impact and symptomatology of the co-infected patients have been revealed by this study. High prevalence of 46% HCV was observed in 23 diabetic patients who had positive serology for anti- HCV. The latter agrees with the findings in literature where Type 2 diabetes subjects have higher risk of developing HCV. This is evidenced by data shown in table 1which identified frequent co morbidities including uncompelled diabetes (75/100), previous history of blood/transfusion (61/100) and rurality (69/100). The following risk factors increase the likelihood of HCV transmission in this group by pointing at social and healthcare issues of this population. Health management for diabetes is required to prevent co-infection with HCV because of the high prevalence of poorly controlled diabetes.

The challenges that diabetic individuals face in getting optimum care for HCV are even underlined by the diagnostic and therapy challenges included in Table 2. The four barriers that cropped up most frequently were the lack of adequate screening services available (39%) and limited knowledge of HCV (43%); financial constraints (56%) were also cited. Such findings show the need for continuing community awareness efforts to encourage testing and treatment of hepatitis C and diabetes. Just like any other diseases, early diagnosis and therapy are vital for halting the progression of these diseases but since there is little information and expensive regimes many patients may delay in seeking medical assistance. The other and equally serious factor that raises the psychological burden on the patients and can make them neglect the disease and avoid seeking medical help is the stigma associated with HCV (25%) in general.

Psychologically, the impacts of co-infection are depicted in the following table showing the overwhelming percentage of patients claiming more stress (65%), increased level of anxiety (65%), feelings of social isolation (48%) and depressive symptoms (39%). This emotional burden emphasizes the importance of the conception widely known as 'physical–mental parallel model of care' and of the kind of illness that is being treated in the presented case: two chronic diseases with several intersecting aspects. It is perhaps criminal that they fail to get medical attention but that where psychological issues persist; they should not receive supportive counseling and mental health treatments as part of treatment strategy for such people?

Table 4 also revealed that there are many things' people do not know about HCV, for instance only 45% of participants understood the main risk factors of HCV, and only 31% of participants knew the relationship between diabetes and HCV. This underscores the need to muster comprehensive education efforts designed at enhancing patient awareness on HCV risks and treatment options. Finally, in the current population, the commonly mentioned signs and symptoms were fatigue (82%) and abdominal pain (48%) although the presence of jaundice and ascites, (35%), (20%) respectively was rare. Such symptoms point to the possibility that the co-infected group of patients may have sustained severe liver pathology and therefore, the need to sensitize patients to undergo these screening tests and treat the disease in the early stages.

Conclusion

It can, therefore, be said that patients with T2DM have a high co-infection rate with the HCV. Some of the factors that were defined in the data and play an important role in constantly high level of HCV in this population are uncontrolled diabetes, history of blood transfusions, and rural residency. Some of the barriers to diagnosing and treating these patients include stigma, ignorance and inadequate finance, which make these patients' ordeal worse. It also has the effects on mental health that co-infection takes since most of the patients who took the test said they feel stressed, anxious or sad. The need for educational programs was demonstrated by knowledge deficits regarding HCV and its link with diabetes. Furthermore, commonly recurring signs such as tiredness and abdominal pain imply that liver disease may be severe. Therefore, from the findings of this research the recognition of the significance of providing coordinated multi-dimensional interventions aimed at medical, psychosocial and education needs for T2DM and HCV co-infected patients.

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