

# Assessment of quality of life of type 2 diabetes patients with newly diagnosed non alcoholic fatty liver disease using quality of life instrument for Indian diabetes patients

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## ABSTRACT

**Introduction:** Non alcoholic fatty liver disease is emerging as a public health problem among type 2 diabetes mellitus patients. It has an impact on quality of life, which is meagrely explored. **Aim:** To assess quality of life of type 2 diabetes patients with newly diagnosed non alcoholic fatty liver disease. **Materials and Methods:** Confirmed cases of newly diagnosed non alcoholic fatty liver disease with type 2 diabetes mellitus ( $n = 55$ ) were enrolled. Clinical, anthropometric and medical profiles were assessed. Quality of life was assessed with the help of quality of life instrument for Indian diabetes patients. **Results:** Weight ( $P = 0.005$ ) and body mass index ( $P 0.008$ ) in grade 3 hepatic steatosis were higher than grade 2 steatosis. Physical health deteriorated from grade 1 to grade 3 hepatic steatosis. The mean likert scores decreased significantly ( $P 0.000$ ) from grade 2 to grade 3 and between grade 1 and grade 3 ( $P 0.0014$ ) hepatic steatosis in the physical endurance domain. Perceptions regarding general health and treatment satisfaction revealed existing loopholes in the health system and one's general attitude towards health. The dietary domain was marked with gross dissatisfaction amongst most with hepatic steatosis with a significant reduction in mean likert scale score between grade 1 and grade 2 ( $P 0.012$ ) of hepatic steatosis. **Conclusions:** Modifiable domains of quality of life should be addressed as a core component of standard care in newly diagnosed non alcoholic fatty liver disease with type 2 diabetes mellitus to avert future cardiac and hepatic events.

**Key words:** Body mass index, nonalcoholic fatty liver disease, quality of life instrument for Indian diabetes patients, quality of life, type 2 diabetes mellitus

## INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD), worldwide has become one of the most common causes of chronic liver disease, causing considerable liver morbidity and mortality, and is becoming a major reason for liver transplantation.<sup>[1]</sup> It is postulated that non alcoholic steatohepatitis (NASH) will increase the global burden of liver disease, affecting

public health and health-care costs globally by becoming an increasingly common problem in the rich as well as the poor countries.<sup>[2]</sup>

As most of the type 2 diabetes patients have some or the other form of NAFLD,<sup>[3]</sup> it will be intriguing to explore the ramifications from the qualitative perspective. An aspect which has been meagrely explored from the NAFLD standpoint, the term quality of life (QOL) is defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. The concept encompasses a broad sphere with the impact factors such as; person's physical health, psychological state, level of independence, social relationships, relationship to salient features of the environment.<sup>[4]</sup> As QOL aids in assessing the burden

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of disease, it provides a glimpse of personal impact of the disease on daily living.<sup>[5]</sup> NAFLD is associated with impaired QOL.<sup>[6-8]</sup> Assessment of QOL as a core strategy for the management of diabetes and its co-morbidities like NAFLD, will help to enhance patient's health-related QOL and thereby, potentially improve treatment compliance and their metabolic profile.<sup>[9]</sup>

There is a dearth of research that provides an insight into the quality of life of type 2 diabetes patients with newly diagnosed non alcoholic fatty liver disease. Thus, the study was conducted to assess the quality of life of type 2 diabetes patients with newly confirmed NAFLD with the help of the quality of life instrument for Indian diabetes patients (QOLID).

## MATERIAL AND METHODS

### Ethics

The study was approved by the Institutional Medical Ethics Committee. Written informed consent was obtained from the study participants.

### Selection and description of participants

Type 2 diabetes patients aged between 30 to 75 years, with newly confirmed non alcoholic fatty liver disease (less than three months of ultrasonographic diagnosis) were enrolled from a diabetes clinic for the study. A strict criterion for inclusion was the availability of the grade of hepatic steatosis in the medical records according to the Brunt *et al.*<sup>[10]</sup> classification. To be precise with the diagnosis of primary non alcoholic nature of the fatty liver, a thorough investigation about any known liver disease, significant alcohol intake and hepatotoxic drugs was carried out with the help of a structured questionnaire. Details regarding the medical and clinical profile, family history of diabetes and duration of diabetes were elicited with a structured questionnaire. Weight was measured with the help of a digital weighing balance to the nearest 0.1kg. Fibre glass tape was used for measuring the height

to the nearest 0.1cm. The body mass index (BMI) was calculated by dividing the weight in kilograms by the height in metre square. Waist circumference (WC), a measure of abdominal obesity, was measured at the level of the umbilicus. Blood pressure was recorded with a mercury sphygmomanometer. Quality of Life Instrument for Indian Diabetes Patients (QOLID) was used to assess the quality of life. QOLID, a tool especially developed for the Indian diabetes patients, comprises of a set of 34 items (questions) representing eight different domains of quality of life, namely; role limitations due to physical health, physical endurance, general health, treatment satisfaction, symptom frequency, financial worries, mental health, and diet advice satisfaction. It is a reliable and valid tool for assessment of quality of life of Indian patients with diabetes. The psychometric strength of the questionnaire is further enhanced by the use of a standard Likert scale across all questions with ratings from one to five.<sup>[9]</sup>

### Statistics

The data was entered and analysed in Microsoft Excel 2007. The quantitative variables were presented as Mean  $\pm$  SD. Frequencies and percentages were used to derive the quantification of responses. To compare the quantitative differences and to derive the statistical significance between the three grades of hepatic steatosis, analysis of variance (ANOVA) was performed.

## RESULTS

### Demographic profile of newly diagnosed non alcoholic fatty liver disease patients with type 2 diabetes

Most of the enrolled patients (70.9%) fell in the grade 2 category. Age, height and waist circumference had no significant relationship between the three grades of hepatic steatosis [Table 1]. Duration of diabetes was insignificant and the prevalence of hypertension was the highest among those with grade 3 steatosis. Weight in grade 3 steatosis was higher than grade 2 ( $P$  0.005) and grade 1 ( $P$  0.05) steatosis. BMI was significantly higher in grade 3 steatosis

**Table 1: Demographic profile of newly diagnosed non alcoholic fatty liver disease patients with type 2 diabetes**

Variables	Steatosis grade 1	Steatosis grade 2	Steatosis grade 3	F value
N	9	39	7	
Age (years)	55.11 $\pm$ 9.02	54.1 $\pm$ 9.2	60.2 $\pm$ 6.2	0.25
Family history of diabetes (%)	66.6	64.1	71.4	
Duration of diabetes (years)	7.53 $\pm$ 6.96	6 $\pm$ 5.65	6.4 $\pm$ 4.4	0.77
Hypertension (%)	55.55	64.1	85.7	
Weight (kg)	73.6 $\pm$ 13.6	71.9 $\pm$ 11.5	85.1 $\pm$ 6.1	0.036*
Height (cm)	161.8 $\pm$ 8.8	159.1 $\pm$ 9.1	158.9 $\pm$ 14.3	0.74
Body mass index (kg/m <sup>2</sup> )	28.4 $\pm$ 6.6	28.5 $\pm$ 5	34.3 $\pm$ 6	0.03*
Waist circumference (cm)	104 $\pm$ 15.48	100.2 $\pm$ 10.3	105.6 $\pm$ 8.8	0.38
Systolic blood pressure (mmHg)	140.3 $\pm$ 18.5	138.6 $\pm$ 17.4	137.1 $\pm$ 8.7	0.93
Diastolic blood pressure (mmHg)	85 $\pm$ 8.7	86.4 $\pm$ 8.8	87.8 $\pm$ 5	0.79

$P < 0.05^*$

vs. the grade 2 steatosis ( $P 0.008$ ). Though diastolic blood pressure increased with each grade of steatosis, the relationship was insignificant.

### Quality of life

1. **Role limitation due to physical health:** Almost 43% of the subjects in grade 3 steatosis missed work 'often' due to their diabetes. One fourth of the diabetes patients in grade 2, 57.14% in grade 3 steatosis cited their schedule of diabetes management affecting their work often. The lesser frequency of 'sometimes' was observed to be the highest in grade 1 hepatic steatosis, with a decline being observed from stage 1 to stage 3 of hepatic steatosis for diabetes affecting their work. Majority of the patients in all the hepatic steatosis grades reported diabetes to be limiting their social life and limiting their social activities compared to others of their own age.
2. **Physical endurance:** Vigorous activities seemed to be limited due to the overall health problems as 42.85% of grade 3 hepatic steatosis patients reported doing vigorous work to be a major issue. Moderate activities were found to be more tolerable as the frequency of moderate activities increased compared to the frequency of vigorous activities. Patients with grade 1 and 2 of fatty liver, sometimes faced problems while walking uphill or climbing a couple of floors (88.88% vs. 41.02% respectively), whereas, the grade 3 patients reported frequent problems with regard to the same (42.85%) and also had serious concerns walking at a stretch for 1-2 kilometers. Bending, squatting and turning were problematic for the grade 3 hepatic steatosis patients, as most of them reported frequent (42.85%) and often (28.57%) limitation of the said activities.
3. **Symptoms bothersome:** Most of the patients in all the three grades of hepatic steatosis, sometimes reported polydipsia (44.44%, 61.53% and 71.4%) and polyuria (66.66%, 53.84% and 57.14%), polyphagia (almost 86% in grade 3 hepatic steatosis) in the last three months.
4. **General health:** Most of the patients in the three different categories of hepatic steatosis opined their health to be good (55.55%, 43.58% and 42.85%, respectively). The grade 1 hepatic steatosis patients opined that their ability to concentrate in the usual chores was 'very much' (77.77%), whereas, the grade 2 (48.71%) and grade 3 (57.14%) hepatic steatosis patients reported moderate levels of concentration. More than half (57.14%) of the grade 3 hepatic steatosis patients sometimes experienced fatigue in the past three months.
5. **Treatment satisfaction:** Very few of the diabetes patients with hepatic steatosis seemed to be very satisfied with their current diabetes treatment. Majority (57.14%) of the grade 3 hepatic steatosis patients were neither satisfied nor dissatisfied with the quantum of time it takes them to manage their diabetes, whereas 66.66% of the grade 1 hepatic steatosis patients were moderately satisfied with the same. Almost 43% of the grade 3 hepatic steatosis patients were moderately dissatisfied with their current exercise regime. Personalized health care and motivating the patients to undertake the management of disease with great enthusiasm can improve treatment satisfaction.
6. **Financial worries:** Most of the patients found the cost factor to be either reasonable or not expensive at all in the management of diabetes. Most (77.77%) of the grade 1 hepatic steatosis patients and 42.85% of the grade 3 hepatic steatosis patients felt that there has been only a little shift in their priority of expenditure towards diabetes management. Most opined that the family budget was not getting affected due to the costs involved in the management of diabetes.
7. **Emotional/mental health:** More than half (55.55%) of the grade 1 and 71.4% of the grade 3 hepatic steatosis patients were moderately satisfied with themselves, their personal relationships and with the emotional support they receive from their family and friends. More than half (57.14%) of the grade 3 hepatic steatosis patients were sometimes discouraged by their health problems, as against 33.33% of grade 1 steatosis patients. With regard to fulfilment of certain roles and leading their lives in a purposeful manner, most of the patients in all the three grades of fatty liver were content as they were very much satisfied.
8. **Diet satisfaction:** Almost 56% of the grade 1 and 71.4% of grade 3 hepatic steatosis patients felt that they sometimes experienced restriction in choosing food when eating out. More than 50% of the grade 2 (51.28%) and grade 3 (57.14%) hepatic steatosis patients sometimes consumed the avoidable food products and 51.28% of grade 2, 42.85% of grade 3 hepatic steatosis patients felt that they have little choice when they eat out. The responses reveal the restricted choices that a diseased patient faces due to the lack of availability of healthy foods while eating outside home and a lesser scope of dietary diversification to choose wisely among the available foods.

### Mean likert scale scores on eight domains of quality of life of newly diagnosed non alcoholic fatty liver disease patients with type 2 diabetes

The mean likert scale scores of type 2 diabetes patients with newly diagnosed NAFLD were found to be significantly lower in the physical endurance and diet satisfaction domains [Table 2]. A significant reduction ( $P 0.000$ ) was

**Table 2: Mean likert scale scores on eight domains of quality of life of newly diagnosed non alcoholic fatty liver disease patients with type 2 diabetes**

Domains	Steatosis grade 1	Steatosis grade 2	Steatosis grade 3	P value
Role limitation due to physical health	4.03±0.43	4±0.61	3.8±0.55	0.1
Physical endurance	3.7±1.09	3.63±1.06	2.9±1.28	0.0002***
General health	4.22±0.64	4.16±0.71	4±0.54	0.51
Treatment satisfaction	3.52± 0.69	3.35±0.86	3.32±0.77	0.5
Symptom botherness	3.74±0.81	3.46±0.91	3.19±0.81	0.1
Financial worries	3.61±0.68	3.59±1.04	3.75±1	0.75
Emotional/mental health	4.13±0.72	3.99±0.8	4±0.54	0.54
Diet satisfaction	3.55±0.93	3.06±0.89	3.09±1.04	0.04*

$P < 0.05^*$ ;  $P < 0.01^{**}$ ;  $P < 0.001^{***}$

observed in mean likert scores from grade 2 to grade 3 in the physical endurance domain and a mean reduction was visible between grade 1 and grade 3 ( $P$  0.0014) hepatic steatosis. In terms of diet satisfaction, a significant reduction in mean likert scale score was observed between grade 1 and grade 2 ( $P$  0.012) hepatic steatosis.

## DISCUSSION

Type 2 diabetic patients have to address several barriers while managing their disease, which, in turn, has an impact on self care behaviour, long term glycemic control, predisposition to developing long term complications and quality of life.<sup>[11]</sup> One complication or a co-morbidity that is yet to get its share of recognition as an unrecognized epidemic, having a major impact on the quality of life of type 2 diabetics is NAFLD. The present study aimed at assessing the quality of life of type 2 diabetic patients with newly diagnosed NAFLD and found the physical endurance of the said patients to be compromised. Needless to say, the ramifications would emerge in terms of productivity losses, mortality,<sup>[5]</sup> significant increases in medical costs and health care utilization over time.<sup>[12]</sup> It also highlights the potent effect of psychosocial factors on physical health outcomes.<sup>[11]</sup> The dietary domain was the second sphere that came under the lens of concern. It is challenging enough for nutritionists and health care practitioners to deliver healthy eating alternatives with the available resources and when meager food choices appear while eating out. Also, lesser acceptance for healthy alternatives among diabetics, to opt for dietary diversification to suit and meet the nutritional needs, further adds to the problem.

Compromised quality of life in the present study further corroborates the evidence that NAFLD patients score poorly on quality of life and especially health related quality of life<sup>[6,8]</sup> and as the severity of the disease increases, there is a further decline in the quality of life.<sup>[6,7]</sup> Such trends ask for inclusion of strategies to improve QOL within the framework of treatment.<sup>[5]</sup>

Evaluations of quality of life as a significant technique for clinical research,<sup>[13,14]</sup> have led to the emergence of management strategies targeting the modifiable factors. Interventions focusing on improving the physical health status of type 2 diabetic patients have shown to have positive impacts on HbA1c, FBG, weight and BMI along with improvement in daily physical activity, mental health, subjective wellbeing and quality of life.<sup>[15]</sup> Improvements in physical health have also been observed regardless of the training modality.<sup>[16]</sup> Thus, identification and intervention on modifiable factors associated with decreased QOL, may hold promise to improve QOL.<sup>[5]</sup> From the health care delivery standpoint, there is a need to increase the capacity to deliver more intensive management, utilize the existing health care resources in the community to cater to the ever increasing numbers of type 2 diabetics.<sup>[17]</sup>

To our knowledge, this is the first research to be documented on the quality of life of type 2 diabetic patients with newly diagnosed non alcoholic fatty liver disease. In this study, diet and physical activity, emerged to be the core components wherein the quality of life of these patients was found to be compromised. Being the core elements of lifestyle modification, these issues can be addressed to bring about a favourable change in the quality of life of these patients. Thus, integration of QOL along with the standard care protocol may improve many psychosocial elements, which, in turn, play a significant role in the holistic management of chronic disease.

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## REFERENCES

1. Lizardi-Cervera J, Aguilar-Zapata D. Nonalcoholic fatty liver disease and its association with cardiovascular disease. *Ann Hepatol* 2009;8:S40-3.

2. LaBrecque D, Abbas Z, Anania F, Ferenci P, Khan AG, Goh KL, *et al.*, Non alcoholic fatty liver disease and nonalcoholic steatohepatitis. WGO Global Guidelines; 2012. p. 1-29. Available at [http://www.worldgastroenterology.org/assets/export/userfiles/2012\\_NASH%20and%20NAFLD\\_Final\\_long.pdf](http://www.worldgastroenterology.org/assets/export/userfiles/2012_NASH%20and%20NAFLD_Final_long.pdf).
3. Medina J, Fernandez-Salazar LI, Garcia-Buey L, Moreno-Otero R. Approach to the pathogenesis and treatment of non-alcoholic steatohepatitis. *Diabetes Care* 2004;27:2057-66.
4. Skevington SM, Lotfy M, O'Connell KA. The World Health Organisation's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHO QOL Group. *Qual Life Res* 2004;13:299-310.
5. David K, Kowdley KV, Unalp A, Kanwal F, Brunt EM, Schwimmer JB, *et al.* Quality of Life in Adults with Nonalcoholic Fatty Liver Disease: Baseline Data from the Nonalcoholic Steatohepatitis Clinical Research Network. *Hepatology* 2009;49:1904-12.
6. Younossi ZM, Boparai N, Price LL, Kiwi ML, McCormick M, Guyatt G. Health-related quality of life in chronic liver disease: the impact of type and severity of disease. *Am J Gastroenterol* 2001;96:2199-205.
7. Younossi ZM, Boparai N, McCormick M, Price LL, Guyatt G. Assessment of utilities and health-related quality of life in patients with chronic liver disease. *Am J Gastroenterol* 2001;96:579-83.
8. Dan AA, Kallman JB, Wheeler A, Younoszai Z, Collantes R, Bondini S, *et al.* Health-related quality of life in patients with non-alcoholic fatty liver disease. *Aliment Pharmacol Ther* 2007;26:815-20.
9. Nagpal J, Kumar A, Kakar S, Bhartia A. The Development of 'Quality of Life Instrument for Indian Diabetes Patients (QOLID): A Validation and Reliability Study in Middle and Higher Income Groups. *J Assoc Physicians India* 2010;58:295-304.
10. Brunt EM, Janney CG, Di Bisceglie AM, Neuschwander-Tetri BA, Bacon BR. Nonalcoholic steatohepatitis: A proposal for grading and staging the histological lesions. *Am J Gastroenterol* 1999;94:2467-74.
11. Rubin RR, Peyrot M. Quality of Life and Diabetes. *Diabetes Metab Res Rev* 1999;15:205-18.
12. Baumeister SE, Volzke H, Marschall P, John U, Schmidt CO, Flessa S, *et al.* Impact of fatty liver disease on health care utilization and costs in a general population: A 5-year observation. *Gastroenterology* 2008;134:85-94.
13. Testa MA, Simonson DC. Assessment of quality of life outcomes. *N Engl J Med* 1996;334:835-40.
14. Thier SO. Forces motivating the use of health status assessment measures in clinical settings and related clinical research. *Med Care* 1992;30(Suppl):MS15-22.
15. Kempf K, Martin S. Autonomous exercise game use improves metabolic control and quality of life in type 2 diabetes patients - a randomized controlled trial. *BMC Endocr Disord* 2013;13:57.
16. Myers VH, Mcvay MA, Brashear MM, Johannsen NM, Swift DL, Kramer K, *et al.* Exercise Training and Quality of Life in Individuals With Type 2 Diabetes A randomized controlled trial. *Diabetes Care* 2013;36:1884-90.
17. Krass I, Dhippayom T. Pharmaceutical care – impact on quality of life in patients with type 2 diabetes: A review. *Clin Audit* 2013;5:17-32.

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