Quality of life in hepatitis c virus seropositive hemodialysis patients

Abstract

Background: Health-related quality of life (HRQOL) is a multidimensional concept that reflects a patient’s perceived well-being. It was well demonstrated that HCV had a negative impact on (HRQOL). The aim of this study was to assess HRQOL in hepatitis C Virus (HCV) seropositive hemodialysis Egyptian patients and highlight possible factors affecting it.

Patients and methods: 200 ESRD patients on regular hemodialysis at Ain Shams University hospitals and National Institute of Nephrology and Urology were included in this study and divided into 2 equal groups of HCV Ab seronegative and seropositive. Both groups were subjected to full medical history taking and examination. Laboratory investigations included hemoglobin level, pre dialysis blood urea, creatinine, calcium, phosphorus, PTH, ALT, AST, albumin and viral markers. Dialysis adequacy using Kt/v. HRQOL was measured through Short Form 36 (SF-36). In each dimension the respondent receives a score from 0 to 100. The higher score, the better the health.

Results: Our study showed that HCV seropositive hemodialysis patients had compromised HRQOL in comparison to HCV seronegative patients which was found in most of SF-36 subscales with higher scores for employed patients compared to the unemployed and those with higher haemoglobin levels. High pre dialysis serum creatinine, dry weight and serum albumin had significant positive correlation with SF-36 scale scores. Elevated liver enzymes and dialysis adequacy had no significant correlation with SF-36 scale scores. A significant negative correlation was present between serum phosphate and PTH on overall HRQOL.

Conclusion: HCV infection impairs HRQOL, in many aspects in hemodialysis patients. Better HRQOL is associated with male gender, younger age, employment, higher hemoglobin, higher pre dialysis serum creatinine and higher serum albumin. Prevention of HCV transmission by proper infection control measures reduces the economic burden and complications in hemodialysis.

Keywords: hemodialysis, hepatitis c virus, HRQOL, sf-36

Introduction

Health-related quality of life (HRQOL) is a multidimensional concept that reflects a patient’s perceived well-being and functioning in physical, psychological and social domains of health. End-stage renal disease (ESRD) is a chronic restrictive illness that affects many aspects of patient’s life. Moreover, ESRD has become worldwide public health problem causing a high level of disability in different domains of the patients’ lives, leading to impaired quality of life (QOL). Although there have been many advances in the treatment of end-stage renal disease (ESRD), mortality rates for ESRD patients remain several times higher than those of age-matched controls, and patients with ESRD continue to have significant impairments in quality of life (QOL), quality of life is related with morbidity and mortality in hemodialysis patients, and it is suggested that QOL should be considered in the regular monitoring of dialysis patients. Hemodialysis patients infected with HCV often have poor short-term clinical outcome, greater mortality, greater hospitalization rate, more significant protein-energy malnutrition and worse health-related quality of life.

The prevalence of HCV infection in patients undergoing dialysis is persistently greater than that in the general population, being endemic in hemodialysis units around the world predominantly in Mediterranean and developing countries of the Middle and Far East. It was well demonstrated that HCV had a negative impact on health-related quality of life (HRQOL). Why quality of life decreases in HCV infected patients is incompletely understood. The aim of this study was to assess health related quality of life (HRQoL) in hepatitis C Virus (HCV) seropositive hemodialysis Egyptian patients.

Patients and methods

This study was carried out at dialysis units at Ain Shams University hospitals and National Institute of Nephrology and Urology. Two hundred patients were included in this study.
Patients were divided into 2 groups

**Group I:** (HCV Ab negative group). Consists of 100 patients with ESRD, undergoing regular hemodialysis of at least 6 months duration, 4 hours each session, three times/week. HD therapy was performed with a low flux biocompatible membrane, using AV fistula and bicarbonate dialysis solution.

**Group II:** (HCV Ab positive group). Consists of 100 patients with ESRD, under regular hemodialysis of at least 6 months duration, 4 hours each session, three times/week. HD therapy was performed with a low flux biocompatible membrane, using AV fistula and bicarbonate dialysis solution.

**Exclusion criteria**

i. Age below 18 years or above 60 years.

ii. Signs of advanced liver disease (ascites, jaundice, bleeding tendency…etc.).

iii. History of other chronic diseases (Ischemic heart disease, chronic pulmonary disease, cerebrovascular disease…etc.).

iv. Previous or simultaneous malignancies.

v. Severe anemia (Hemoglobin less than 9gm/dl).

vi. Major surgery in last 6 months.

vii. Non cooperative patients.

**All patients underwent**

A. Thorough medical history and clinical examination including: age, gender, marital status, employment and occupation, social status, etiology of ESRD, duration of dialysis, dialysis dosage, vascular access and dry weight.

B. The data collection for this study was approved by the Ethics Committee and all subjects provided written informed consent before participating in this study.

**Laboratory investigations:** Blood samples were taken for determination of the following:

a. Hemoglobin, pre dialysis blood urea, serum creatinine.

b. Calcium, phosphorus, parathyroid hormone, ALT, AST, Albumin.

c. Viral markers: HCV Ab, HBs Ag, HIV Ab.

d. Dialysis adequacy as measured by single pool Kt/v

**Health-related quality of life measurement:**

It was measured through Short Form 36 (questionnaire). SF-36 Questionnaire was filled by all patients, data were analyzed from this questionnaire to determine the QOL for all patients. SF-36 questionnaire is a generic instrument that includes 36 items assessing 8 scales of functioning ability and health well-being of individuals. The 8 multi-item scales are as follows:

1. Physical Functioning (PF) is a 10-questions scale that captures abilities to deal with the physical requirement of life, such as attending to personal needs, walking, and flexibility.
2. Role-Physical (RP) is a 4 items scale that evaluates the extent to which physical capabilities limit activity.
3. Bodily Pain (BP) is a 2 items scale that evaluates the perceived amount of pain experienced during the most recent 4 weeks and the extent to which that pain interfered with normal work activities.
4. General Health (GH) is a 5 items scale that evaluates general health in terms of personal perception.
5. Vitality (VT) is a 4 items scale that evaluates feeling of energy and fatigue.
6. Social Functioning (SF) is a 2 items scale that evaluates the extent and amount of time, if any, that physical health or emotional problems interfered with family, friends, and other social interactions during the most recent 4 weeks.
7. Role-Emotional (RE) is 3 items scales that evaluate, the extent, if any, to which emotional factors interfere with work or other activities.
8. Mental Health (MH) is a 5 items scale that evaluates feelings principally of anxiety and depression.

In each dimension the respondent receives a score from 0 to 100. The higher the score, the better the health.

D-SF-36 eight subscales can also be combined into 2 component summary scores, a physical component summary PCS (general health, physical function, role-physical, bodily pain) and a mental component summary MCS (role- emotional, vitality, mental health, and social function) (Table 1).

Regarding clinical and laboratory data:

- The duration of hemodialysis is significantly higher in group 2.
- The dry weight is significantly higher in group 1.
- The hemoglobin level in group 2 is significantly higher than group 1.
- ALT and AST in group 2 is significantly higher than group 1.
- Albumin in group 2 is significantly lower than group 1.
- Kt/v is significantly higher in group 1 (Table 2).

Males showed significant better quality of life than females in the same group with significantly higher scores in the following quality of life domains: physical functioning, role emotional, social functioning, general health, physical component summary and mental component summary (Table 3).

There was significant higher score in role emotional, bodily pains and physical component summary in males than females of this group (Table 4).

Employed patients had significantly better quality of life than unemployed patients in the same group with significantly higher score in physical functioning, vitality, social functioning, general health, physical component Summary and mental component summary (Table 5).

There is no significant difference in quality of life between employed and unemployed patients but there is only significant higher score in physical function in employed patients (Table 6).

**In group 1**

- QOL was affected by age with a significant –ve correlation between age and PF, P=0.05 and a significant +ve correlation between age and MH, P= 0.036.
- There was also a significant + ve correlation between Hgb level and PF, VT, MH, GH, QoL, PCS and MCS P= 0.034, 0.015, 0.027, 0.002, 0.01, 0.004, and 0.018 respectively.

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c) There was also a significant + ve correlation between pre dialysis serum creatinine and PF, MH, GH, QoL, PCS and MCS P=.00, 0.042, 0.001, 0.04, 0.018, and 0.047 respectively.

d) There was no effect of serum albumin, PTH or Kt/v on QOL.

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

Table 1 The demographic characteristics of patients included in the study are shown in the table

|                      | HCV Negative | HCV Positive |
|----------------------|--------------|--------------|
| Age (years)          | 42.4±13      | 43±10.7      |
| Gender               |              |              |
| Male                 | 38 (38%)     | 68 (68%)     |
| Female               | 62 (62%)     | 32 (32%)     |
| Duration of HD (years)| 4.24±2.53   | 7±5.69       |
| Dry weight (kg)      | 71.82±20     | 66.16±18.39  |

Table 2 Comparative study between the two patients groups regarding clinical data, laboratory investigations and quality of life parameters

| HCVAb                | N    | Mean   | Std. Deviation | Std. Error Mean | t-test for Equality of Means | t | PValue |
|----------------------|------|--------|----------------|-----------------|------------------------------|---|--------|
| Age Negative         | 100  | 42.4   | 13.0066        | 1.30066         | -0.367                       | -3.67       | 0.003  |
| Positive             | 100  | 43.02  | 10.76937       | 1.07694         | -5.387                       | 0.001       |        |
| Duration of HD Negative | 100  | 4.242  | 2.53015        | 0.25301         | -3.058                       | -3.058      | 0.003  |
| Positive             | 100  | 7.6    | 5.69689        | 0.56969         | 1.83934                      | 0.156       |        |
| Dry Weight Negative  | 100  | 71.82  | 20.02896       | 2.0029          | 2.081                        | 0.039       |        |
| Positive             | 100  | 66.16  | 18.39341       | 1.83934         | -2.099                       | 0.039       |        |
| Hgb Negative         | 100  | 10.248 | 1.13159        | 0.11316         | -3.058                       | -3.058      | 0.003  |
| Positive             | 100  | 10.806 | 1.43173        | 0.14317         | 0.156                        | 0.156       |        |
| Urea Negative        | 100  | 98.44  | 30.6727        | 3.06727         | -3.343                       | -3.343      | 0.001  |
| Positive             | 100  | 117.48 | 47.98326       | 4.79833         | 0.156                        | 0.156       |        |
| Creat. Negative      | 100  | 10.232 | 2.61923        | 0.26192         | 1.424                        | 1.424       | 0.003  |
| Positive             | 100  | 9.76   | 2.02978        | 0.20298         | 0.156                        | 0.156       |        |
| ALT Negative         | 100  | 25.38  | 4.06955        | 0.40695         | 7.990                        | 7.990       | 0.001  |
| Positive             | 100  | 34.48  | 10.63678       | 1.06368         | 0.156                        | 0.156       |        |
| AST Negative         | 100  | 15.88  | 3.96775        | 0.39677         | -11.82                       | -11.82      | 0.001  |
| Positive             | 100  | 25.98  | 7.56785        | 0.75678         | 0.156                        | 0.156       |        |
| Albumin Negative     | 100  | 3.88   | 0.32035        | 0.03204         | 10.148                       | 10.148      | 0.001  |
| Positive             | 100  | 3.472  | 0.24291        | 0.02429         | 0.156                        | 0.156       |        |
| Ca Negative          | 100  | 8.812  | 0.63394        | 0.06339         | -1.260                       | -1.260      | 0.209  |

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Table continued...

| HCVAb                          | N  | Mean   | Std. Deviation | Std. Error Mean | t-test for Equality of Means | t  | PValue |
|-------------------------------|----|--------|----------------|-----------------|-----------------------------|----|--------|
| Positive                      | 100| 8.916  | 0.52852        | 0.05285         |                             |    |        |
| Phos. Negative                | 100| 5.894  | 0.92887        | 0.09289         | 1.473                       | 0.142|
| Positive                      | 100| 5.688  | 1.04517        | 0.10452         |                            |    |        |
| PTH Negative                  | 100| 492.7  | 334.48886      | 33.44889        | -1.930                      | 0.055|
| Positive                      | 100| 580.72 | 309.94167      | 30.99417        |                            |    |        |
| Positive                      | 100| 1.1255 | 0.19089        | 0.01919         | 2.134                       | 0.034|
| Physical Functioning Negative | 100| 55.5   | 22.47895       | 2.24789         | -1.195                      | 0.846|
| Positive                      | 100| 56.1   | 21.06483       | 2.10648         |                            |    |        |
| Role Physical Negative        | 100| 40     | 42.93523       | 4.29352         | 2.093                       | 0.038|
| Positive                      | 100| 27.5   | 41.51488       | 4.15149         |                            |    |        |
| Role Emotional Negative       | 100| 53.332 | 42.93639       | 4.39364         | 5.269                       | 0    |
| Positive                      | 100| 22.666 | 38.1615        | 3.81615         |                            |    |        |
| Vitality Negative             | 100| 46.8   | 14.69419       | 1.46942         | 2.592                       | 0.01 |
| Positive                      | 100| 40.5   | 19.36492       | 1.93649         |                            |    |        |
| Mental Health Negative        | 100| 52.24  | 17.23347       | 1.72335         | 2.726                       | 0.007|
| Positive                      | 100| 45.92  | 15.51258       | 1.55126         |                            |    |        |
| Social Functioning Negative   | 100| 58     | 24.45879       | 2.44588         | 2.102                       | 0.037|
| Positive                      | 100| 51     | 22.59101       | 2.2591          |                            |    |        |
| Bodily Pains Negative         | 100| 49.15  | 26.24001       | 2.624           | 1.258                       | 0.21 |
| Positive                      | 100| 44.35  | 27.71523       | 2.77152         |                            |    |        |
| General Health Negative       | 100| 39.5   | 17.47292       | 1.74729         | 0.893                       | 0.373|
| Positive                      | 100| 37.2   | 18.91395       | 1.89139         |                            |    |        |
| Quality Of Life Negative      | 100| 50.2524| 16.95088       | 1.69509         | 3.758                       | 0    |
| Positive                      | 100| 40.9759| 17.94395       | 1.79439         |                            |    |        |
| Physical Component Negative   | 100| 46.13  | 17.15638       | 1.71564         | 1.926                       | 0.056|
| Summary                       | 100| 41.132 | 19.46517       | 1.94652         |                            |    |        |
| Positive                      | 100| 46.13  | 17.15638       | 1.71564         | 1.926                       | 0.056|
| Summary                       | 100| 41.132 | 19.46517       | 1.94652         |                            |    |        |

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Table 3 Comparative study between males and females of HCV negative group regarding quality of life scores

|                        | Sex   | N     | Mean   | Std. Deviation | t    | Sig. (2-Tailed) |
|------------------------|-------|-------|--------|----------------|------|-----------------|
| Physical Functioning   | Male  | 38    | 64.7368| 21.77736       | 3.382| 0.001           |
|                        | Female| 62    | 49.8387| 21.13516       |      |                 |
| Role Physical          | Male  | 38    | 50     | 44.26578       | 1.845| 0.068           |
|                        | Female| 62    | 33.871 | 41.26503       |      |                 |
| Role Emotional         | Male  | 38    | 64.9116| 45.81417       | 2.098| 0.038           |
|                        | Female| 62    | 46.2348| 41.53436       |      |                 |
| Vitality               | Male  | 38    | 50.5263| 16.9972        | 1.882| 0.065           |
|                        | Female| 62    | 44.5161| 12.69793       |      |                 |
| Mental Health          | Male  | 38    | 56.2105| 17.17188       | 1.825| 0.071           |
|                        | Female| 62    | 49.8065| 16.95011       |      |                 |
| Social Functioning     | Male  | 38    | 69.0789| 21.50127       | 3.776| 0               |
|                        | Female| 62    | 51.2097| 23.81513       |      |                 |
| Bodily Pains           | Male  | 38    | 51.9737| 28.54085       | 0.841| 0.402           |
|                        | Female| 62    | 47.4194| 24.8065        |      |                 |
| General Health         | Male  | 38    | 50.5263| 13.45026       | 3.546| 0.001           |
|                        | Female| 62    | 44.5161| 12.69793       |      |                 |
| Quality Of Life        | Male  | 38    | 57.443 | 18.7329        | 3.282| 0.002           |
|                        | Female| 62    | 45.8453| 14.19582       |      |                 |
| Physical Component Summary | Male  | 38    | 52.9737| 19.52509       | 3.033| 0.004           |
|                        | Female| 62    | 41.9355| 14.1211        |      |                 |
| Mental Component Summary| Male  | 38    | 58.1211| 13.22258       | 4.264| 0               |
|                        | Female| 62    | 45.2581| 13.22258       |      |                 |

Table 4 Comparative study between males and females of HCV positive group regarding quality of life scores

|                        | Sex   | N     | Mean   | Std. Deviation | t    | Sig. (2-Tailed) |
|------------------------|-------|-------|--------|----------------|------|-----------------|
| Physical Functioning   | Male  | 68    | 58.5294| 19.9076       | 1.697| 0.093           |
|                        | Female| 32    | 50.9375| 22.80483      |      |                 |
| Role Physical          | Male  | 68    | 31.6176| 43.32661      | 1.547| 0.126           |
|                        | Female| 32    | 18.75  | 36.47801      |      |                 |
| Role Emotional         | Male  | 68    | 28.4306| 41.63462      | 2.638| 0.01            |
|                        | Female| 32    | 10.4163| 26.00968      |      |                 |
| Vitality               | Male  | 68    | 42.0588| 21.12923      | 1.335| 0.186           |
|                        | Female| 32    | 37.1875| 14.6979       |      |                 |
| Mental Health          | Male  | 68    | 47.0588| 16.73985      | 1.071| 0.287           |
|                        | Female| 32    | 43.5   | 13.92144      |      |                 |
| Social Functioning     | Male  | 68    | 51.8382| 22.47145      | 0.539| 0.591           |
|                        | Female| 32    | 49.2188| 23.10074      |      |                 |
| Bodily Pains           | Male  | 68    | 48.6765| 29.04728      | 2.552| 0.013           |
|                        | Female| 32    | 35.1563| 22.38715      |      |                 |
| General Health         | Male  | 68    | 38.5294| 18.98662      | 1.025| 0.308           |
|                        | Female| 32    | 34.375 | 18.74059      |      |                 |

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Table 5: Comparative study between employed and unemployed patients of HCV negative group regarding quality of life scores

|                               | N   | Mean   | Std. Deviation | Minimum | Maximum | P Value |
|-------------------------------|-----|--------|----------------|---------|---------|---------|
| **Physical Functioning**      |     |        |                |         |         |         |
| Employed                      | 24  | 72.5000| 21.61923       | 20.00   | 100.00  |         |
| Unemployed                    | 76  | 50.0000| 20.30588       | 5.00    | 85.00   | .000    |
| Total                         | 100 | 55.5000| 22.47895       | 5.00    | 100.00  |         |
| **Role Physical**             |     |        |                |         |         |         |
| Employed                      | 24  | 45.8333| 45.24491       | .00     | 100.00  | .088    |
| Unemployed                    | 76  | 36.4865| 41.62561       | .00     | 100.00  |         |
| Total                         | 100 | 40.0000| 42.93523       | .00     | 100.00  |         |
| **Role Emotional**            |     |        |                |         |         |         |
| Employed                      | 24  | 58.6667| 18.60030       | 24.00   | 84.00   |         |
| Unemployed                    | 76  | 51.3497| 42.44747       | .00     | 100.00  | .294    |
| Total                         | 100 | 53.3320| 43.93639       | .00     | 100.00  |         |
| **Mental Health**             |     |        |                |         |         |         |
| Employed                      | 24  | 49.9459| 16.52884       | 16.00   | 92.00   | .079    |
| Unemployed                    | 76  | 54.0541| 24.81844       | .00     | 100.00  |         |
| Total                         | 100 | 52.2400| 23.93639       | .00     | 100.00  |         |
| **Social Functioning**        |     |        |                |         |         |         |
| Employed                      | 24  | 56.8750| 31.00009       | .00     | 100.00  |         |
| Unemployed                    | 76  | 47.3649| 24.26273       | 10.00   | 100.00  | .106    |
| Total                         | 100 | 49.1500| 26.24001       | .00     | 100.00  |         |
| **Bodily Pains**              |     |        |                |         |         |         |
| Employed                      | 24  | 47.3697| 12.43867       | 5.00    | 60.00   | .000    |
| Unemployed                    | 76  | 34.7297| 17.47292       | 5.00    | 90.00   |         |
| Total                         | 100 | 39.5000| 22.16539       | 15.00   | 90.00   |         |
| **General Health**            |     |        |                |         |         |         |
| Employed                      | 24  | 47.0766| 14.10860       | 25.44   | 88.39   | .006    |
| Unemployed                    | 76  | 34.7297| 12.43867       | 5.00    | 60.00   |         |
| Total                         | 100 | 39.5000| 17.47292       | 5.00    | 90.00   |         |
| **Quality Of Life**           |     |        |                |         |         |         |
| Employed                      | 24  | 47.0766| 14.10860       | 25.44   | 88.39   | .001    |
| Unemployed                    | 76  | 34.7297| 12.43867       | 5.00    | 60.00   |         |
| Total                         | 100 | 39.5000| 17.47292       | 5.00    | 90.00   |         |
| **Physical Component Summary**|     |        |                |         |         |         |
| Employed                      | 24  | 57.2083| 22.02613       | 28.00   | 88.00   |         |
| Unemployed                    | 76  | 42.4459| 13.85284       | 20.00   | 88.00   | .001    |
| Total                         | 100 | 46.1300| 17.15638       | 20.00   | 88.00   |         |
| **Mental component**          |     |        |                |         |         |         |
| Employed                      | 24  | 59.6833| 18.32825       | 29.30   | 84.00   |         |
| Unemployed                    | 76  | 46.8270| 13.87055       | 25.90   | 73.40   | .001    |
| Total                         | 100 | 50.1460| 15.86200       | 25.90   | 84.00   |         |
Table 6 Comparative study between employed and unemployed patients in HCV positive group

| P value | Maximum | Minimum | Std. Deviation | Mean      | N   |  |
|---------|---------|---------|----------------|-----------|-----|-----|
| 0.006   | 95      | 20      | 20.90047       | 95        | 66  | Employed Physical Functioning |
| 0.743   | 100     | 0       | 42.48954       | 66        | 66  | Unemployed Role Physical     |
| 0.206   | 100     | 0       | 37.00768       | 66        | 66  | Unemployed Role Emotional    |
| 0.313   | 90      | 0       | 20.36492       | 66        | 66  | Unemployed Vitality          |
| 0.133   | 84      | 8       | 15.78126       | 66        | 66  | Unemployed Mental Health     |
| 0.704   | 100     | 0       | 21.14166       | 66        | 66  | Unemployed Social Functioning|
| 0.486   | 90      | 0       | 25.2408        | 66        | 66  | Unemployed Bodily Pains      |
| 0.083   | 70      | 0       | 17.38633       | 66        | 66  | Unemployed General Health    |
| 0.253   | 85.44   | 11.72   | 16.98601       | 66        | 66  | Unemployed Quality Of Life   |
| 0.143   | 87      | 13      | 19.46517       | 66        | 66  | Unemployed Physical Component Summary|
| 0.097   | 86.8    | 12.2    | 17.52176       | 66        | 66  | Unemployed Mental component Summary |

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| MCS   | PCS  | QoL  | GH   | BP   | SF   | MH   | VT   | RE   | RP   | PF   |
|-------|------|------|------|------|------|------|------|------|------|------|------|
| 0.115 | -0.032 | 0.039 | 0.02 | -0.109 | 0.168 | .210* | 0.093 | -0.013 | 0.069 | -0.197 | Pearson Correlation |
| 0.254 | 0.755 | 0.698 | 0.847 | 0.28 | 0.095 | 0.036 | 0.358 | 0.898 | 0.497 | 0.05 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| 252*  | 0.14  | 0.183 | 0    | -0.157 | .254** | 0.019 | 0.128 | .249* | .259** | 0.132 | Pearson Correlation |
| 0.012 | 0.166 | 0.069 | 0.998 | 0.119 | 0.011 | 0.851 | 0.206 | 0.012 | 0.009 | 0.189 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| 0.176 | 0.002 | 0.104 | 0.133 | -0.007 | .345** | .241* | 0.112 | -0.076 | -0.109 | 0.051 | Pearson Correlation |
| 0.079 | 0.984 | 0.304 | 0.188 | 0.942 | 0    | 0.016 | 0.267 | 0.451 | 0.28  | 0.613 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| .236* | .287** | .257** | .307** | 0.095 | 0.088 | .222* | .244* | 0.096 | 0.188 | .213* | Pearson Correlation |
| 0.018 | 0.004 | 0.01  | 0.002 | 0.349 | 0.383 | 0.027 | 0.015 | 0.344 | 0.061 | 0.034 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| 0.073 | 0.155 | 0.12  | 0.097 | 0.015 | -0.082 | 0.076 | 0.141 | 0.086 | 0.048 | .285** | Pearson Correlation |
| 0.473 | 0.124 | 0.235 | 0.339 | 0.885 | 0.416 | 0.451 | 0.162 | 0.393 | 0.636 | 0.004 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| .199* | .236* | .206* | .315** | 0.082 | 0.119 | .204** | .294** | 0.019 | -0.09 | .537** | Pearson Correlation |
| 0.047 | 0.018 | 0.04  | 0.001 | 0.417 | 0.237 | 0.042 | 0.003 | 0.851 | 0.373 | 0     | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| 0.019 | 0.099 | 0.053 | 0.152 | 0.072 | -0.023 | -0.08 | -0.067 | 0.032 | 0.123 | -0.024 | Pearson Correlation |
| 0.854 | 0.328 | 0.599 | 0.131 | 0.476 | 0.818 | 0.431 | 0.506 | 0.749 | 0.222 | 0.811 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| -0.124 | -0.084 | -0.12 | 0.014 | 0.002 | -0.081 | -0.085 | -0.098 | -0.129 | -0.069 | -0.14 | Pearson Correlation |
| 0.218 | 0.406 | 0.233 | 0.892 | 0.985 | 0.423 | 0.402 | 0.33  | 0.201 | 0.493 | 0.166 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |
| 0.024 | -0.034 | -0.081 | 0.195 | -0.127 | 0.088 | -0.056 | 0.008 | -0.077 | -0.129 | 0.098 | Pearson Correlation |
| 0.81  | 0.734 | 0.425 | 0.052 | 0.208 | 0.382 | 0.579 | 0.939 | 0.449 | 0.203 | 0.331 | Sig. (2-tailed) |
| 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | 100   | N |

Table 7 Correlations between QoL domains and clinical, laboratory data in both groups

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Table 8 *Correlation is significant at the 0.05 level (2-tailed)

| MCS  | PCS  | QoL  | GH   | BP   | SF   | MH   | VT   | RE   | RP   | PF   | Pearson Correlation | Age | Duration of HD | Dry Weight | Hb | Urea | Creat | ALT | AST | Albumin |
|------|------|------|------|------|------|------|------|------|------|------|---------------------|-----|--------------|-----------|----|------|-------|-----|-----|---------|
| 0.066| 0.053| 0.084| 0.065| 0.074| 0.092| 0.073| 0.018| 0.068| 0.128| -0.18| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.517| 0.603| 0.406| 0.519| 0.462| 0.361| 0.472| 0.86 | 0.503| 0.206| 0.073| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| 0.063| -0.076| -0.033| -0.044| -0.207**| 0.011| -0.021| -0.099| 0.175| 0.032| -0.01| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.53 | 0.454| 0.743| 0.665| 0.039| 0.914| 0.833| 0.325| 0.081| 0.752| 0.923| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| 0.134| 0.134| 0.126| 0.196| -0.015| 0.121| 0.068| 0.213*| 0.041| 0.154| -0.038| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.184| 0.185| 0.212| 0.05  | 0.879| 0.23 | 0.501| 0.033| 0.687| 0.125| 0.707| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| .476**| .488**| .506**| .225*| .321**| .296**| .471**| .305**| .499**| .493**| .380**| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0    | 0    | 0    | 0.024| 0.001| 0.003| 0    | 0.002| 0    | 0    | 0    | Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| .365**| .302**| .320**| .248*| .210*| .316**| .068  | .286**| .381**| .331**| -.021| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0    | 0.002| 0.001| 0.013| 0.036| 0.001| 0.502| 0.004| 0    | 0    | 0.839| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| 0.02 | 0.075| 0.018| 0.162| 0.136| -0.077| 0.015| 0.094| -0.04 | -0.017| -0.029| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.845| 0.458| 0.856| 0.107| 0.178| 0.444| 0.884| 0.355| 0.69 | 0.864| 0.775| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| 0.09 | 0.164| 0.12  | 0.181| .269***| -.065 | 0.081| -.011 | 0.116 | 0.1   | 0.056| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.372| 0.102| 0.235| 0.072| 0.007| 0.52 | 0.423| 0.91  | 0.252| 0.321| 0.578| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| 0.067| 0.137| 0.072| .223*| 0.174| -.139| 0.107| 0.009 | 0.046 | 0.066 | 0.065| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.511| 0.174| 0.476| 0.026| 0.083| 0.169| 0.289| 0.929| 0.65 | 0.514| 0.518| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |
| .313**| .226* | .278**| 0.025| 0.012| .272**| 0.104| .269**| .345**| .297**| 0.174| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 0.002| 0.023| 0.005| 0.809| 0.904| 0.006| 0.301| 0.007| 0    | 0.003| 0.084| Sig. (2-tailed) |     |              |            |    |      |       |     |     |         |
| 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | N                   |     |              |            |    |      |       |     |     |         |

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In this study, SF-36 Questionnaire was used to compare and study QOL among both HCV Ab negative and positive hemodialysis patients and the effect of different clinical and laboratory variables on their QOL. Our study showed that HCV seropositive hemodialysis patients had compromised health related quality of life in comparison to HCV seronegative patients which was found in most of SF-36 subscales particularly in role physical, role emotional, vitality, mental health and social functioning subscales and mental component summary.

In group 2, we demonstrated that the majority of the SF-36 subscales were lower in anti-HCV antibody positive HD patients compared with in anti-HCV antibody negative patients except physical functioning subscale which is comparable. In this group QOL was not affected by age, but affected by gender and males were found to have higher scores in role emotional, bodily pains and PCS compared with females. Afsar et al. demonstrated that the majority of the SF-36 subscales were lower in anti-HCV antibody positive HD patients compared with in anti-HCV antibody negative patients, with an independent association between anti-HCV antibody positivity and PCS of SF-36, but not with MCS, which was in agreement with our study.

The exact mechanisms regarding the relationship between anti-HCV seropositive hemodialysis patients and low MCS and depression remain not fully understood. Presence of depressive symptoms might be one of the explanations; both HCV and HD are implicated in an increased prevalence of depression, which negatively impacts HRQOL. It has been shown that HD patients with depression scored lower on all of the 8 SF-36 subscales than patients without depression. Depression may exist as a secondary phenomenon to HCV infection: it may take the form of a reactive depression related to the diagnosis or concerns over long-term health or may be linked to symptoms such as fatigue and cognitive impairment. In HCV seronegative group, we found that male gender and younger age were associated with better

### Discussion

Quality of life is one of the important indicators of the effects of medical treatment. Hemodialysis patients experience various problems that may adversely influence their quality of life. Hepatitis C virus (HCV) infection is also an important problem in hemodialysis patients. This is the most important comorbid disease that can affect their quality of life. A variety of instruments for measuring HRQOL exist, including those that are “generic” and those that are “disease-targeted”. The tool most commonly used to study HRQOL in people with renal disease is the SF-36.
quality of life with a significant negative correlation between age and physical functioning. Also, we found that males had higher scores in majority of the SF-36 subscales and overall QoL.

Anca Seica et al.,10 found that age had a significant impact on health related QoL especially physical component summary of the SF-36, but not on MCS and that women had lower QoL scores than men (which was in agreement with our study). Women on hemodialysis generally have lower QoL than men due to factors other than clinical ones including difficulty coping with kidney disease, more susceptibility to anaemia, anxiety and depressive symptoms with an association between psychological and social factors. In addition, women on hemodialysis usually continue performing their traditional roles of home making and child caring, unlike men, they cannot circumvent and thus are exposed to higher levels of physical and mental stress, resulting in lower QoL than men.11

In our study, we found that employed patients had significantly better quality of life than unemployed patients with significantly higher scores in physical functioning, vitality, social functioning, general health, PCS and MCS. In 2007 analysis of baseline data of 9,526 hemodialysis patients from 7 countries enrolled in phase I of the Dialysis Outcomes and Practice Patterns Study (DOPPS)12 found that being unemployed (compared with employed) was independently and significantly associated with lower scores in all eight SF-36 scales, with larger differences being observed for role-emotional and role-physical, which was in agreement with our study.

In our study, there was a positive correlation between haemoglobin levels and the following SF-36 subscales: physical functioning, vitality, mental health, general health, physical component summary and mental component summary. In agreement with our study, Afzar et al.,4 found positive correlation between haemoglobin levels and the following SF-36 subscales: physical functioning, role-physical limitation, bodily pain, general health perception, vitality, social functioning, role emotional and mental health subscales, PCS and MCS.

Moreover, interestingly, we found that haemoglobin levels were significantly higher in HCV seropositive patients than HCV seronegative which may be responsible for comparable physical functioning subscale between two groups. Similarly, Khurana et al.,13 documented that hepatitis C patients tend to have higher baseline haemoglobin and decreased need for EPO therapy on dialysis. The possible explanation for these findings may be the release of hepatic EPO because of chronic hepatic inflammation secondary to HCV infection.

As in group 1, there was a significant positive correlation between haemoglobin level and the following SF-36 subscales: physical functioning, role physical, role emotional, vitality, mental health and bodily pains, and PCS and MCS, which was in agreement with Fabrizi et al.8 In group 1 (and not in group 2), a significant positive correlation between pre dialysis serum creatinine and physical functioning, mental health, general health subscales, PCS and MCS. Feroze et al.,14 showed that better QoL was associated with higher pre dialysis serum creatinine which was surrogate for larger muscle mass and/or greater meat intake. Similarly, Fabrizi et al.,8 reported direct relationship between serum creatinine and SF-36 scale scores in hemodialysis population and the largest correlations were recorded in the general health, mental health, and bodily pain subscales.

Also, Spiegel et al.,15 found that patients with low creatinine had a significantly lower adjusted SF-36 PCS score versus patients with higher levels of serum creatinine. In our study, there was no significant relation between dialysis adequacy, as measured by Kt/V and QOL. Our findings were similar to the findings of Fabrizi et al.,8 Spiegel et al.15 In contrast, Asfar et al.,4 found that Kt/V was only correlated with the mental health subscale.

In our study, we found that QOL was affected by dry weight with a significant positive correlation between dry weight and vitality and general health subscales. Spiegel et al.,15 documented highly significant independent correlations between dry weight and both PCS and MCS scores of the SF-36, similar to results of our study. Also, Kalantar-Zadeh et al.,16 documented highly significant independent correlations between BMI and both PCS and MCS scores of the SF-36, which was in agreement with our study. In our study, there was a significant positive correlation between serum albumin level and role physical, role emotional, vitality, social functioning subscales, PCS and MCS.

Afsar et al.,4 found that serum albumin was positively correlated with role physical limitation, bodily pain, general health perception, vitality, role emotional and mental health subscales, PCS and MCS, but other subscales were not related to the serum albumin level. Feroze et al.,14 suggested that better QoL was associated with higher serum albumin levels, which were surrogates for greater meat intake and for higher visceral protein stores. In this study liver enzymes ALT and AST were significantly higher in HCV seropositive patients than seronegative patients but, they had no significant correlation with SF-36 subscales. In Afsar et al.,4 found that HRQOL was not related to liver enzymes ALT, AST in HCV-infected HD patients, which was in agreement with our study.

In our study there was a significant negative correlation between phosphate and overall quality of life, physical functioning, role physical and mental health subscales and mental component. Also we found that QOL was affected by parathyroid hormone with a significant negative correlation between PTH and physical functioning and vitality subscales of SF-36. In contrast to us, Fabrizi et al.,4 reported that mineral metabolism (such as parathyroid hormone, calcium/phosphorus levels) had small effect sizes and correlations with HRQOL. Similarly, Tanaka et al.,17 found a non-significant difference in mental health scores in patients with high versus low PTH levels.

Conclusion
HCV infection impairs quality of life, in many mental aspects in hemodialysis patients particularly in role physical, role emotional, vitality, mental health and social functioning subscales and mental component summary. Better quality of life is associated with male gender, younger age, employment, higher hemoglobin, higher pre dialysis serum creatinine and higher serum albumin.

Recommendations
A. Improving Hemoglobin level in hemodialysis patients which is associated with better quality of life.
B. Improving nutritional status and increasing body mass index.
C. Encouraging patients to join employments.
D. Prevention of hepatitis C transmission by proper Infection control measures reduces the economic burden and complications in hemodialysis.

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Conflict of interest

Author declares that there is no conflict of interest.

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