

# Impact of Hepatitis C Virus Chronic Infection on Quality of Life in Egypt

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**Abstract**—The study aimed at determining the impact of chronic hepatitis C virus (HCV) infection on patients' Quality of Life (QoL), its relation to geographical characteristics of patients, awareness of the disease, treatment regimen, co-morbid psychiatric or other diseases. 457 patients were randomly selected from ten National Treatment Reference Centers of Ministry of Health hospitals from four community locations representing Egypt. Health related QoL assessment questionnaire with the 36-item Short Form used for assessment of the enrolled patients. The study showed no significant difference between HCV patients in different governorates as regards total QoL. Females, illiterate patients and those had bilharziasis, diabetes mellitus, hypertension or were depressed had significantly the lowest QoL score. HCV patients who knew the danger of the disease had significant lower mean score of physical and mental health components. Optimal care of overall well-being of HCV patients requires adequate knowledge of their neurological and psychological status. It is important to know how to cope with having a family member with hepatitis C and more importantly to know what should you say and what shouldn't you say as a positive hopeful attitude is essential for combating HCV chronic infection.

**Keywords**—Hepatitis C virus chronic infection, physical health component and mental health component of QoL, total quality of life.

## I. INTRODUCTION

HEPATITIS C is often referred to as the "silent epidemic". The World Health Organization (WHO) reports that approximately 3% of the world population, or approximately 170 million persons, are infected with HCV and between 3 and 4 millions new infections each year. Africa and Asia have highest reported prevalence rates, in contrast to the low rates of HCV in North America, Western Europe, and Australia. Egypt has the highest prevalence of Hepatitis C in the world. Overall, estimates of the HCV rate in the general population have range between 10 and 20 percent. Geographically, the Hepatitis C prevalence has been shown to be higher in Lower Egypt (Nile Delta) than in Upper Egypt and lower in urban compared to rural areas [1], [2].

HCV has a major impact on QoL and can cause patients significant distress. QoL is a popular term that conveys an overall sense of well-being, including aspects of happiness and satisfaction with life as a whole. It is broad and subjective rather than specific and objective [2].

The study was conducted to determine the impact of HCV chronic infection on patients' QoL and its relation to the

geographical characteristics of patients, awareness of the disease, treatment regimen, as well as the co-morbid psychiatric disorders and other diseases.

## II. METHODS

This study was cross sectional research, conducted in ten out of 21 National Treatment Reference Centers of National Hepatology and Tropical Medicine Research Institutes of Ministry of Health hospitals. The studied HCV patients were randomly selected from four different community locations of Egypt representing Upper Egypt (BeniSuef & Assuit governorates), Lower Egypt (Dakahlia & Gharbya governorates), Middle (Cairo governorate) and Canal (Ismailia governorate). The study targeted 457 patients; 303 males and 154 females.

## III. DATA COLLECTION TYPES AND TOOLS

The Short Form 36 (SF-36) is the preferred tool for HRQoL assessment in a wide range of different diseases, including chronic HCV infection. This generic instrument, which permits comparison of HRQoL status with other conditions, includes 36 items divided into eight domain scales, which contribute to either a physical or a mental health summary measure (physical function, role physical health, bodily pain, general health, vitality, social function, role emotional, and mental health) and two physical and mental summary scales. Each scale is scored from 1 to 100, with higher scores indicating better HRQoL [3].

Ethical Considerations: Ethical approval: the Research and Ethical Committee of the National Research Centre have cleared the study protocol. Informed consent was obtained from all participants involved in the study and the information obtained at the individual level was kept strictly confidential.

## IV. DATA ANALYSIS

All completed questionnaire forms were entered in the computer, Statistical Package of Social Science Software program (SPSS), version 16 to be statistically analyzed. Descriptive statistics in the form of frequency, percent and mean  $\pm$  SD were used for data summarization. The analysis was done as comparative between different governorates, between depressed and non-depressed HCV patients and between male and female patients. The analysis was done using independent-Sample T test between two means and One-Way ANOVA test between more than two means.

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## V. RESULTS

Table I shows socio-demographic characteristics and other risk factors for hepatitis C infection and interferon treatment as regards gender. HCV patients in Cairo had the best mean score in physical, mental, and total QoL. Patients in Upper Egypt had significantly the lowest mean physical QoL compared to those in other governorates. While, for mental health QoL, there is no significant difference between HCV patients in different governorates except in the role emotional item in Lower Egypt ( $P < 0.05$ ) (Table II). Depressed HCV patients had significantly lower mean in all domains of physical and mental health components of QoL score compared to non-depressed. The most affected domains were the role physical and the role emotional (Table III).

Female patients had significant lower mean score in total QoL score and all components of physical and mental health QoL ( $P < 0.05$ ) except in general health item and role emotional compared to males ( $P > 0.05$ ). The most affected domains among males and females were the role physical and the role emotional QoL (Table IV). Mental and total QoL score show only a significant difference between gender when the duration of the disease is  $< 10$  years, not receiving interferon ( $P < 0.01$ ).

While, there is a significant difference between gender regards physical QoL score irrespective of duration of illness or treatment ( $P < 0.05$ ).

As shown from Table V, older patients especially those  $\geq 45$  years had the lowest mean score in physical, mental and total QoL, but the difference was only significant for physical QoL. University and higher educated patients had the highest mean physical, mental and total QoL score ( $P < 0.01$ ). Patients knew the dangerous of HVC had significant lower mean physical, mental and total QoL score compared to other group. Patients with other co-morbidities had significantly lower mean score for physical, mental and total QoL. HCV patients who had bilharziasis, diabetes mellitus and hypertension had the lowest mean score of physical and total QoL ( $P < 0.05$ ).

In Table VI depression was found to be the most significant predictor for lower physical, mental and total quality scores. Male gender was a significant predictor for higher physical QoL score. Higher level of education was also a significant predictor for higher mental and total scores QoL scores. Living in Cairo was found to be a significant predictor for higher physical and total QoL scores compared to those living in other governorates.

TABLE I  
SOCIODEMOGRAPHIC CHARACTERISTICS AND OTHER RISK FACTORS OF HEPATITIS C AS REGARDS GENDER

Characteristics*	Patients (HCV +ve) (n=540)			
	Male HCV Patients (n= 359) No (%)		Female HCV Patients (n=181) No (%)	
Age:				
<20	2	0.6	2	1.1
20-	69	19.2	14	7.7
30-	89	24.8	22	12.2
40-	123	34.3	65	35.9
$\geq 50$	76	21.2	78	43.1
Mean age	40.28 $\pm$ 11.077		46.53 $\pm$ 10.896	
Marital status				
1. Married	304	84.7	152	84.0
2. Single	50	13.9	5	2.8
3. Divorced	3	0.8	8	4.4
4. Widow	1	0.3	16	8.8
Education				
1. Illiterate	60	16.7	101	55.8
2. Read and write	47	13.1	22	12.2
3. Primary	31	8.6	12	6.6
4. Preparatory	23	6.4	10	5.5
5. Secondary or equivalent (technical-vocational)	136	37.9	29	16.0
6. University and higher	58	16.2	7	3.9
Employment				
1. Not working	72	20.1	153	84.5
2. Working	287	79.9	28	15.5
Type of the treatment				
Interferon treatment	71	34.1	31	25.4
No Interferon treatment	111	53.4	71	58.2
Duration of disease				
<10 years	307	85.5	163	90.1
$\geq 10$ years	52	14.5	16	8.8

\*Those who did not answer were not excluded from the % calculation

TABLE II  
COMPARISON BETWEEN HCV PATIENTS IN DIFFERENT GOVERNORATES AS REGARDS QOL SCORE

Governorates	Cairo	Canal	Upper Egypt	Lower Egypt	P
Quality of Life Components	Mean $\pm$ SD (n= 240)	Mean $\pm$ SD (n= 60)	Mean $\pm$ SD (n=120)	Mean $\pm$ SD (n= 120)	value
Physical components items					
Physical functioning	68.3 $\pm$ 26.3	65.9 $\pm$ 20.4	68.3 $\pm$ 26.6	66.6 $\pm$ 25.1	0.886
Role physical	41.2 $\pm$ 44.2	24.6 $\pm$ 38.4	29.4 $\pm$ 41.6	26.8 $\pm$ 38.9	0.000
Bodily pain	48.8 $\pm$ 29.9	56.6 $\pm$ 25.7	46.2 $\pm$ 26.5	53.2 $\pm$ 25.0	0.000
General health	54.9 $\pm$ 21.4	47.0 $\pm$ 20.9	50.0 $\pm$ 22.8	48.3 $\pm$ 17.7	0.012
Physical component summary	38.9 $\pm$ 20.5	34.6 $\pm$ 15.0	33.3 $\pm$ 18.0	36.8 $\pm$ 16.7	0.000
Mental component items					
Vitality	47.9 $\pm$ 24.1	46.0 $\pm$ 19.8	42.7 $\pm$ 21.9	44.2 $\pm$ 19.3	0.205
Social functioning	70.2 $\pm$ 28.8	62.5 $\pm$ 23.1	68.6 $\pm$ 27.7	62.6 $\pm$ 25.3	0.058
Role emotional	48.6 $\pm$ 47.9	37.8 $\pm$ 43.2	40.6 $\pm$ 47.0	35.1 $\pm$ 43.9	0.000
Mental health	56.9 $\pm$ 25.3	51.0 $\pm$ 20.2	54.0 $\pm$ 21.3	53.9 $\pm$ 20.0	0.319
Mental component summary	54.8 $\pm$ 23.6	49.9 $\pm$ 21.1	51.1 $\pm$ 22.0	49.8 $\pm$ 19.7	0.242
Total QoL score	45.2 $\pm$ 19.3	40.4 $\pm$ 15.7	39.4 $\pm$ 17.5	43.1 $\pm$ 17.2	0.146

TABLE III  
COMPARISON BETWEEN DEPRESSED AND NON-DEPRESSED HCV PATIENTS AS REGARDS QOL SCORE

HCV Patients	Non-Depressed HCV Patients	Depressed HCV Patients	P
Quality of Life Components	(n= 392) Mean $\pm$ SD	(n= 143) Mean $\pm$ SD	value
Physical component items			
Physical functioning	71.4 $\pm$ 24.2	58.0 $\pm$ 26.3	0.0001
Role physical	38.7 $\pm$ 44.2	20.0 $\pm$ 33.4	0.0001
Bodily pain	56.0 $\pm$ 26.5	36.4 $\pm$ 25.8	0.0001
General health	55.9 $\pm$ 19.6	38.4 $\pm$ 19.7	0.0001
Physical component summary	40.2 $\pm$ 18.7	28.1 $\pm$ 15.3	0.0001
Mental component items			
Vitality	50.0 $\pm$ 21.6	33.7 $\pm$ 18.8	0.0001
Social functioning	72.7 $\pm$ 24.7	51.4 $\pm$ 27.7	0.0001
Role emotional	48.0 $\pm$ 47.0	28.4 $\pm$ 42.3	0.0001
Mental health	59.6 $\pm$ 20.7	41.0 $\pm$ 22.5	0.0001
Mental component summary	57.1 $\pm$ 21.3	37.8 $\pm$ 18.5	0.0001
Total QoL score	46.9 $\pm$ 17.6	32.1 $\pm$ 14.4	0.0001

TABLE IV  
COMPARISON BETWEEN MALE AND FEMALE HCV PATIENTS AS REGARDS QOL SCORE

HCV Patients	Male HCV Patients	Female HCV Patients	P
Quality of Life Components	(n= 359) Mean $\pm$ SD	(n=181) Mean $\pm$ SD	value
Physical components items			
Physical functioning	73.9 $\pm$ 22.7	55.7 $\pm$ 26.4	0.00
Role physical	38.2 $\pm$ 42.7	24.1 $\pm$ 40.1	0.00
Bodily pain	56.4 $\pm$ 27.2	40.3 $\pm$ 25.4	0.00
General health	52.5 $\pm$ 21.7	48.8 $\pm$ 19.4	0.06
Physical component summary	40.9 $\pm$ 17.9	29.8 $\pm$ 17.6	0.00
Mental component items			
Vitality	48.2 $\pm$ 21.9	39.9 $\pm$ 21.2	0.00
Social functioning	70.2 $\pm$ 26.3	60.8 $\pm$ 27.8	0.00
Role emotional	45.7 $\pm$ 46.4	36.4 $\pm$ 46.2	0.31
Mental health	57.8 $\pm$ 22.3	48.6 $\pm$ 22.2	0.00
Mental component summary	55.2 $\pm$ 21.9	45.5 $\pm$ 21.4	0.00
Total QoL score	46.4 $\pm$ 17.7	36.7 $\pm$ 16.9	0.00

TABLE V  
COMPARISON BETWEEN DOMAINS OF QOL AND SOME RISK FACTORS OF HEPATITIS C

Risk Factors of Hepatitis C	Physical Quality Score Mean ± SD	Mental Quality Score Mean ± SD	Total Quality Score Mean ± SD
Age			
<20	51.2 ±24.6	58.6 ±35.1	54.9 ±29.7
20-	50.9 ±19.8	61.1 ±24.2	55.2 ±20.4
30-	50.4 ±19.1	54.4 ±22.2	51.6 ±17.4
40-	47.7 ±20.0	58.5 ±24.8	53.2 ±20.6
≥50	43.5 ±19.1	52.1 ±22.6	47.9 ±18.8
P value	.032	.066	.119
Education			
Illiterate	41.5 ±17.6	50.5 ±23.1	46.1 ±18.5
Read and write	44.3 ±17.4	51.7 ±21.5	47.6 ±16.3
Primary	47.5 ±20.4	54.4 ±22.9	52.2 ±19.2
Preparatory	52.2 ±21.5	56.6 ±26.4	53.5 ±19.6
Secondary or Diploma	50.6 ±20.0	60.8 ±23.3	55.4 ±20.1
University + higher	55.0 ±20.4	63.9 ±24.5	58.3 ±20.3
P value	.000	.000	.000
Knowledge of the dangerous of HCV infection			
Yes	47.8 ±19.6	55.7 ±23.7	51.6 ±19.4
No	52.6 ±21.4	66.3 ±24.4	59.8 ±20.7
P value	.094	.005	.007
Knowing that after HCV infection the patient could show no symptoms for a period of time			
Yes	47.9 ±19.9	56.4 ±23.8	51.8 ±19.5
No	47.6 ±21.5	60.2 ±26.1	54.5 ±22.7
P value	.946	.476	.553
Awareness of methods of prevention of HCV infection			
1-Yes	48.2 ±19.9	56.8 ±24.3	52.1 ±20.0
2-No	46.1 ±19.2	55.2 ±22.5	51.1 ±18.6
P value	.275	.515	.645
HCV patients had other co-morbidities			
Yes	41.4 ±19.2	51.9 ±24.1	46.9 ±19.6
No	49.1 ±19.1	57.8 ±23.5	53.3 ±19.3
P value	.000	.020	.003
Other co-morbidities			
Bilharziasis	49.4 ±19.5	58.3 ±23.3	53.8 ±19.7
Diabetes Mellitus (DM)	38.2 ±18.8	52.9 ±20.2	47.7 ±18.3
Hypertension	45.2 ±22.3	45.9 ±16.0	45.0 ±15.5
Two Diseases	40.8 ±19.8	50.8 ±25.8	47.1 ±20.8
Three Diseases	24.6 ±16.8	48.2 ±23.5	31.3 ±15.3
P value	.006	.143	.048
Received HCV treatment			
Yes	46.4 ±19.4	56.1 ±23.8	51.5 ±19.4
No	48.1 ±19.3	56.7 ±23.8	51.9 ±19.9
P value	.362	.805	.830
Type of the treatment			
Interferon	45.9 ±16.8	52.7 ±21.3	49.3 ±17.0
No Interferon (Drugs only)	46.9 ±20.5	58.4 ±25.0	53.0 ±20.3
P value	.659	.060	.140

TABLE VI  
PREDICTOR VARIABLES FOR BETTER PHYSICAL, MENTAL AND TOTAL QUALITY SCORES

Factor	Physical Quality Score Regression coefficients	Mental Quality Score Regression coefficients	Total Quality Score Regression coefficients
Male gender	9.136	-----	-----
P value	.000	.370	.053
Education	-----	2.229	1.900
P value	.058	.002	.001
Cairo Governorate	2.218	-----	1.913
P value	.013	.304	.032
Not depressed HCV patient	12.489	18.827	15.664
P value	.000	.000	.000

Variables enter in models (age, duration of the disease, knowledge of the dangerous of HCV infection, ever had diseases other than HCV infection, type of the treatment) are not significant.

## VI. DISCUSSION

Viral hepatitis is arguably the most significant public health

problem facing Egypt today. People with hepatitis C are affected in different ways. Some people may experience severe restriction in performing basic activities of daily living

and other people experience intermittent episodes of ill health of varying intensity and duration. Studies have shown chronic hepatitis C virus (HCV) has a deleterious impact on QoL.

Our results show that the HCV patients in Upper Egypt had lowest mean score in comparison to the other governorates HCV patients in physical health component of QoL which is statistically significant. But as regards mental component, there is no significant difference between different governorates HCV patients except in the role emotional item in which the HCV patients in Lower Egypt had significant lowest mean score. Living in Cairo also was found to be a significant predictor variable for higher physical and total QoL scores compared to those living in other governorates.

As shown from the current study university and higher educated HCV patients had the highest mean score for total QoL and in both health components of QoL with significant difference between different levels of education and with significant regression. Schwarzinger et al., 2004; Sobhonslidsuk et al., 2006 and Basal et al., 2011 studies also documented that lower education level was associated with hepatitis C infection and affect the HRQoL [4]-[6], so the low level of education, the limited access to health care, the current large burden of HCV disease and the distressing long-term outcomes related to HCV infection would impact HRQoL.

This study reveals that HCV patients who knew that the disease is danger had significant lower mean score in physical health component, mental health component of QoL and total QoL in comparison to HCV patients who didn't know, with significant difference between the two groups of HCV patients. Patients with HCV have a lower Health Related QoL (HRQoL) measure compared to general population, as documented by multiple studies [7]. With regards to these mental components, patients aware of their diagnosis have a more reduced HRQL than those who are unaware of their positive HCV status [8], [9]. Chronic infection with the HCV has profound negative impacts on both physical and mental wellbeing [8], [10]-[12].

A recent systematic review of 15 studies comparing HRQoL in HCV-infected patients versus healthy controls showed that HCV infection most profoundly impaired vitality, general health, physical function and social function [9]. In comparison with normative data for the general Canadian population [13], the SF-36 scores of the disease were statistically significantly lower for all SF-36 domains. They determined that concomitant factors such as comorbidity, income and marital status have a greater effect on QoL than HCV disease stage [13].

The current study shows that female patients had significant lower mean score in comparison to males as regards total QoL. Other studies documented that HCV infected women report worse QoL than HCV infected men, women reported more symptoms than men especially depression, headaches, mental tiredness, physical tiredness [8], [10], [14]. This study also reported significant difference between HCV females and HCV males in all domains of physical and mental health

components of QoL except in general health item of the physical component and the role emotional of the mental component of the QoL which are not statistically significant. In Bezemer et al., 2012 study there is a significant difference between men and women in the dimensions bodily pain ( $p=.02$ ), social functioning ( $p=.008$ ), vitality ( $p=.03$ ) and role limitations due to emotional problems ( $p=.05$ ) [8]. HCV females also were more affected than males irrespective to the duration of the disease and intake of interferon for all domains of physical and mental health components and total QoL. While in Basal et al., 2011 study there is no significant difference between HCV males and females as regards the duration of the disease ( $p=0.175$ ) [6].

In this study there is no significant difference between HCV patients who thought that patients couldn't show symptoms for a period of time after HCV infection and those who didn't think that as regards total QoL. The infection lasts for decades for a person to develop serious complications and the patient may or may not be aware of its presence [2].

Our results show that old age HCV patients especially those who are  $\geq 45$  years old had the lowest mean score in total QoL and HCV patients who also had other diseases had the lowest mean score as regards the total QoL and the two components of QoL. In Bezemer et al., 2012 document younger HCV patients had a better performance compared to older patients, especially on the physical components of HRQL [8]. Queensland Health, 2003 document also reported that participants over the age of 40 were significantly more likely to have at least one other chronic medical condition compared with those aged less than 40 years ( $P=0.002$ ) [10]. It should be noted that the presence of these co-morbidities could impact on health-related QoL, symptom profiles, sleep and mental adjustment to illness.

As revealed from this study the depressed HCV patients had lower mean score in comparison to the non-depressed group in all domains of QoL. Other studies also mentioned that fatigue, depression and cognitive impairment are among the most common complaints of chronic HCV-infected patients. They added that, all of these symptoms have the potential to impair patients' ability to function at work, at home, in school and in society and their presence often compromises the patient's QoL. People with hepatitis C report less confidence in their current health and more concern about their health in the future [3], [9], [11], [15].

QoL is a significant factor when making decisions about hepatitis C treatment. Patients want to know if they are going to get back a better QoL in exchange for a temporarily reduced one caused by the side effects of the HCV medications [9].

This study shows that the total QoL and the two components of QoL weren't different between HCV patients who received treatment and those who didn't receive treatment. While Mathew et al., 2006 and Foster, 2009 reported that without treatment patients with chronic HCV infection will be unlikely to see any improvement in HRQoL. The HRQoL scores of patients with HCV infection refractory

to prior treatment at baseline were low compared to the general population [7], [11].

As observed from this study, HCV patients who received interferon only as a treatment of HCV infection had the lowest mean score of the mental health component of QoL [12]. Other studies mentioned that during the treatment with interferon and ribavirin, the scores in all domains dropped significantly among responders and non-responders to treatment, but the pattern of change was different. During therapy the HRQoL domain scores of responders decrease significantly in the domain of vitality which is a mental component item. The decrease in general health (mean difference = -4.53) and in physical function (mean difference = -5.23) were notable and both of them are physical component items. Physical functioning, role-physical, general health, vitality, and social functioning, were significantly reduced in patients with HCV compared with matched population norms [2], [7], [8], [15]-[17].

Transient deterioration of HRQoL of patients submitted to treatment is mainly due to the induction of depression and other side effects of treatment with Interferon and Ribavirin. For these reasons many patients refuse to start treatment, probably due to concerns about adverse effects. But QoL frequently improves in all domains after completion of antiviral treatment. Early improvement in the QoL of patients who become HCV-RNA negative suggests that the virus itself plays a biological role [2], [7], [11], [12], [14], [17], [18].

#### VII. CONCLUSION

When the duration of the HCV disease increased the physical, mental and total quality scores are increased. Chronic hepatitis compromises QoL of HCV patients and it is more affected in illiteracy, depression, and with other comorbidities as bilharziasis, diabetes mellitus and hypertension. This study also concluded that HCV females were more affected than males irrespective to the duration of the disease and intake of interferon for all domains of physical and mental health components and total QoL. Optimal care for the overall well-being of patients with HCV infection requires adequate knowledge of their neurological and psychological status. Assessing the impact of HCV infection on QoL will provide the information required for risk management counseling with education on HCV disease and impact of treatment.

#### VIII. RECOMMENDATIONS

The findings of this study give a clear picture of the magnitude of the problem of the impact of HCV on HRQoL among Hepatitis C patients. Therefore, it is important to increase public awareness about HCV related issues with special focus on quality of life that is a significant factor when making decisions about hepatitis C treatment. Patients need to know if they are going to get back a better quality of life in exchange for a temporarily reduced one caused by the side effects of the HCV medications or not. Patients often find an equilibrium point at which they can function. As in combating

any chronic illness, a positive hopeful attitude is essential.

It is important to know how to cope with having a family member with hepatitis C and more importantly to know what should you say and what shouldn't you say. If it is you, be prepared for a possible lack of acceptance from some, from whom you might expect support. This may be a shock and your emotional world will become quite different. At that point, it will be important to find new sources of support and to create a new family-and-friends support structure. This can be done through HCV support groups, electronic networking and other means. You will need to take the time to create a new self image for yourself, to know that your new physical limitations do not limit you as a person, as a soul, no matter what other people are thinking.

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