# ASSESSMENT OF HEPATITIS C PATIENT'S ADHERENCE TO INFECTION CONTROL PRECAUTIONS AT HOMES

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## Abstract:

**Background:** Hepatitis C virus (HCV) is a disease of significant global impact, every family in Egypt is touched by hepatitis C virus infection, this blood borne virus which is highly infectious. **The aim of study:** to assess the hepatitis C virus patients' adherence to infection control precautions at homes **Materials and methods:** A cross sectional design was utilized in this study; the study was conducted at the outpatient clinics in El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City. The sampling method used was convenient sample included 430 hepatitis C virus patients who attended to outpatient clinic in El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City to receive hepatitis C virus treatment. **Tools**: Three structured interviewing tools were used to assess socio-demographic and economic data, adherence of patients to infection control precautions at homes and factors that hinder the patients from adherence to infection control precautions at homes. The data were analyzed using SPSS (Stand for statistical product and service solutions) version 16.**Results**: revealed that there was highly statistical significance relationship between socio-demographic characteristics of patients and their adherence to infection control precautions at homes. **Conclusion:** Regarding patients' total adherence score to infection control precautions at home most of the patients were not adhered and more than one third of the patients did not do anything to adhere to infection control precautions at homes

**Recommendation**: Providing Continuous educational programs for patients and their families about hepatitis C to avoid complications of hepatitis C

*Key words:*  hepatitis C, adherence, infection control, at homes

## Introduction:

Hepatitis C virus (HCV) infection remains to be a significant Worldwide health problem, and is one of the chief reasons of chronic liver disease global. The long-term effect of hepatitis C virus infection is highly inconstant in Egypt, from insignificant changes to widespread fibrosis and cirrhosis with or without hepatocellular carcinoma [1].

The World Health Organization (WHO) appraisals that about 3%of the world's population has been infected with HCV, but most of them are ignorant of their infection and more than 170 million chronic carriers who are at risk of emerging liver cirrhosis and/or liver cancer [2]. Egypt has greater degrees of hepatitis C virus than nearby countries as well as other countries in the world with similar socioeconomic circumstances and hygienic principles for disturbing medical, dental or paramedical measures [3].

The prevalence of hepatitis C in Egypt is 14.7% of worldwide prevalence. The drivers of hepatitis C virus endemic in Egypt are not well understood, but the form parenteral anti schistosomal therapy promotions in the second half of the 20th

century are believed to be the cause of the high occurrence [4].

Hepatitis C virus effects both acute and chronic infection. Acute HCV infection is defined as the presence of HCV within six months of contact to and infection with HCV. It is usually clinically silent, and is only very not often associated with serious disease. Natural clearance of acute HCV infection occurs within six months of infection in 15–45% of infected individuals in the deficiency of treatment. Almost all the remaining 55–85% of persons will be infected with HCV for the rest of their lives (if not treated) and are considered to have chronic HCV infection. Anti-HCV antibodies develop as part of acute infection and continue to the end of the life [5].

HCV is spread mainly by direct connection with human blood. Transmission through blood transfusions that are not partitioned for HCV infection, through the reuse of ineffectively sterilized needles, syringes or other medical tools especially in dental management, or through needle-sharing among drug-users, is well recognized. Other methods of transmission through social, cultural, and behavioral practices using percutaneous measures (e.g. ear and body penetrating, circumcision, tattooing) can occur if ineffectively decontaminated tools are used. Sexual and prenatal transmission may also occur, although less commonly. HCV is not spread by sneezing, cuddling, coughing, food or water, sharing eating instruments or unintentional contact, although there are home contacts with unexplained HCV infection [6].

There is no vaccine to prevent HCV infection, and immune-globulin is not effective for post contact prophylaxis. Moreover, HCV infected people serve as a reservoir for transmission of infection to others if left unresolved [7].

Having enough awareness and proper adherence towards these HCV infections are foundations of preventing the spread of them. While, lack of knowledge and proper adherence about Hepatitis C in the community often leads to distortion, missing of chances for prevention and treatment, and stigmatization of infected people in the work place, by family members and by members of their communities. The concerns for members of at-risk communities are important in that missing chances for prevention can lead to infection of extra people with HCV [8].

The most exciting difficulties to dealing HCV are the continuous transmission of infection due to lack of effective infection control methods and prevention programs as well as the great cost of treatment. So, all patients particularly operating patients need to be delivered with knowledge to understand details about HCV, way of spread, how to avoid contact to HCV and learn simple ways that can prevent or stop HCV infection from one person to another. This knowledge is needed to help patients protect themselves, families, and the people around them from the probability to be diseased [9, 10].

Standard precautions consist of hand hygiene, before and after every event of patient contact, the use of personal protective equipment, the safe use and disposal of sharps routine environmental cleaning, recycling of returnable medical tools, and devices, sterilized non-touch method waste management; and, appropriate usage of linen. Standard precautions should be used in the handling of: blood (including dried blood); all other body substances, secretions and excretions (excluding sweat), irrespective of whether they contain visible blood; non-intact skin; and mucous membranes [11].

Adherence is the attachment or commitment to a good infection prevention and control are essential to ensure that people who use health and

social care facilities receive safe and effective care. Effective prevention and control of infection must be part of everyday practice and be practical consistently by everyone. Patients and caregivers are only safe from infectious processes when everyone adhere good infection control techniques [12]. Exposures to risks to blood borne infections might have been prevented if infection control precautions are adhered to and determined that adherence to infection control precautions reduced exposure meaningfully [13]. So, it is important for nurses to understand health related behaviors among patients with viral hepatitis C, to educate those patients the healthy behaviors in order to prevent transmission of HCV to others and protect themselves against complication of HCV. Thus the nurse should firstly assess health behaviors followed by the patients in their life circumstances to develop health education programs based on significance for needs according to interests of HCV patients and their families [14].

In Egypt; patients with viral hepatitis C represent an important and major sector of patients with hepatitis. Therefore, there is a clear need to assess their adherence to infection control precautions at homes also to identify unhealthy behaviors that make family members high risk for contracting disease. This is important in nursing because nurses are often responsible for assisting those patients focus their nursing care on preventing patient, family and patient's contact complications and reinstating the patient independent function and correct misbehaviors since cure is not a realistic anticipation for most patients with hepatitis virus C [15].

**Aim of study**

This study aimed to assess the hepatitis C virus patients' adherence to infection control precautions at homes.

**Research questions**

1. What is the hepatitis C virus patients' knowledge regarding infection control precautions at homes?
2. What is the hepatitis C virus patients' adherence regarding infection control precautions at homes?
3. What are the factors that affect hepatitis C virus patients' adherence to infection control precautions at homes?

**Materials and method**

**Materials:**

**Design:** A cross-sectional study was utilized..

**Setting of the study:** The study was carried out at the outpatient clinics in El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City

**Subjects:** The study was included hepatitis C virus patients who attended to the outpatient clinic to receive hepatitis C virus treatment.

**Sample size:** Sample size was calculated using Medcal 15.8 (https://www.medcalc.org/). The total number of registered patients who attended to the outpatient clinic to receive hepatitis C virus treatment was about 22000 in El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City. The pilot study revealed that at least 20% of the patients were non-adherent to infection control precautions at homes, with alpha error of 5%, study power of 80% then the sample size would be 430patients.

**Sampling technique**

A convenient sample included 430 hepatitis C virus patients who attended to outpatient clinic in El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City to receive hepatitis C virus treatment.

**Tools used in the study:**

Four tools were developed by the researcher after reviewing the related literatures.

**Tool 1:** This tool was included socio-demographic and economic characteristics as: age, gender, residence, marital status, educational level of the patients, occupation, monthly income, caregiver person, and his/her educational level.

**Tool 2:** A structured interview to assess patients' knowledge

The questions assessed patients' knowledge about HCV disease, and measures to prevent it such as: definition of hepatitis C virus, hepatitis C is prevailing in Egypt , causative agent, routs of transmission, signs, and symptoms availability of hepatitis C vaccine, patients advised to receive hepatitis A and B vaccines, preventive measures to avoid transmission of hepatitis C virus to family members.

**Patients' knowledge scoring system**

A correct answer was awarded 1 mark while incorrect answer and don't know answer were awarded zero. It included 9 multiple choice questions. Which was included:

- Definition of hepatitis C (It includes 1 item = 1 mark).
- Hepatitis C is prevailing in Egypt (It includes 1 item = 1mark).
- Hepatitis C is an infectious disease (It includes 1 item = 1 mark).
- Causative agent of hepatitis C (It includes 1 item = 1 mark).
- Availability of hepatitis C vaccination(it include 1 item= 1 mark)
- Patient is advised to take hepatitis A and B vaccines (it include 1 item = 1 mark)

The response to questions used to estimate the knowledge about hepatitis C infection which has multiple answers was assessed by using the median level (50% of the answers) as a cutoff point for considering the answer correct or incorrect, as:

- Routs of transmission of hepatitis C
- Signs and symptoms of hepatitis C
- Preventive measures to avoid transmission to family members

The total score of knowledge range from 0-9. According to the researcher's cut of point the knowledge level was consisted of two categories:

- Satisfactory level≥ 60 % of the total score (≥5.4)
- Unsatisfactory level< 60% of the total score (<5.4)

**Tool 3:** It included questions to assess patients' adherence to infection control precautions such as: personal hygiene, wearing personal protective equipment while handling blood and other body fluids, dealing with syringes, needles and sharp objects at home, and how to get rid of garbage at home**.**

**Tool 4:** It composed of inquiries about causes and obstacles that might hinder patients' adherence to infection control precautions at home such as: methods of adherence to infection control precautions at home, causes of did not adhered to infection control precautions at homes, issues needed to adhere to infection control precautions at homes, and patients' action after meeting these needs.

**Method:**

1. An official letter was issued from the Faculty of Nursing; Mansoura University to the director of El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City to permit the researcher to carry out the study.

2. A Pilot study was carried on 10% of study sample were selected conveniently from the same settings and excluded from the studied sample to evaluate the clarity, applicability, and reliability of the research tools and estimate the approximate time required for data collection. Accordingly the necessary modification was done, some questions were added and others were clarified or omitted

3. Validity testing was done to the tools by submitting the tools to five

expertise in the field of "community health nursing, in addition to statisticians ". Their recommended modifications had been done.

.4. Reliability of these tools was tested by using Cronbach's alpha test in spss v.16 as the following: the Cronbach's alpha formula was 0.849 for the adherence tool

5. The researcher visited the outpatient clinics at El-Salam International Hospital affiliated to Ministry of Health and Population at Mansoura City three days weekly (Mondays, Wednesdays, and Thursdays) from 9: 00A.M to 12:00 after noon.

6. The researcher interviewed the patients on individual basis. The required time needed to complete data collection varied from one patient to another based on his/her response to the questions.

7. The time needed for data collection ranged from 25 to 50 minutes for each patient in which each tool took from 5 to 10 minutes.

8. The number of patients interviewed ranged between 1 to 7 patients each day

**Ethical consideration:**

- An approval would be obtained from Research Ethical Committee, Faculty of Nursing, at Mansoura University to accomplish this study.

- An approval was obtained from the patients. The researcher introduced herself and a simple explanation about the aim of the study would be given to them. They would assure that their participation in the study was voluntary and that collected data would be treated confidentially and would be only used for the purpose of the study. Patients would be informed that they had the right to withdraw at any time from the study.

**Data analysis**

- Data was sorted, coded, organized, categorized and then transferred into especially designed formats.
- Data were analyzed using SPSS (Stands for Statistical Product and Service Solutions) version 16.
- Data were presented by using descriptive statistics in the form of frequencies and percentage.
- The following statistically tests were used:
- Chi-Squared statistically test was used:

Level of significance $p < 0.05$.

**Result**

Table (1): Represents Socio-demographic and economic characteristics of studied patients. Shows that 56.5% of the patients aged $40 \leq 60$ years, in relation to gender, 55.8% of the patients were females. Regarding to residence, 87.9% of the patients were resident at rural areas. Concerning marital status, 79.5 % of the patients were married. In relation to the educational level, 59% of the patients cannot read and write, while 7.9% of them had university level. Regarding to occupation 50% of the patients did not work while 2.8% of them were health care workers. Concerning monthly income, 69.8% of the patients had insufficient monthly income. 57.9% of the patients' spouse (Wife/Husband) was the caregiver persons, and 42.3% of the care givers were secondary level of education.

Table (2) represents knowledge about hepatitis C virus patients' knowledge: about hepatitis C virus and preventive measures. Unsatisfactory knowledge about definition, causative agent, routs of transmission, signs and symptoms, availability of vaccination, and preventive measures of hepatitis C, representing 67.0%, 85.1%, 76.3%, 88.4%, 85.1% and 84.0% respectively. On the opposite side 86.3% and 62.1% of the patients had satisfactory knowledge about hepatitis C is prevailing in Egypt, and it is

an infectious disease respectively. Regarding patients' total knowledge score 78.6% of them had unsatisfactory knowledge

**Table (3):** Represents adherence of hepatitis C patients to infection control precautions at homes regarding personal hygiene. reveals that 66.3% of the patients adhered to proper hand washing, 97.7% of them adhered to drying hands after washing and 90.9% of them adhered to cut their nails regularly, 99.6%, 95.3% and 82.0% out of 233 of the patients having own toothbrush, washing toothbrushes after using, and disinfecting sink after tooth brushing respectively, and 79.4% of them disinfecting after injury from razor. On the opposite side 48.8%, 40.5%, 20.1% and 56.7% of the patients shared the following tools: towel, nail clipper, razor, and picker respectively. Regarding patients' total adherence score to personal hygiene 67.7% of the patients were not adherent.

**Table (4):** Represents patient's adherence to infection control precautions at homes. reveals that the highest percentage of the patients not adhered to wearing gloves when dealing with blood, disinfecting the floor after blood spill, disinfecting surfaces and furniture soiled with blood, washing cloths and sheets soiled with blood, disposal of soiled cotton/ gloves with blood, washing hands after dealing with blood, caring with wounds, using syringe more than one time, action after needle stick, and disposal

of syringes and sharp objects at home representing 83.2%, 75.8%, 70.0%, 52.8%, 77.7%, 74.4%, 79.8%, 91.2%, 92.1% and 94.2 ,respectively. Regarding patients' total adherence score to infection control precautions at home 91.9% of the patients were not adhered..

**Table (5):** Regarding patients' total score of adherence to infection control precautions 88.4% of the patients were not adhered to infection control precautions at homes.

**Table (6):** represents factors that hinder patients from adherence to infection control precautions at homes. It reveals that 33.8% of the patients did not do anything to adhere to infection control precautions at homes while 30.2% of them adhere to infection control precautions at homes through cleanliness and disinfection. Concerned with cause of not adherence of infection control at homes 80% of the patients thought that the lack of knowledge is the main cause, and 77.7% of them need for health education while 22.3% need for improvement of finance, and 88% of the patients will adhere to infection control precautions at homes after meeting these needs.

**Table (7):** represents that there were statistically significant association between patients' age, residence, marital status, educational level, occupation, monthly income, and level of education of care givers and their total adherence score P=0.020, 0.006, 0.006, <0.001, <0.001 <0.00 and <0.001 respectively.

**Table (1):** Socio-demographic and economic characters of the hepatitis C virus patients (n=430)

| Items | No | % |
|---|---|---|
| **Age** | | |
| Age <20 | 3 | 0.7 |
| Age from 20 to <40 years | 79 | 18.4 |
| Age from 40 to <60 years | 243 | 56.5 |
| Age from 60 years or more | 105 | 24.4 |
| **Gender** | | |
| Female | 240 | 55.8 |
| Male | 190 | 44.2 |
| **Residence** | | |
| Rural | 378 | 87.9 |
| Urban | 52 | 12.1 |
| **Marital status** | | |
| Married | 342 | 79.5% |
| Single/Divorced/Widow | 88 | 20.5% |
| **Educational level** | | |
| Cannot read and write | 254 | 59.1 |
| Secondary education | 94 | 21.9 |
| Basic education (Primary/ Preparatory) | 48 | 11.2 |
| University education and above | 34 | 7.9 |
| **Occupation** | | |
| Did not work | 215 | 50.0 |
| Manual worker | 134 | 31.2 |
| Employee | 36 | 8.3 |
| Retired | 17 | 4.0 |
| Trader/Lawyer | 16 | 3.7 |
| Health care worker | 12 | 2.8 |
| **Monthly income** | | |
| Insufficient | 300 | 69.8 |
| Sufficient | 123 | 28.6 |
| Sufficient and save | 7 | 1.6 |
| **Caregiver person** | | |
| Spouse | 249 | 57.9 |
| Family member (Brother/Sister/Mother/Father/Son) | 159 | 37 |
| Himself | 22 | 5.1 |
| **Educational level of caregivers** | | |
| Secondary | 182 | 42.3 |
| Cannot read and write | 169 | 39.3 |
| University and above university | 45 | 10.5 |
| Basic education (Primary/preparatory) | 34 | 7.9 |

**Table (2):** Hepatitis C virus patients' knowledge: about hepatitis C virus and preventive measures (n=430)

| Items | No | % |
|---|---|---|
| **Definition of hepatitis C** | | |
| Unsatisfactory | 288 | 67.0 |
| Satisfactory | 142 | 33.0 |
| **Hepatitis C is prevailing in  Egypt** | | |
| Unsatisfactory | 59 | 13.7 |
| Satisfactory | 371 | 86.3 |
| **Hepatitis C is an infectious disease** | | |
| Unsatisfactory | 163 | 37.9 |
| Satisfactory | 267 | 62.1 |
| **Causative agent of hepatitis C** | | |
| Unsatisfactory | 239 | 55.6 |
| Satisfactory | 191 | 44.4 |
| **Routes of transmission of hepatitis C** | | |
| Unsatisfactory | 328 | 76.3 |
| Satisfactory | 102 | 23.7 |
| **Signs and symptoms of hepatitis C** | | |
| Unsatisfactory | 380 | 88.4 |
| Satisfactory | 50 | 11.6 |
| **Availability of hepatitis C vaccine** | | |
| Unsatisfactory | 366 | 85.1 |
| Satisfactory | 64 | 14.9 |
| **Patients advised  to receive hepatitis A and B vaccines** | | |
| Unsatisfactory | 207 | 48.1 |
| Satisfactory | 223 | 51.9 |
| **Preventive measures to avoid transmission to family members** | | |
| Unsatisfactory | 361 | 84.0 |
| Satisfactory | 69 | 16.0 |
| **Total knowledge score** | | |
| Satisfactory | 92 | 21.4 |
| Unsatisfactory | 338 | 78.6 |

**Table (3):** Hepatitis C virus patients' adherence to personal hygiene (n 430)

| Items | No | % |
|---|---|---|
| **Hand washing** | | |
| Not adhered | 145 | 33.7 |
| Adhered | 285 | 66.3 |
| **Drying hands after washing** | | |
| Not adhered | 9 | 2.1 |
| Adhered | 421 | 97.9 |
| **Having own towel** | | |
| Not adhered | 210 | 48.8 |
| Adhered | 220 | 51.2 |
| **Cut nails regularly** | | |
| Not adhered | 39 | 9.1 |
| Adhered | 391 | 90.9 |
| **Having own nail clipper** | | |
| Not adhered | 174 | 40.5 |
| Adhered | 256 | 59.5 |
| **Having own toothbrush (n=233)** | | |
| Not adhered | 1 | 0.4 |
| Adhered | 232 | 99.6 |
| **Washing toothbrushes after using** | | |
| Not adhered | 11 | 4.7 |
| Adhered | 222 | 95.3 |
| **Disinfecting sink after tooth brushing** | | |
| Not adhered | 42 | 18.0 |
| Adhered | 191 | 82.0 |
| **Having own razor(n=204)** | | |
| Not adhered | 41 | 20.1 |
| Adhered | 163 | 79.9 |
| **Disinfecting after injury from razor** | | |
| Not adhered | 42 | 20.6 |
| Adhered | 162 | 79.4 |
| **Having own picker** | | |
| Not adhered | 244 | 56.7 |
| Adhered | 186 | 43.3 |
| **Total score of adherence related to personal hygiene** | | |
| Not adhered | 291 | 67.7 |
| Adhered | 139 | 32.2 |

**Table (4):** Hepatitis C virus patients' subjective adherence related to infection control precautions at home (n= 430)

| Items | No | % |
|---|---|---|
| **Wearing gloves when dealing with blood** | | |
| Not adhered | 358 | 83.2 |
| Adhered | 72 | 16.8 |
| **Disinfecting the floor after blood spill** | | |
| Not adhered | 326 | 75.8 |
| Adhered | 104 | 24.2 |
| **Disinfecting surfaces and furniture soiled with blood** | | |
| Not adhered | 301 | 70.0 |
| Adhered | 129 | 30.0 |
| **Washing cloths and sheets soiled with blood** | | |
| Not adhered | 227 | 52.8 |
| Adhered | 203 | 47.2 |
| **Disposal of soiled cotton/ gloves with blood** | | |
| Not adhered | 334 | 77.7 |
| Adhered | 96 | 22.3 |
| **Washing hands after dealing with blood** | | |
| Not adhered | 320 | 74.4 |
| Adhered | 110 | 25.6 |
| **Caring with wounds** | | |
| Not adhered | 343 | 79.8 |
| Adhered | 87 | 20.2 |
| **Using syringe more than one time** | | |
| Not adhered | 392 | 91.2 |
| Adhered | 38 | 8.8 |
| **Action after needle stick** | | |
| Not adhered | 396 | 92.1 |
| Adhered | 34 | 7.9 |
| **Disposal of syringes and sharp objects at home** | | |
| Not adhered | 405 | 94.2 |
| Adhered | 25 | 5.8 |
| **Safe disposal of wastes at homes** | | |
| Not adhered | 203 | 47.2 |
| Adhered | 227 | 52.8 |
| **Total score of adhered related to infection control precautions at home** | | |
| Not adhered | 395 | 91.9 |
| Adhered | 35 | 8.1 |

**Table (5):** Hepatitis C virus patients' total score of adherence to infection control precautions at homes (n=430)

| Total score of adherence | | |
|---|---|---|
| Adhered | 50 | 11.6 |
| Not adhered | 380 | 88.4 |

**Table (6):** Factors that hinder the hepatitis C virus patients from adherence to infection control precautions at homes (n=430)

| | No | % |
|---|---|---|
| **Methods of adherence to infection control precautions at homes** | | |
| Nothing | 145 | 33.8 |
| Cleanliness and disinfecting | 130 | 30.2 |
| Hand washing | 101 | 23.5 |
| Cover wounds | 35 | 8.1 |
| Safe disposal of syringe | 19 | 4.4 |
| **Causes of did not adhered to infection control precautions at homes** | | |
| lack of knowledge | 344 | 80.0 |
| No supplies | 80 | 18.6 |
| No time | 4 | 0.9 |
| No cause | 2 | 0.5 |
| **Issues needed to adhere to infection control precautions at homes** | | |
| Health education | 334 | 77.7 |
| Improvement of finance | 96 | 22.3 |
| **Patients' action after meeting these needs** | | |
| Adherence to infection control precautions | 379 | 88. |
| I don't know | 35 | 8.1 |
| Nothing | 16 | 3.7 |

**Table (7):** Association between hepatitis C virus patients' total adherence score and their Socio-demographic and economic characters (n=430)

| Scio-demographic and characters | Total adherence score | | | | χ2 | P |
|---|---|---|---|---|---|---|
| | Adhered | | Not adhered | | | |
| | No | % | No | % | | |
| **Age** | | | | | | |
| Age <20 | 1 | 2% | 2 | 0.5% | 9.814 | 0.020* |
| Age from 20 to <40 years | 16 | 32% | 63 | 16.6% | | |
| Age from 40 to <60 years | 26 | 52% | 217 | 57.1% | | |
| Age from 60 years or more | 7 | 14% | 98 | 25.8% | | |
| **Gender** | | | | | | |
| Female | 26 | 52.0% | 214 | 56.3% | 0.334 | 0.563 |
| Male | 24 | 48.0% | 166 | 43.7% | | |
| **Residence** | | | | | | |
| Rural | 38 | 76% | 340 | 89.5% | 7.546 | 0.006* |
| Urban | 12 | 24% | 40 | 10.5% | | |
| **Marital status** | | | | | | |
| Married | 41 | 82.0% | 301 | 79.2% | 12.309 | 0.006* |
| Single/Divorced/Widow | 9 | 6% | 45 | 11.9% | | |
| **Educational level** | | | | | | |
| Cannot read and write | 5 | 10.0% | 249 | 65.5% | 126.160 | <0.001* |
| Secondary education | 20 | 40.0% | 74 | 19.5% | | |
| Basic education (Primary/ Preparatory) | 3 | 6.6% | 45 | 11.9% | | |
| University education and above | 22 | 44.0% | 12 | 3.2% | | |
| **Occupation** | | | | | | |
| Don't work | 12 | 24% | 203 | 53.4% | | |
| Manual worker | 4 | 8% | 130 | 34.2% | 157.220 | <0.001* |
| Employee | 14 | 28% | 22 | 5.8% | | |
| Retired | 5 | 10% | 12 | 3.2% | | |
| Trader/Lawyer | 4 | 8% | 12 | 3.2% | | |
| Health care worker | 11 | 22% | 1 | 0.3% | | |
| **Monthly income** | | | | | | |
| Insufficient | 15 | 30.0% | 285 | 75.0% | 48.996 | <0.001* |
| Sufficient | 31 | 62.0% | 92 | 24.2% | | |
| Sufficient and save | 4 | 8.0% | 3 | 0.8% | | |
| **Education level of care giver** | | | | | | |
| Secondary | 23 | 46.0% | 159 | 41.8% | 49.259 | <0.001* |
| Cannot read and write | 8 | 16.0% | 161 | 42.4% | | |
| University and above university | 18 | 36% | 27 | 7.1% | | |
| Basic education (Primary/preparatory) | 1 | 2% | 33 | 8.7% | | |

☐2:  Chi square test

:Statistically significant at p ≤ 0.05.

**Discussion:**

Infection control adherences are essential to all patients' family members and have a great impact on their health. It can be as simple as hand washing and as sophisticated as high-level disinfection of surgical instruments [16]

Moreover, assessment of healthy preventive adherences needed for patients with HCV because of the profound impact of the disease on their function and wellbeing, along with the associated high resources use. In addition assessment of health behavior data can potentially assist medical decision makers and assist policy planners in determining allocation of medical resources among different treatments of HCV and may be particularly beneficial in both preventing progression of HCV and increasing the likelihood of a response to antiviral therapy [17].

As regard for socio-demographic and economic characteristics. The present study reveals that more than half of the patients are in age group between 40 to 60 years, female, and illiterate. In relation to age; this finding is in accordance with a study [18] reported that peak prevalence of chronic HCV infection was among studied patients in the age group 50 to more. While contradicted with [19] a study of an open-label, phase II clinical trial conducted at three sites in California on 101 patients assesse the dose, efficacy and safety of darbepoetin alpha and filgrastim for treatment of anaemia and neutropenia associated with combination therapy for hepatitis C virus that about two - fifths of studied sample are aged between 20 to 40 years old and. This may be explained by this age group belonged to a period increased exposure to HCV transmission through preventive health campaigns that used contaminated needles in massive anti –schistsomiasis injections.

As for gender; this finding is in accordance with [20] a cross-sectional study to investigate the prevalence and risk factors of HCV infection in Rwanda on 324 patients attending Rwanda Military Hospital that more than half of patients were female. On the other hand this result is contradicted by [21] across-sectional study of "Risk Factors OF Hepatitis C Infection among Egyptian Blood Donors in Egypt" carried out on 168 sero-positive patients that the prevalence rate of HCV infection among males more than females. Furthermore, this finding is supported by [22] a study emphasized that HCV prevalence clearly decreased with higher educational level.

The current study reveals that the majority of the patients are married and resident at rural areas; these results are supported by [23] a prospective study to determine the prevalence and risk factors of hepatitis B and C virus infections in patients with chronic liver diseases in three public hospitals in Addis Ababa City, Ethiopia on 120 patients. As well [24] a study of "Hepatitis C Virus in Egypt is more than one challenge" mentioned that higher prevalence of HCV among those resident in rural areas compared to urban ones areas. While these findings are contradicted with [25] a study "Impact of Hepatitis C on Lifestyle of Patients in Egypt" that more than half of patients were from urban areas. This findings may be due to in rural areas patients are not aware about mode of transmission of viral hepatitis.

The present study shows that half of the patients are don't work, and few numbers of them are health care workers. These findings are in accordance with [26] a cross-sectional study "Assessment of Educational Needs and Quality of Life of Chronic Hepatitis Patients" carried out on 135 patients was recruited from two regional teaching hospitals in Taiwan. ,

revealed that more than half of the study patients were unemployed; and, supported by [27] a cross sectional study on 400 patients in three areas in Egypt including Cairo, Giza and kaliobia governorate in a study of "Exploring Interfamilial Transmission Risk Factors of HCV" less than one tenth of infected patients reported working in jobs related to the medical field. On the opposite, these findings are contradicted with [25] study found that more than half of studied patients were working. This finding may be attributed to increased female gender, and illiteracy among the studied patients.

In relation to family income the present study shows that more than two thirds of studied patients have insufficient monthly income. This finding is supported by [25] who reported that the majority of his patients had monthly income less than 100 Egyptian pounds and contradicted by [28)] who found that the majority of the patients had sufficient income. This finding may be due to more than half of studied patients don't work and retired.

As for caregiver of the patient, the main persons responsible for caring for the patients in the current study are the spouse, and brother/sister/mother/father/son. This result is consistent with [29, 28] who discovered that the majority of HCV patients choose their first degree relatives as mother, father and sister as a significant others who provide support and care to them. The patients may felt more trust in their spouse, and those family members believe that they would not be afraid from their disease and caring them well.

Regarding patients' knowledge about HCV disease**.** The present study shows that the majority of the patients have unsatisfactory level of knowledge about signs and symptoms, availability of hepatitis C vaccine, and preventive measures to avoid transmission to family members. This finding is supported by [33]

who, stated in a study "Prevalence, Knowledge and Practices of Hepatitis C Virus among Patients Undergoing Surgery in Sulaimani City" on 400 HCV patients that two thirds of patients and three fourths of patients do not know about HCV infection definition and HCV infections are a viral diseases, while a small percentage of patients and less than one fourth of patients had satisfactory knowledge, about the transmission modes and prevention routes of HCV.

Regarding patients' adherence to personal hygiene, less than half, one fifth, and more than half of the patients share personal hygienic tools as towel, nail clipper, razor, and picker respectively. This result is supported by [30)] across sectional study conducted on Alexandria that HCV patients' females shared nail clippers, eyes borrow forceps and cosmetics tools with other women and reported that the main factor of transmitting HCV among women in most of beauty centers, manicurists and hair dressers, and supported by [31] who stated in a study "Assessment of Knowledge Regarding Risk Factors of Hepatitis C Virus Transmission and Options to Avoid them in Pakistan" on 344 HCV patients that majority of them were sharing miswak, toothbrush and razor with others .This finding may be due to patients were strongly believed that, nail clippers, eye forceps and sharing razors did not transmit HCV infection to other family members as HCV can be only transmitted by direct blood contact. This creates a massive need of those patients for health education about different HCV modes of transmission and how to prevent such transmission to others.

Concerning patients' adherence related to infection control precautions at home. More than half to most of the patients are not adhered to wearing gloves when dealing with blood, disinfecting the floor after blood spill, disinfecting surfaces

and furniture soiled with blood, washing cloths and sheets soiled with blood, disposal of soiled cotton/ gloves with blood, washing hands after dealing with blood, caring with wounds, using syringe more than one time, action after needle stick, and disposal of syringes and sharp objects at home. These results are supported with [32] who stated in a study "Preventive Practices Adopted by Hepatitis "C" Patients in Alexandria-Egypt" that more than three quarters of the patients had low preventive adherences score regarding the hepatitis C infection. This result may be due to lack of knowledge about proper preventive adherences that prevent transmission of infection to others. Most of patients thought that leaving wounds exposed make them heal rapidly and they do not know that uncovered wounds can transmit virus to others especially in case of contact of blood with un-intact skin.

As regards to patients' total score of adherence to infection control precautions at homes, the present study revealed that the majority of the patients are not adhered to infection control precautions at homes. This result is supported by [33,] who conducted a study "Prevalence, Knowledge and Practices of Hepatitis B and C Viruses among Patients Undergoing Surgery in Sulaimani City", on 400 HCV patients that more than [three] quarters of patients' within poor adherence level and few percentages of patients had a good adherences level toward HCV infection.

In relation to factors that hinder the patients from adherence to infection control precautions at homes. One third of the patients are not concerned about adherence to infection control precautions at homes. This finding is supported by [33] who stated in a study that majority of the patients were not concerned about the practices and safety measures which can be used as a tool to prevent exposing themselves to the hazards of acquiring HCV infection. The same finding, by[34, 35] who documented that the lowest percentage of the studied sample were followed the health related behaviors to prevent the transmission of HCV to others .The opposite was illustrated by [36] who reported that more than half of the patients follow the infection control practices related to condom use, and wound care. This might be because the infectious disease that compounded by stigmatization may imposed stressful effect that led them to continue or increase their risky behaviors.

As for association between patients' total adherence score and their Socio-demographic and economic characters. There was highly statistical significance between patients' marital status, educational level of patient, occupational status, monthly income and patients' total adherence to preventive practices about hepatitis C infection. These findings are in the same line with [32] their study was carried out at three outpatient hepatic clinics representing: Ministry of Health and Population in Alexandria-Egypt to assess preventive practices adopted by hepatitis C patients in Alexandria and identify factors affecting their practices on 450 chronic hepatitis C adult patients of both sexes that patients' marital status, educational level of patient, occupational status, monthly income had highly statistical significance with patients total adherence to preventive practices about hepatitis C infection.

There were statistically significant association between patients' age, and their total adherence score. These results are contradicted by[32] who stated in a study "Preventive Practices Adopted by Hepatitis "C" Patients in Alexandria-Egypt" that highest preventive adherences' score was among older patients (60years and more) however, the least score was among the youngest (less than 30years)..

## Conclusion:

Based on the findings of the present study, it could be concluded that:

- Regarding patients' total adherence score to personal hygiene more than two thirds of the patients were not adherent,
- Patients' total adherence score to infection control precautions at home most of the patients were not adhered and more than one third of the patients did not do anything to adhere to infection control precautions at homes
- There were highly statistical significance association between patients' age, residence, marital status, educational level, occupation, monthly income, and level of education of care givers and their total adherence score

## Recommendation:

Based upon the findings of the current study:

- Provide HCV patients with Health education programs in order to teach them how to apply infection control precautions at homes
- Nurses working in outpatients liver clinics should update their knowledge about HCV disease, its management and healthy behaviors of HCV patients. Through attending pre- service and in-service training programs and workshops
- Nurses should focus on correcting misconception of unhealthy practices among patients with HCV infection disease also their knowledge in performing health activities of daily living to avoid subsequent complications of HCV
- Supply outpatients liver clinics to treat hepatitis C virus with psychotherapists, social worker,

dietitians and health educator nurse to assess patients' needs and intervene with them.

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