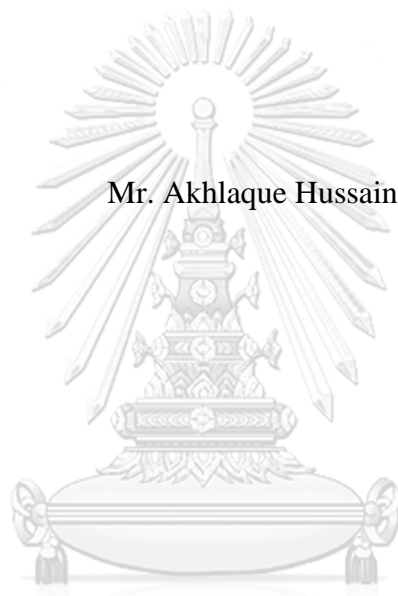


ASSOCIATED FACTORS OF HEPATITIS C INFECTION IN PREGNANT  
WOMEN AT OUTPATIENT DEPARTMENT OF PEOPLES MEDICAL  
UNIVERSITY AND HOSPITAL DISTRICT SHAEED BENAZIR ABAD  
SINDH PROVINCE PAKISTAN



Mr. Akhlaque Hussain

จุฬาลงกรณ์มหาวิทยาลัย

บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)  
เป็นแฟ้มข้อมูลของนิสิตเจ้าของวิทยานิพนธ์ ที่ส่งผ่านทางบัณฑิตวิทยาลัย

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A Thesis Submitted in Partial Fulfillment of the Requirements  
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College of Public Health Sciences  
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ปัจจัยที่เกี่ยวข้องกับการติดเชื้อไวรัสตับอักเสบประเภทซีของผู้หญิงในหอผู้ป่วยนอกของ  
โรงพยาบาล มหาวิทยาลัย จังหวัดชรีด เบนนาเซอร์ ประเทศปากีสถาน.



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต  
สาขาวิชาสาธารณสุขศาสตร์  
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย  
ปีการศึกษา 2560  
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย



อัคราเว ฮุสเซน : ปัจจัยที่เกี่ยวข้องกับการติดเชื้อไวรัสตับอักเสบประเภทซีของผู้หญิงในหอผู้ป่วยนอกของโรงพยาบาล มหาวิทยาลัย จังหวัดซาริค เบนนาเซอร์ ประเทศปากีสถาน. (ASSOCIATED FACTORS OF HEPATITIS C INFECTION IN PREGNANTWOMEN AT OUTPATIENT DEPARTMENT OF PEOPLES MEDICAL UNIVERSITY AND HOSPITAL DISTRICT SHAEED BENAZIR ABADSINDH PROVINCE PAKISTAN) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: สติกร พงศ์พานิช, 92 หน้า.

ปัจจัยที่เกี่ยวข้องกับการติดเชื้อไวรัสตับอักเสบประเภทซีของผู้หญิงในหอผู้ป่วยนอกของโรงพยาบาล มหาวิทยาลัย จังหวัดซาริค เบนนาเซอร์ ประเทศปากีสถาน บทคัดย่อ วัตถุประสงค์หลักของการศึกษาคือการติดเชื้อไวรัสตับอักเสบประเภทซีมีประมาณถึง 3% ของประชากรโลกทั้งหมดและประมาณ 3,000,000 อุบัติการณ์ใหม่ของโลกนี้เกิดขึ้นต่อปีในประเทศปากีสถาน มีผู้ติดเชื้อไวรัสตับอักเสบประเภทซีถึงแปดถึง 15% ของประชากรทั้งหมด 13,000,000 คนที่ติดเชื้อนี้เป็นผู้หญิงตั้งครรภ์ซึ่งมีค่าอธิบาย ในประเทศปากีสถานว่ามีการติดเชื้อระหว่าง 3.27% ถึง 8.9% ระเบียบวิธีวิจัย การศึกษาในครั้งนี้เป็นการศึกษาแบบภาคตัดขวางตั้งแต่เดือนพฤษภาคมถึงเดือนมิถุนายนของปี 2018 ในประชากรผู้ป่วยนอกของโรงพยาบาลซาริค เบนนาเซอร์ของวอร์ดสตูดินารีเวซ ผู้ป่วยที่ตั้งครรภ์อายุระหว่าง 16 ถึง 45 ปี ครอบคลุมถึงกลุ่มสตรีซึ่งเข้าร่วมโครงการเตรียมตัวเพื่อมีครรภ์ โดยกลุ่มสตรีดังกล่าวจะได้รับการสัมภาษณ์รวมทั้งให้กรอกแบบสอบถามภายหลังจากการผ่านจริยธรรมการวิจัยกลุ่มตัวอย่างทั้งหมดในการศึกษาครั้งนี้คือ 318 คน ผลการศึกษา พบได้ว่าจากกลุ่มผู้เข้าร่วมวิจัย 318 คน 26 คนหรือ 8.2% เป็นผู้ที่ได้รับเชื้อไวรัสตับอักเสบประเภทซีและกลุ่มที่ติดเชื้อเป็นกลุ่มที่มีการศึกษาต่ำคือ 10 คนหรือ 38.5% (pvalue=0.001) กลุ่มที่ติดเชื้อโดยการใช้น้ำดื่มมีถึง 24 คนหรือ 92.3% (p value=0.002) กลุ่มที่เกิดจากติดเชื้อจากการถ่ายเลือด 15 คนหรือ 57.7%(p.value = 0.001) สรุป จากผลการศึกษาพบว่าการติดเชื้อตับอักเสบประเภทซีเป็นเรื่องปกติของผู้หญิงตั้งครรภ์ในประเทศปากีสถานและพบว่าการศึกษาส่วนใหญ่ขึ้นอยู่กับปัจจัยทางสังคมต่างๆเช่นผู้ที่มีการศึกษาต่ำ ผู้ที่มีรายได้ต่ำรวมถึงผู้ที่มีประวัติการใช้น้ำดื่มและ การถ่ายเลือดซึ่งเป็นปัจจัยหลักที่ส่งผลต่อการติดเชื้อไวรัสตับอักเสบประเภทซีในหญิงตั้งครรภ์ คำสำคัญ: ไวรัสตับอักเสบประเภทซี หญิงตั้งครรภ์ โรงพยาบาลซาริค เบนนาเซอร์ประเทศปากีสถาน

## 6078843353 : MAJOR PUBLIC HEALTH

KEYWORDS: HEPATITIS C VIRUS / PREGNANT WOMAN / SHAHEED BENAZIR ABAD / SINDH PAKISTAN

AKHLAQUE HUSSAIN: ASSOCIATED FACTORS OF HEPATITIS C INFECTION IN PREGNANTWOMEN AT OUTPATIENT DEPARTMENT OF PEOPLES MEDICAL UNIVERSITY AND HOSPITAL DISTRICT SHAEED BENAZIR ABADSINDH PROVINCE PAKISTAN. ADVISOR: PROF. SATHIRAKORN PONGPANICH, Ph.D., 92 pp.

Purpose: The prevalence of hepatitis C is 3% of the world population with more the 3 million new cases are being reported, In Pakistan, the prevalence of hepatitis C virus Infection ranges from 8%-15% in the general population. In Pakistan about 13 million people are infected. Prevalence of hepatitis C in pregnancy has been studied across Pakistan and is reported with the range of 3.27%-8.9%.

Methods: A descriptive cross sectional study was conducted between may to June 2018. in people's medical university at outpatient Department of gynaecology and obstetrics in district shaheed Benazir abad Sindh Pakistan. All pregnant Patient age 16 -45 years visiting in department of gynaecology and obstetrics included irrespective of gestational age on their first visit of antenatal care were targeted and interviewed using a pretested and structured questionnaire after ethical approval. The calculated sample size was 318.

In this study out of 318 respondents 26 (8.2%) were positive with HCV there is association in socio demographic factors between HCV uneducated respondents 10(38.5% n=26) (p.value=0.001) association also observed in past medical history that were significantly associated history injectable 24 (92.3% n=26) (p.value=0.002) were positive with HCV and history blood transfusion 15(57.7% n=26) (p.value =0.001) positive for HCV.

Conclusion: It is concluded from this study that HCV is a common infection in pregnant women. It was also found out that the prevalence of HCV was associated with socio demographic factors like poor literacy rate, low socioeconomic status; past medical history including unsafe injection by traditional practitioners, and blood transfusion, were found to be strongly associated with increased HCV infection among the pregnant women.

Field of Study: Public Health

Academic Year: 2017

Student's Signature .....

Advisor's Signature .....

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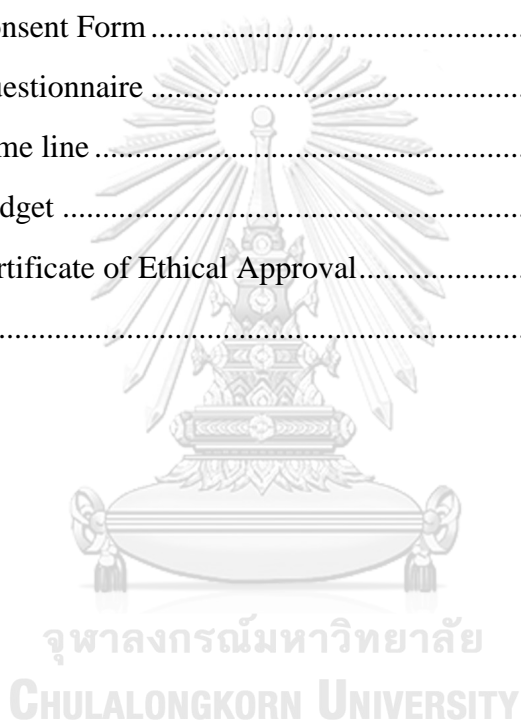
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### List of Abbreviations

D&C	:	Dilatation and curettage
DAA	:	Direct acting anti-viral
DAI	:	Lady who handle pregnant women at home
HCC	:	Hepatocellular carcinoma
HCV	:	Hepatitis C virus
IVDU	:	Intra venous drug user
IVF	:	Intravenous fluid
SBA	:	Shaheed Benazir Abad (district)
SPSS	:	Statistical program for social sciences
WHO	:	World health organization

## CHAPTER I

### INTRODUCTION

#### 1.1 Background and rationale

Hepatitis c discovered in 1989. Hepa means liver and titis means inflammation, collectively hepatitis means inflammation of liver mainly caused by drugs like halothane ,erythromycin acetaminophen, toxins, alcohol consumption and bacterial and viral infections.it can be acute or chronic.(1)

Hepatitis C infection is one of the major health issue worldwide caused by hepatitis c virus(HCV). Infection with HCV is major public health concern it is increasing disease burden on health care system especially in low income countries(1). The virus can cause both acute and chronic hepatitis infection ranging in severity from a mild illness lasting for few weeks to serious life long illness such as cirrhosis, hepatocellular carcinoma and death. HCV is member of flaviviridae single stranded positive RNA genome(2). The mode of transmission is mainly parenteral and vertical. The prevalence of hepatitis C is 3% of the world population with more the 3 million new cases are being reported, every year in all over the world representing a leading cause of liver Cancer and transplant(3). In Pakistan, the prevalence of hepatitis C virus Infection ranges from 8%-15% in the general population with variations in different parts of the country(4). In Pakistan about 13 million people are infected with HCV within estimated population of 207 million in 2017. Being a vulnerable group, pregnant women are likely to be more infected. Prevalence of hepatitis C in pregnancy has been studied across Pakistan and

is reported with the range of 3.27%-8.9%(5). HCV is transmitted readily by blood to blood Contact as it is hepatotropic virus(6). Viral hepatitis has increased risk of maternal complications during pregnancy and it is a notable reason of maternal mortality(7). In low resource countries, like Pakistan where there is lack awareness and research orientation, during pregnancy patient can go through different kind of complication, abortions, caesarean, section low hemoglobin, low iron levels, inadequate food intake that can cause vertigo and nausea patient need blood transfusion that is main cause source of infection because in rural areas of Pakistan there many paramedics and local laboratories transfuse blood without screening(8). The epidemiology and risk factors of HCV Are poorly understood. The prevalence of HCV in population can be predicted by the risk factors associated with transmission of infection. These risk factors includes, 1) blood products transfusion, 2) occupational injury, 3) surgery, 4) injection and vertical transmission(9). The objective of this study was to find out the risk factors of hepatitis C virus in pregnant women attending clinics at peoples Medical College & Hospital.

The mode of transmission is mainly parenteral and vertical. It can be transmitting by blood products, unsterile surgical procedures, injectable, sharp skin piecing objects, mother to infant(10). Many studies have different idea some says it can be transmitted with saliva and body secretions and others not agree with this statement transmission is high and different in developed and Developing countries. In Australia and Western Europe transmission through injection and drug use is less than 2% Eastern Europe, Latin America, Africa Middle East, south Asia and former Soviet Union more than 3 % where Egypt with highest prevalence more than 10% in general population (11).

In developing countries, unsafe injection in health care settings resulting 2million new cases each year(12). China has highest number of HCV drug users in the world(13).in Mexico, Pakistan and Thailand more than 80% intravenous drug users are anti HCV positive(14). Globally an estimation 170 million people have chronic HCV infection(15). Global Prevalence is 1.1%. Higher rate of prevalence more than 2.5% in West Africa, Eastern Europe and central Asia(16). A global strategy was formed for HCV by world health assembly in May 2016.It is first ever global target to eliminate new cases of HCV and deaths with goal to eliminate HCV public health threat by 2030.Before 2014 there was limited choice of treatment 1<sup>st</sup> was interferon for 24 -48 weekly dose 2<sup>nd</sup> was ribavirin tablets twice daily. Both options of treat Was expensive, not easy to deliver to the patient and cure rate was very low Comparative to Direct Acting Antivirals (DAA)(17).

In the year 2014 was a remarkable year regarding treatment of HCV Direct Acting Antiviral (DAAS) have been introduce that cure rate is 90% in just 12 weeks of treatment and the best part of the treatment is whether patient is HIV positive or any other stage of liver disease or any drug history from the past will not affect (DAA) In April 2016 WHO issued treatment guidelines for HCV that Include DAA based treatment of HCV for all genotypes. A large number of cases ends with cirrhosis and hepatocellular carcinoma. According to WHO 400000 people die each year in the world from HCV. The most affected Region is Eastern Mediterranean with prevalence of 2.3% and 1.5%respectively(18).

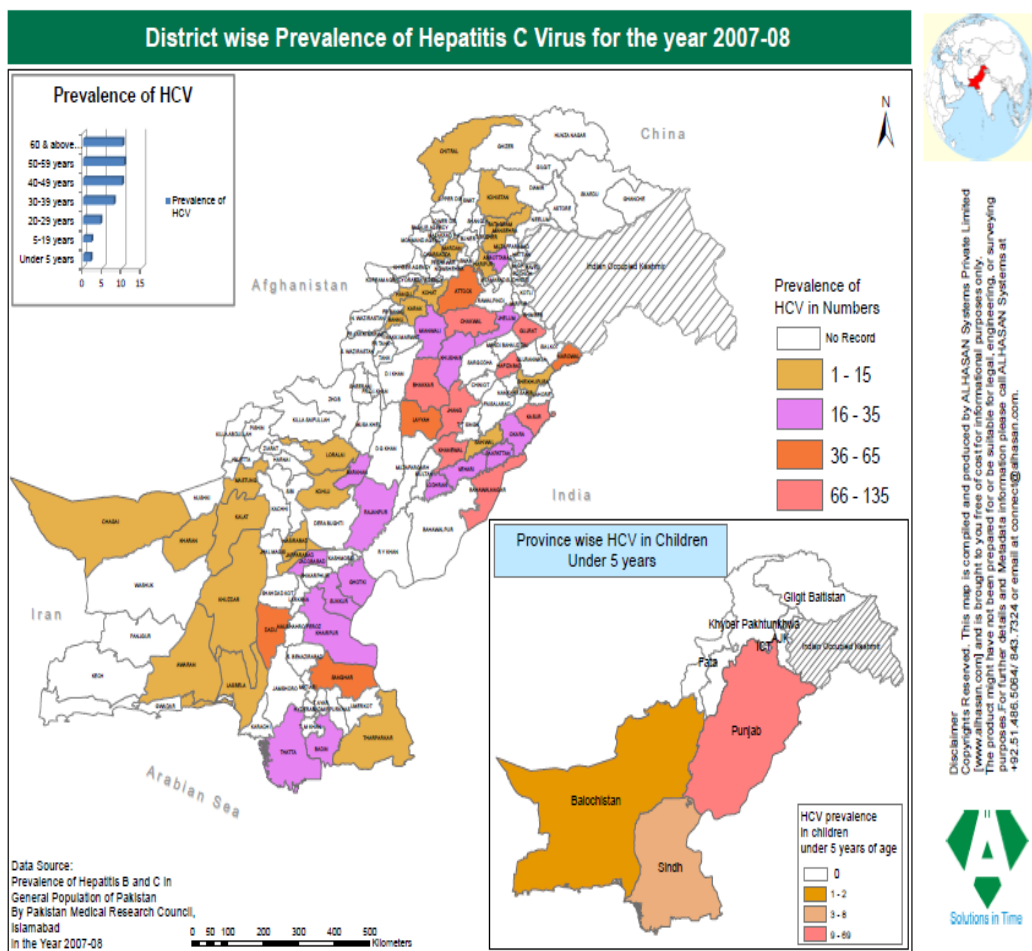
In Pakistan, the prevalence of hepatitis C virus infection ranges from 8-15% in the general population with variations in different parts of the country. In Pakistan about 13 million people are infected with HCV within estimate population of 207 million.



Under the Human Development Index of the United Nations, Pakistan is ranked 134th of 174 countries due to its poor educational and health standards. Pakistan is reported as a higher risk country regarding HCV. The situation will be worst in coming years and the disease burden will increase in next decades because of unsafe medical procedures. Studies show extremely high prevalence in rural, peri urban and underdeveloped areas up to 23%. Nosocomial spread of the disease is 30% of all cases. Genotype 3 is infecting more people of Pakistan that is around 61%. There are some cases reported infected with genotype 2 in different geographical regions while genotype 2a is common in province of Sindh. (19) Regarding high prevalence in Pakistan it is an alarming situation because it is the major cause of liver disease related to morbidity and mortality. Common routes of transmission are blood products, transfusions, highest rate of injectable usage, and reuse of syringes, unsterilized surgical procedures, and sharp objects for skin piercing like cautery, nose and ear piercing. Studies have shown that the risk factors are different from other world or developed countries, high poverty, level of education, low level of sanitary condition. Lack of information on prevention in remote areas plays a great part in spread of disease. Quackery is also responsible for spreading they give intravenous injection like pain killers and antibiotic for fast relief and earning handsome amount. The carrier rate of HCV is 3-4% (20).

Pakistan is in intermediate zone in prevalence of HCV. There is nosocomial transmission originates from hospital settings for hepatitis C 1) frequency of transfusion of blood, 2) cheap screening of donor blood by local laboratories in towns, and 3) hospital acquired transmission. To conclude there is high prevalence of HCV in upper Sindh region as well as in Pakistan due to high cost of screening and treatment and

availability of other of medical services. We have to focus on prevention on further spread of this disease through local, national and international level.



**Figure 1: District wise prevalence of HCV in Pakistan (PMRC)**  
(Pakistan medical research council)

In Sindh province prevalence rate is 4-6% that is higher than other provinces and rural areas are more affected(19). Disease burden continuously increasing in Pakistan as well as for other developing countries. Children and new born are less affected worldwide ranges from 0.2-0.4%. Being a vulnerable group, pregnant women are likely to be more infected. Prevalence of hepatitis C in pregnancy has been studied across Sindh province and is reported with the range of 3.27%-8.9%. HCV is transmitted readily by blood to blood contact as it is hepatotropic virus. Viral hepatitis has increased risk maternal complications during pregnancy and it is a notable reason of maternal mortality. In low income countries, where there is lack of awareness and research orientation, the epidemiology and risk factors for HCV are poorly understood. The prevalence of HCV in population can be predicted by the risk factors associated with transmission of infection. These risk factors include, blood products transfusion, occupational injury, surgery, unnecessary injections unsafe sex, drug users in vertical transmission from mother to infant through intrauterine transmission and at time of delivery transmission(21).

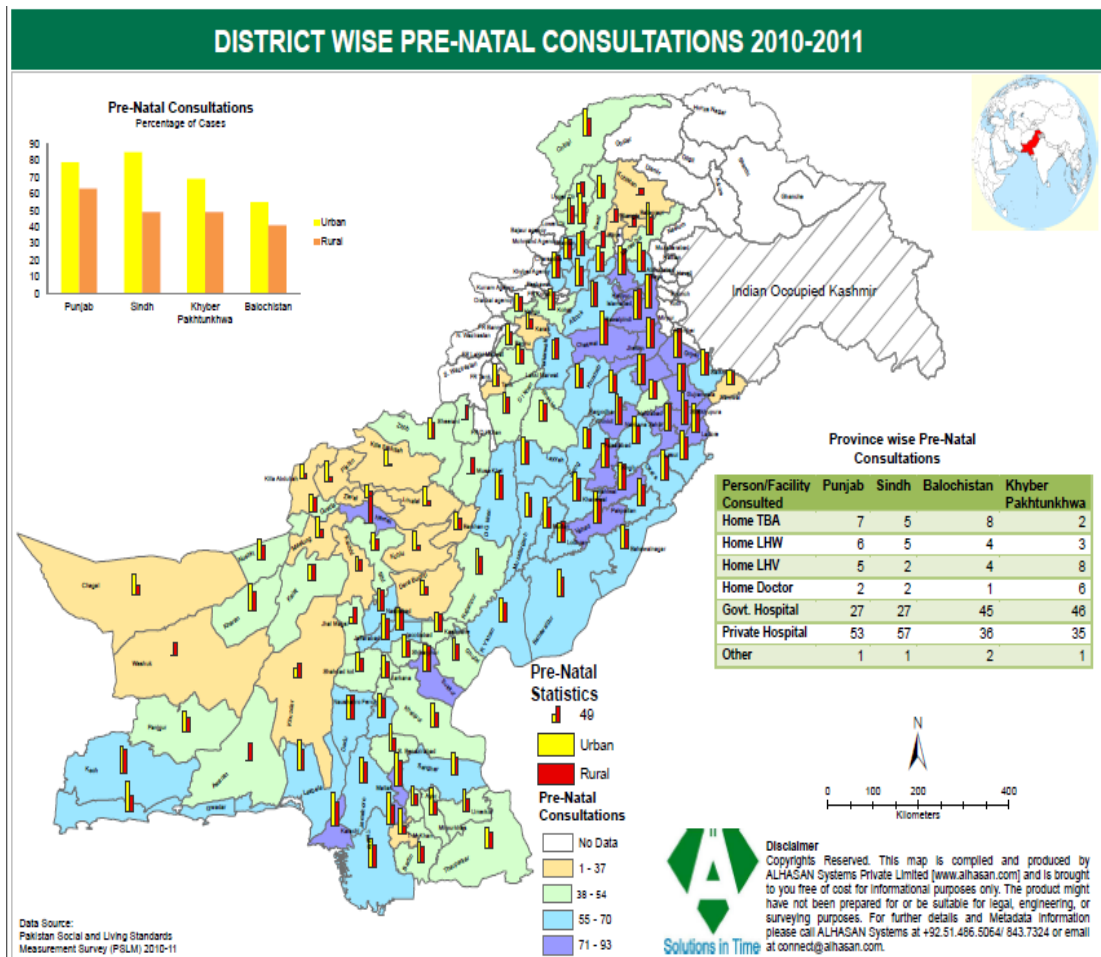
Most rural area people are poor, they work as farmers, mason and daily wages and they are not well educated to get information about the disease and They also not in position to get check them self in clinics or hospital. Whereas urban people are advance their living conditions are good and they are well informed about the disease and prevention.

The aims of this study is to find out the risk factors transmission of hepatitis C virus in pregnant women attending clinics at peoples Medical College & Hospital in Shaheed Benazir Abad district.

## 1.2 Research gap

Limited data on hepatitis c is available especially for hepatitis c in pregnant women's  
Few studies have been reported in pregnant women for hepatitis c in district Shaheed  
Benazir Abad. More studies should be carried out to get more knowledge





**Figure 2: District wise pre-natal consultations 2010-2011 (Pakistan bureau of statistics)**

### 1.3 Research Question

What are the associated factors of hepatitis c in pregnant women in outpatient department of people's medical college and hospital district Shaheed Benazir Abad district?

- What are the associated factors of sharp skin objects in pregnant women and HCV?
- What are the associated factors of socio demographic factors in pregnant women and HCV?
- What are the associated factors of past medical history in pregnant women and HCV?
- What are the associated factors of obstetrical surgical procedure in pregnant women and HCV?

### 1.4 Hypothesis

HA. There is no association between hepatitis c infection and pregnant women 1) blood transfusions, 2) injectable an (education)

HO. There is an association between hepatitis c infection and 1) blood transfusions 2) injectable and 3) education in pregnant women

### 1.5 Objectives

#### 1.5.1 General objectives

To determine the associated factors of hepatitis c infection in pregnant women at outpatient department people's medical university and hospital in district Shaheed Benazir Abad district Sindh Pakistan

### 1.5.2 Specific objectives

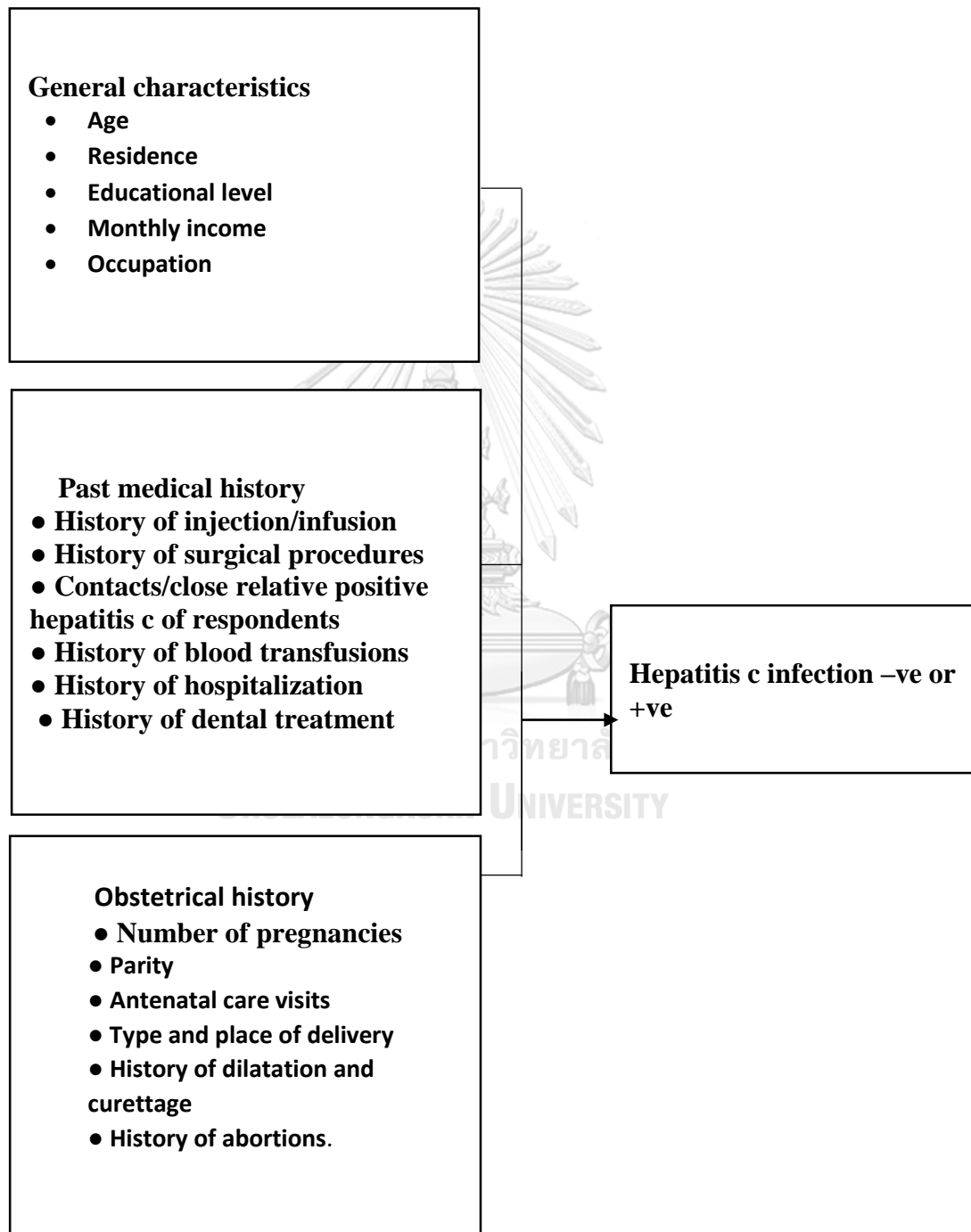
- To identify the association between socio demographic factors and hepatitis c infection in pregnant women.
- To identify the association between past medical history and hepatitis c infection in pregnant women
- To identify the association between obstetrical surgical procedures and hepatitis c infection in pregnant women
- To identify the association between sharp skin piercing objects and hepatitis c infection in pregnant women



## 1.6 Conceptual frame work

### *Independent Variables*

### *Dependent Variable*





## **1.7 Operational definition**

### **age**

16-45 age.

### **Residence**

Refers to the respondent who lives in city of Shaheed Benazir Abad and suburbs of the district.

### **Monthly income**

How much money family earns in 1 month in Pakistan Rupees?

### **Educational level**

Refer to assess the level of education of respondents living in study area.

### **Past medical history**

Refers to history of injectable, intravenous fluids, for medical or surgical procedures in last 1 year and during this pregnancy

### **History of surgical procedure**

Refers to any kind of surgical treatment in last and current pregnancy

### **Contact or partner with HCV positive**

Refers to relative or partner of the respondent who diagnosed with positive HCV and living together with respondent

### **History of blood transfusions**

Refers to the respondent who did blood transfusions in last and current pregnancy

### **History of dental treatment**

Refers to dental treatment like tooth extraction, root canal or scaling.

**History of hospitalization.**

Refers to how many times respondent hospitalized in last 1 year and during current pregnancy

**Sharp skin piercing objects**

Refers to how and when respondent did ear piercing, nose piercing or cautery with sharp objects.

**Number of gestation**

Refers to number of pregnancy how many times she got pregnant

**Parity**

Refers to how many times respondents got full term pregnancy or still births

**History of dilatation and curettage**

Refer to surgical procedure of dilation and curettage in case of respond did not want to continue the pregnancy or any medical reason to do dilatation and curettage

**Antenatal care visits**

Refers to check-up during pregnancy in hospital or clinics

**Types of delivery**

Refers to the procedure of baby delivery with caesarean section or normal vaginal delivery, or forceps delivery.

### **1.8 Expected benefits of study**

1. This study will provide useful information about risk factors, preventive measures and how stop the spread of this disease.
2. This study can be used as case study for upcoming research on hep c in Pakistan as well as in Sindh province.
3. The details of the study will certainly help for develop any programmes or strategy to control the spread of hepatitis c.



## CHAPTER II

### LITERATURE REVIEW

In this literature review will discuss about the history, causes of hepatitis c mode of transmission, incubation period, sign and symptoms and about prevention and treatment. The potential risk factors associated with pregnancy from present and past literatures. There are 5 main hepatitis viruses, referred to as types A, B, C, D and E. These 5 types are of greatest concern because of the burden of illness and death they cause and the potential for outbreaks and epidemic spread. In particular, types B and C lead to chronic disease in hundreds of millions of people and, together, are the most common cause of liver cirrhosis and cancer. Hepatitis A and E are typically caused by ingestion of contaminated food or water. Hepatitis B, C and D usually occur as a result of parenteral contact with infected body fluids. Common modes of transmission for these viruses include receipt of contaminated blood or blood products, invasive medical procedures using contaminated equipment and for hepatitis B transmission from mother to baby at birth, from family member to child, and also by sexual contact(22).

Hepatitis C is found worldwide. The most affected regions are Eastern Mediterranean and European Regions, with the prevalence of 2.3% and 1.5% respectively. Prevalence of HCV infection in other WHO regions varies from 0.5% to 1.0%. Depending on the country, hepatitis C virus infection can be concentrated in certain populations (for example, among people who inject drugs) and/or in general populations. There are

multiple strains (or genotypes) of the HCV virus and their distribution varies by region(23)

Hepatitis c will be a continuous life threatening problem for humanity in all over the world especially in low income countries or developing countries. Hepatitis c is contagious liver disease caused by hepatitis c virus(15). There are six major strains (genotypes) of hepatitis c virus causes Infection any 1 can be infected with more than one genotype at a time(24). Genotype 1 is the most common strain in United States and genotype 3 is most common in Pakistan(25). Before 1989 it was called a blood product named Non A and non B because the virus cannot be identified(13). Human's immunity System can fight with virus and kills but some studies shows that the virus can live in human body up to six months(26).in Pakistan understandings of epidemiology of HCV is improved and better from past decades by various kind of studies has been done. A nationwide survey of HCV has been done in 2007-2008 and national surveillance fully operated in all 4 capital of provinces and 1 in capital of Pakistan in Islamabad. The surveillance centers reviewed data closely they are focusing on prevalence, patterns and frequency of HCV also distribution of genotypes. Number studies have been published and reveals that prevalence of HCV in rural areas of Sindh province high that goes up to 25%.it is fact that 15-45% individuals can clear the virus but remain HCV positive(21).

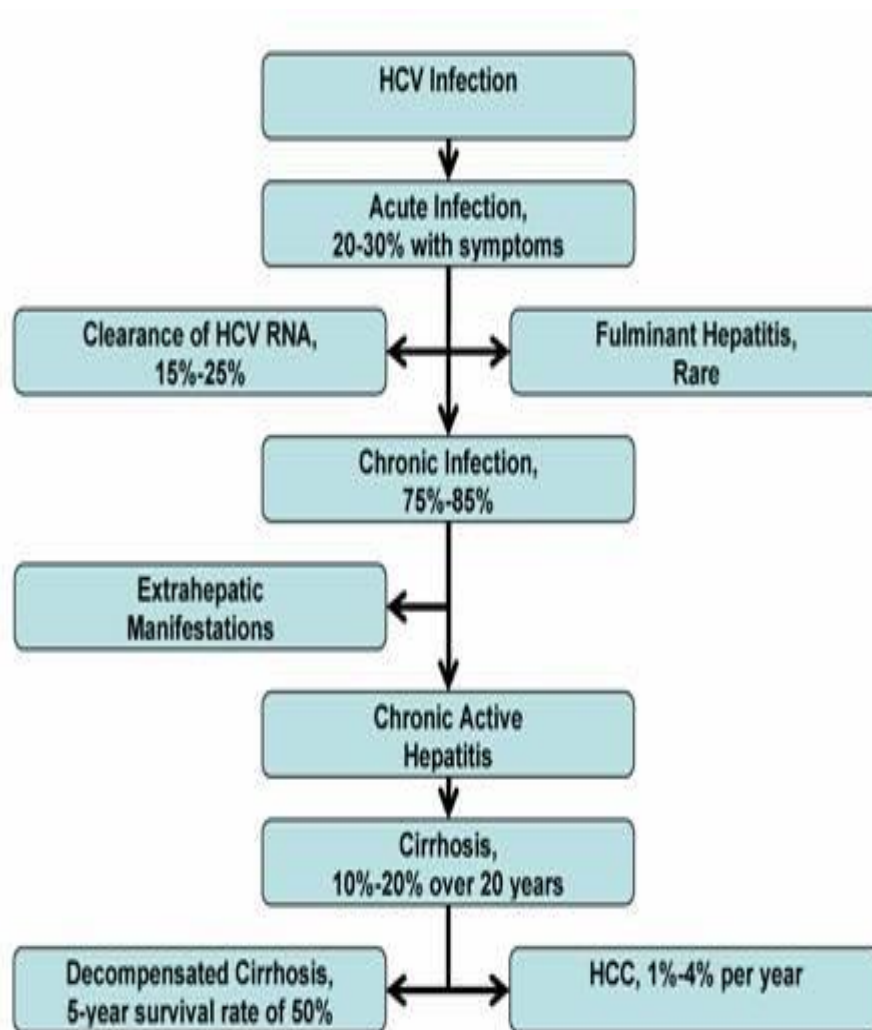
## **2.1 Mode of transmission**

Mainly its blood borne virus it can transmit through transfusion of unscreened blood, in devolving countries people who need transfusion for surgical procedures like pregnant women, sharing needles or syringes, re use of syringes most common in intravenous drug users ,organ transplant also a cause of transmission, tattooing also a

cause of transmission because tattoo shops not taking aseptic measures during tattooing people who have multiple sex partners are at risk of transmission if not use safety measures like usage of condom, people who shares tooth brush ,nail cutter or razors with positive HCV person(12). Studies shown that it is possible that infected mother can transmit virus to the new born(27). In Pakistan mode of Transmission is slightly different, barbers use same razors with many customers in unhygienic place for shaving, glass syringes used by Paramedics and quakes they use them and wash it in hot water and reuse it again because in Pakistan, people are insisting for injectable for fast relief from Pain and quakes giving those IV fluids and injectable to earn money, Unsterilized surgical procedures also play a great part in spread of disease in Pakistan. Skin piercing objects like needle is used for ear and nose piercing is very common in females in unhygienic conditions the sewing needle mostly used people are not using any kind of aseptic measures during and after that procedure after piercing they put thread in that point to maintain the hole. While tattooing is less common in Pakistan some models, actors, singers have tattoos and young generation and elite class people have tattooing practice but not very common in Pakistan. HCV is more dangerous for poor people of Pakistan because they are not educated and they don't have enough money to get them checked in a hospital(28). Travelling in countries should be cautiously where prevalence of hepatitis c is high.

Hepatitis c can't not be transmitted with breast milk if the mother is positive unless the nipples are crack, so breast feeding should be stop until full recovery(29). Currently there is no intervention to prevent transmission from Mother to new-born(30). Transmission rate is low ranges from 0.2-0.4%. if mother is HIV positive she is more vulnerable to get infected(27).

It cannot be transmitted with kissing, saliva or oral secretions, coughing or sneezing or using utensils.



*Figure 3: Natural history of HCV (Int J Med Sci 2006)*

## 2.2 Incubation period

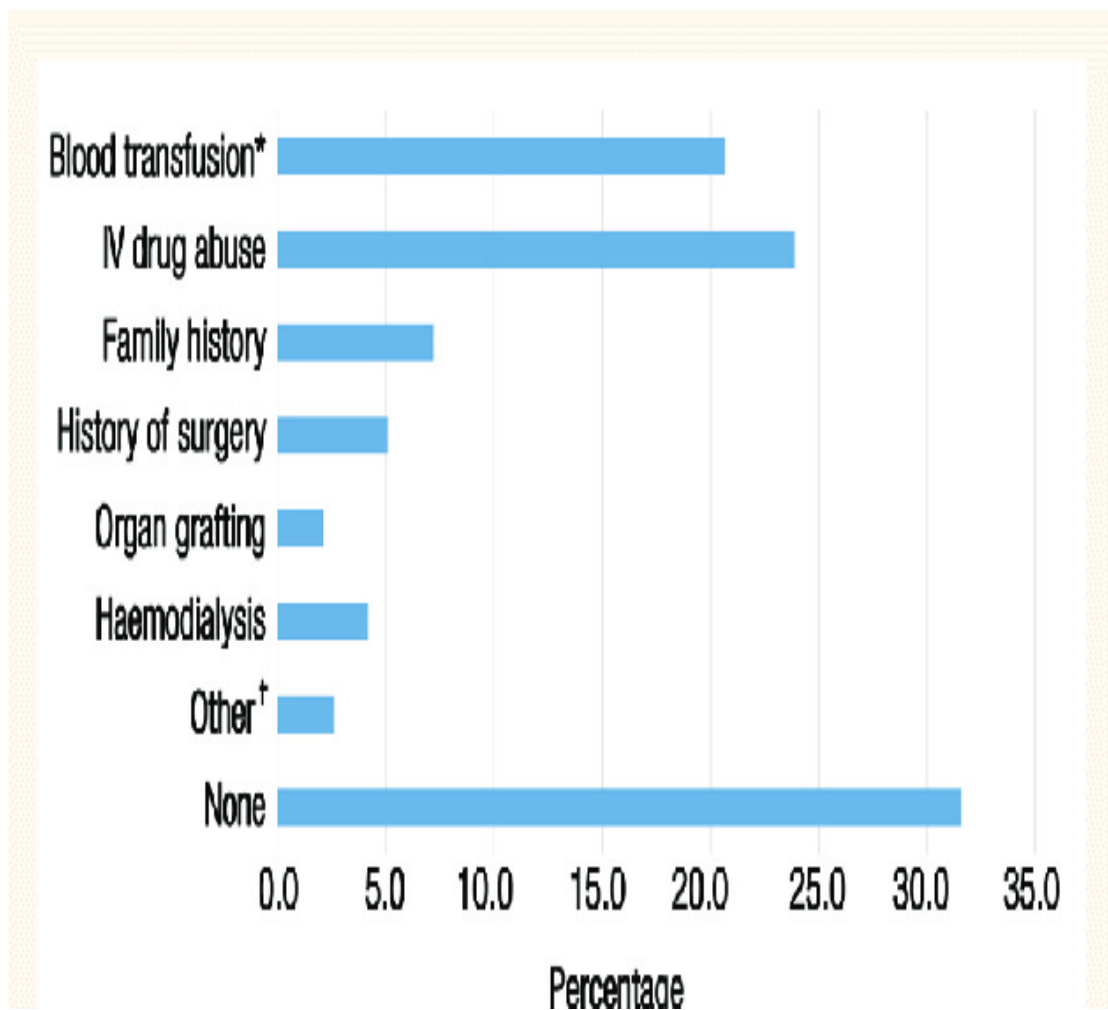
This is hard to say and uncertain for incubation period of hepatitis c because most Individuals not develop any symptoms a person who expose to virus can develop symptoms in 6 – 12 weeks(31)

## 2.3 General risk factors

People with AIDS they more vulnerable or easy target of any disease because their low immunity can put them in dual or co infection situation so they must take care regarding blood borne disease like HCV. blood donors and recipients, especially poor people are target because of low quality kits were used to draw the blood or transfuse the blood any surgical procedure needs transfusion for every one specially pregnant women who need blood transfusion in many kind of situation like ,C-section, bleeding per vagina ,episiotomy, low hemoglobin ,low food intake so blood transfusion is said to be the most important cause of HCV people who use sharp skin piercing Objects like tattooing because unhygienic atmosphere of the place where most people get tattooed them self and unsterile equipment's also the die they used for coloring the skin can cause hepatitis c , nose and ear piercing this practice is going on from evaluation of human being but in urban areas or big cities people are well informed about the consequences on other hand some rural areas or remote areas practicing the same bad unhygienic way that can transmit the disease , multiple transfusion of IV fluids and Injectable are also included in spreading of disease, health care workers got infected from accidently needle prick from a positive HCV patient while care giving., hospital acquired hepatitis from patient to Patient and from patient to health care workers, patient who need dialysis are At risk, unsterilized dental equipment's, poor and needy people are at risk Cause local



laboratories using low quality kits for drawing and screening blood Drug abusers because they are injecting drugs, reuse syringes.(32)studies have shown strong affiliation between hepatitis c and non-injectable objects of intranasal drug users(33).



*Figure 4: Risk Factors of Hepatitis C*

## 2.4 Specific risk factors during pregnancy

It is proven from previous literature and articles that predominant mode of transmission of hepatitis c is nosocomial that why pregnant women are target because when a women get pregnant they need multiple visits for antenatal care, prenatal and post-natal care the prevalence rate in pregnant women around 4.51% in Pakistan. And in big metropolitan city Karachi prevalence rate is 1.83%. and the population of Karachi is 25 million (21)

**Blood transfusion** Pregnant women go through different kind of health situation during their pregnancy like many of them have complaint of low hemoglobin levels reason for low hemoglobin levels can be inadequate food supply, bleeding during pregnancy, low iron levels can cause vertigo low blood pressure or leads to premature delivery, abortion so they need transfusion of blood and that is the main cause to get infected with HCV virus(13),

### **Blood donors**

Blood donation is healthy practice in in Pakistan as well as in most world during this practice donor are at risk from health care workers, from unhygienic surroundings and equipment they use for draw blood. HCV is common in health care workers in most rural part of the Sindh province also donor blood screening should carried out to control the spread of disease.(34)

**Dilatation and curettage.** many pregnant women's can complete their pregnancy due to abnormal bleeding and patient cannot complete their pregnancy finally they go for dilatation and curettage this is surgical procedure in general anesthesia all unsterilized surgical procedure can be a good source of exposure to HCV(35)

**Multi transfused individuals or patient** Those who suffers from congenital disease like anemia, leukemia need multiple transfusion of blood or any other disease who need to transfuse a part of blood like RBC, white blood cells , fresh frozen plasma are at risk of transmission, road traffic accidents individuals who needs urgent blood transfusions are also at risk of transmission(36).

**Patient who seek hospital care.** Hundreds of thousand people rush to hospital seeking medical care in outpatient department, minor surgeries, and clinics they are at risk from health care workers from patient to patient transmission, or any procedure has been done in hospital can easily transmit the disease if proper aseptic or hygienic measure not apply before procedure.(37)

**AGE** Studies shown that infected children under 6 years of age do not notice any symptoms only 10% of children develop jaundice. Among older children and adults aged 40 -50 can be more vulnerable and develop more severe symptoms like fever, yellowish discoloration of eyes and skin, decrease appetite, abdominal discomfort (38).

**Race / Ethnicity.** HCV can develop in any race or ethnicity but the most affected race or ethnic group in united states was white Americans were affected 54% and the black were 16% and Asians was on lowest range 14% for hepatitis c virus. This study also mentions that the ethnicity affected for HCV ranges high in Asians and lowers in white and black ethnic groups .(39)

**Religion.** Studies suggested that any 1 can affected whether religious or not but in some religious belief or practices are connected with sharp objects like cautery, tattooing, they make tattoos for good luck not for fashion. In African countries the African female

circumcision is common practice in villages and rural areas that is highly potential risk of HCV transmission because they perform procedure without aseptic measures and the equipment's not sterilized. All of the Muslim world doing male circumcision this their religious practice but now days many of them are educated or living in urban areas so they take their child to hospital for circumcision but in rural this practice done by some local health workers. In rural part of Sindh province people are celebrating this circumcision event people gathered and for lunch or dinner some of them arrange musical instruments and singers to well celebrate. Circumcision is common practice now a day in western world studies shown that male circumcision can protect many sexual transmit disease also some infectious diseases. People need support and care in difficult times. Spiritual care and support means a lot in some religions(40, 41) (42).

**Educational level.** Studies suggested that educational status plays an important role in individuals of general health as well as in specific disease because more education can give exposure to media newspapers, magazines can provide information in terms of knowledge, mode of spread, and spread of disease(43).

**Monthly income.** Refers to the respondent monthly income directly effect on quality of life so you have better living conditions, hygienic surroundings, good employment status, comorbidity status have less chances to get infected with HCV. People with less monthly income are more prone to disease(44). (Who 2016)

## 2.5 PAST MEDICAL HISTORY

**History of injections and transfusions.** According to studies on hepatitis c if any individual gets more injectable or doing frequent hospital visits have chances to get infected. In developing or low income countries it is a trend to insist for injectable even for minor problems is they higher risk for HCV. Like IV drug users sharing syringes,

reuse them. Pregnant women also at risk because of multiple transfusions and injectable. Frequent hospital visits for antenatal care, or going hospital for any kind of intravenous transfusions. In pregnancy low hemoglobin level is common complaint so pregnant women going to get blood transfusions from unauthorized laboratories or hospital and medical technicians they are not follow proper screening of blood , blood kits for drawing or transfusion mostly low quality is also a cause of spread(45).

**Surgical procedures.** According to references transmission of HCV with surgical procedures is much higher in developing countries also in developed countries. Usage of unsterilized equipment's, glass syringes, blood transfusion during surgery plays an important role in spread of disease. Specially pregnant women are more prone to get infected because during pregnancy they undergo many surgical procedure according to their diagnosis like some may go through abortion and others may go for caesarean section , normal vaginal delivery, ectopic pregnancy ,dilatation and curettage so they end up in different surgical situation so they might get infected from unsterilized equipment's ,operation theatres, blood transfusions ,intravenous fluids other pain killer injections(46).

**Positive HCV close relative or partner.** many studies shown that HCV mainly is a blood borne disease so, sharing razors, nail clipper, tooth brushes or anything that contaminated with blood of positive HCV patient can be a source of spreading disease. People who live with HCV positive patient may take special care for further spreading(47).

**Blood transfusion.** Most people getting infection from blood products. Because its widely used for surgical procedures during pregnancy studies proven that spotting occurs in nearly one third of all pregnancies the vast majority of spotting is harmless,

but it can be indication of variety of complications like miscarriage ,ectopic pregnancy or abortion so pregnant women need transfusion at any stage of pregnancy in procedure like caesarean section, normal vaginal delivery, suffering from low hemoglobin level causes inadequate food supply because of poverty in most low income countries hormonal changes ,sexual intercourse ,certain infections like chlamydia can cause bleeding per vagina. So screening of blood products must be assuring before transfusion(34).

**History of hospitalization.** Studies shown many causes of hospital acquired transmission of HCV health care workers got infected by positive HCV patient during hospital work. Infected patient can transmit the disease to non-infected patient and from infected health care worker to non-infected patient Unhygienic hospital environment and hospital waste management contribute spread of disease like many hemodialysis patients frequently visits for dialysis they are at risk of getting infected. A normal individual can be infected during endoscopy biopsies (colonoscopy) (37, 48).

**Number of gestation.** CDC reports that if 100 babies born to HCV positive mother 4 of them are infected and risk goes to 10%. Risk increases if mother is HIV positive(49).

**Antenatal care visits.** Multiple visits of antenatal care can provide better information about the new born how well the baby is also health of mother related to disease progress can be known and early diagnosis of HCV is helpful to treat the case accordingly not progress to chronic(50)

**Type and place of delivery.** Surgical procedures like caesarean section or normal vaginal delivery without aseptic measures can transmit the virus to pregnant women(35).

**History of dilatation and curettage.** Most pregnant women go through different kind of procedures during their pregnancy so unsterilized surgical procedure is high risk of transmission of HCV c(35).

**History of abortions.** History of multiple visits or going through different kind of procedures has strong affiliation of transmission of disease(51).

## **2.6 Prevention**

There is no prophylactic vaccine available for HCV. Reduce risk to exposure to virus is main objective. Hand washing, choose safe health care centers. Usage of sharp objects safely like scissors, knife, nail cutter and razors. Safe and sterilized operation theatres. Dispose of needles properly, cover open wounds, practice safe sex, like use of condoms, reduce sex partner's cessation of alcohol intake. Positive HCV patients must inform to the house hold members about the disease so they take care of patient as well as them self for further spreading. Informing health workers before getting any kind of procedure like injections, or donating blood or any kind of procedures that can impact others or lead to spread the disease(52).

## **2.7 Screening and diagnosis**

Early screening can prevent multiple risk factors like, cirrhosis and liver carcinoma. Hepatitis is silent virus so most individuals are asymptomatic so very few patients do screening in acute phase. The others develop chronicity like Cirrhosis and liver carcinoma. Acute phase individuals free from virus in six Months.

HCV Antibody Testing: Diagnosing hepatitis C begins with an antibody test. Antibodies to HCV can be detected in the blood, usually within two or three months

after the virus enters the body. If a person is positive for HCV antibodies, he or she has been exposed to the virus in the past.

Who should be get tested or do lab investigation?

- People who inject drugs
- People who use intranasal drugs
- Recipients of infected blood products or invasive procedures in health-care facilities with inadequate infection control practices
- Children born to mothers infected with HCV
- People with sexual partners who are HCV-infected
- People with HIV infection
- Prisoners or previously incarcerated persons
- People who have had tattoos or piercings

Steps for detection of hepatitis c virus

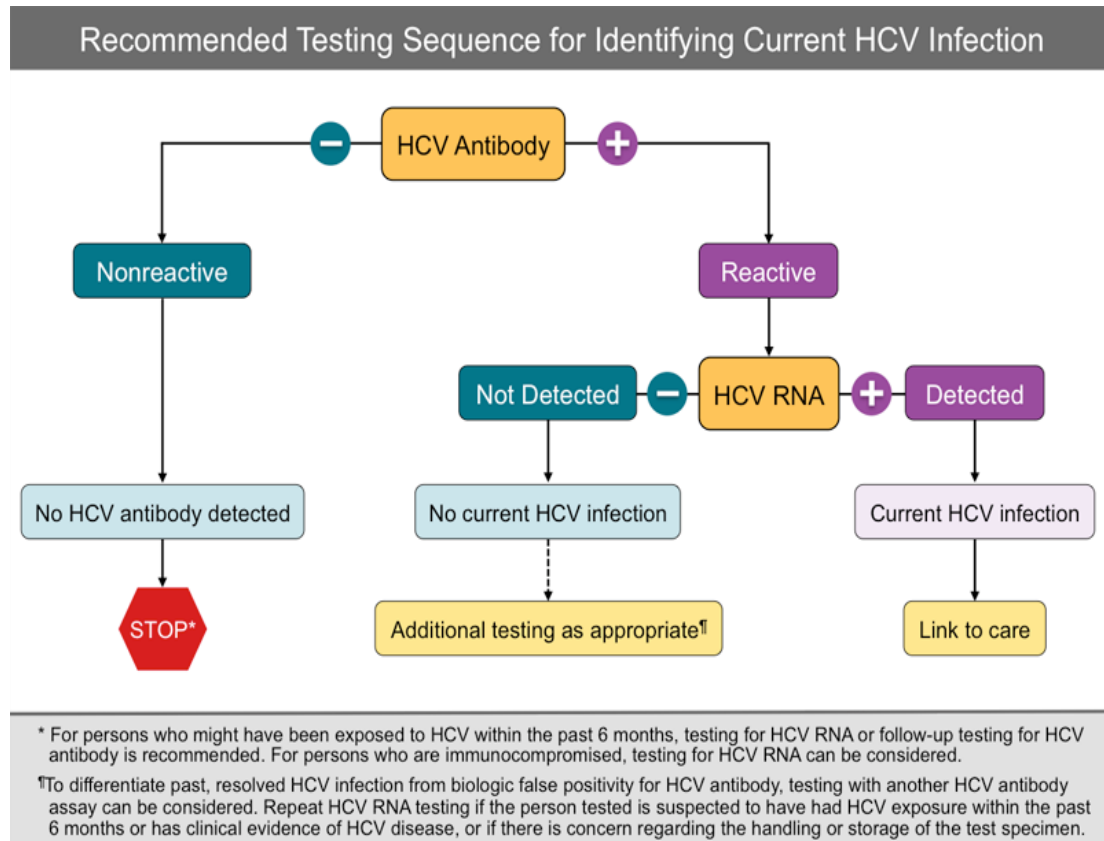
1. Screening for anti HCV antibodies with serologic test identify for the person who is exposed.
2. With positive HCV antibodies a nucleic acid test should be done.
3. Immune chromatograph test (ICT)
4. Enzyme immunoassay (EIA)

To determine if hepatitis C antibodies (HCAb or anti-HCV) are in your blood, doctors use a screening test called ELISA, which stands for Enzyme-Linked Immunosorbent Assay(53)

Anti-HCV antibody testing followed by polymerase chain reaction testing for viremia is accurate for identifying patients with chronic HCV infection. Various noninvasively



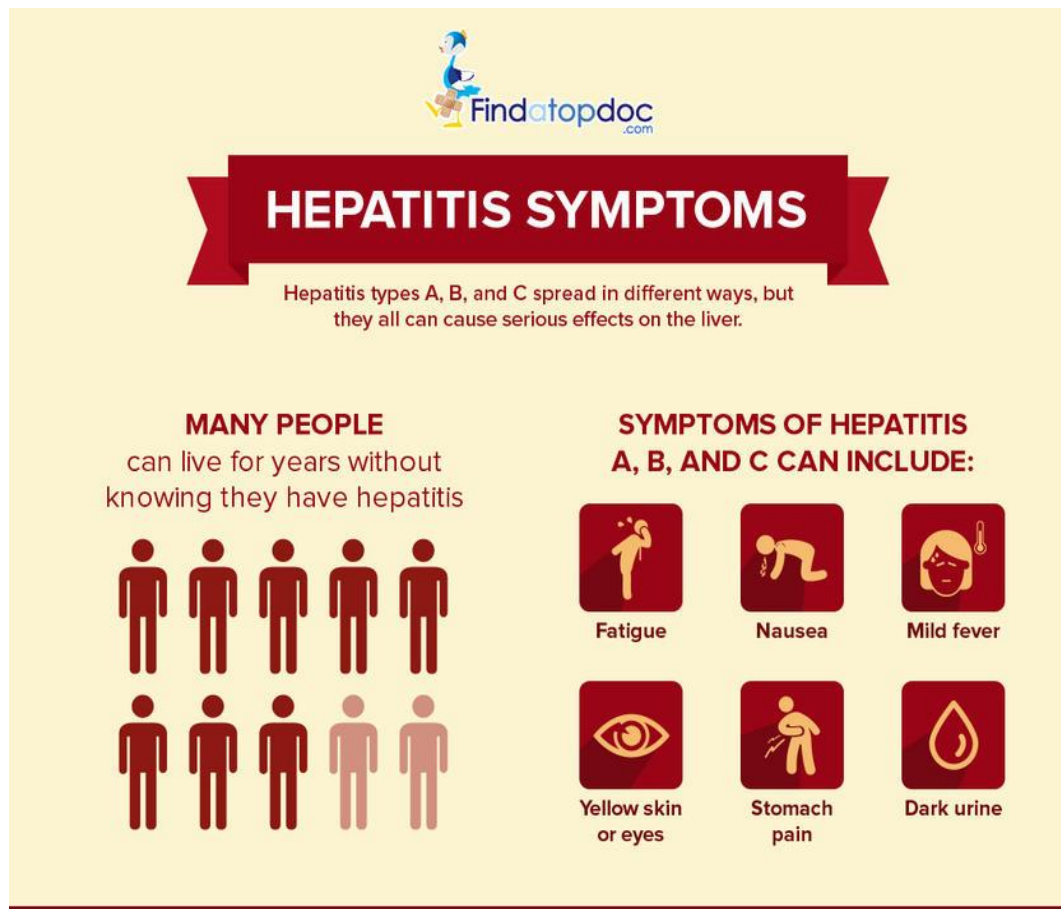
tests with good diagnostic accuracy are possible alternatives to liver biopsy for diagnosing fibrosis or cirrhosis.



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CHULALONGKORN UNIVERSITY  
**Figure 5: Recommended Lab Investigation**

## 2.8 Sign and symptoms

Hepatitis c is asymptomatic in most individuals but in some cases some patients may develop different kind of sign and symptoms like abdominal pain, right upper quadrant pain, fever, yellow discoloration of skin and eyes and dark colored urine and in some cases patient may complaint of nausea and vomiting, fatigue and depression



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Chulalongkorn University  
**Figure 6: Signs and symptoms**

## 2.9 Treatment

The purpose of antiviral treatment regimens is to prevent long-term health complications of chronic HCV infection (such as cirrhosis, liver failure, and hepatocellular carcinoma). Limited treatment of HCV infection among current HCV

positive may relate to general barriers to treatment access, low prioritization and specific barriers to treatment access, and active discrimination by clinicians. Because few studies have explored access to treatment for HCV infection among current populations,

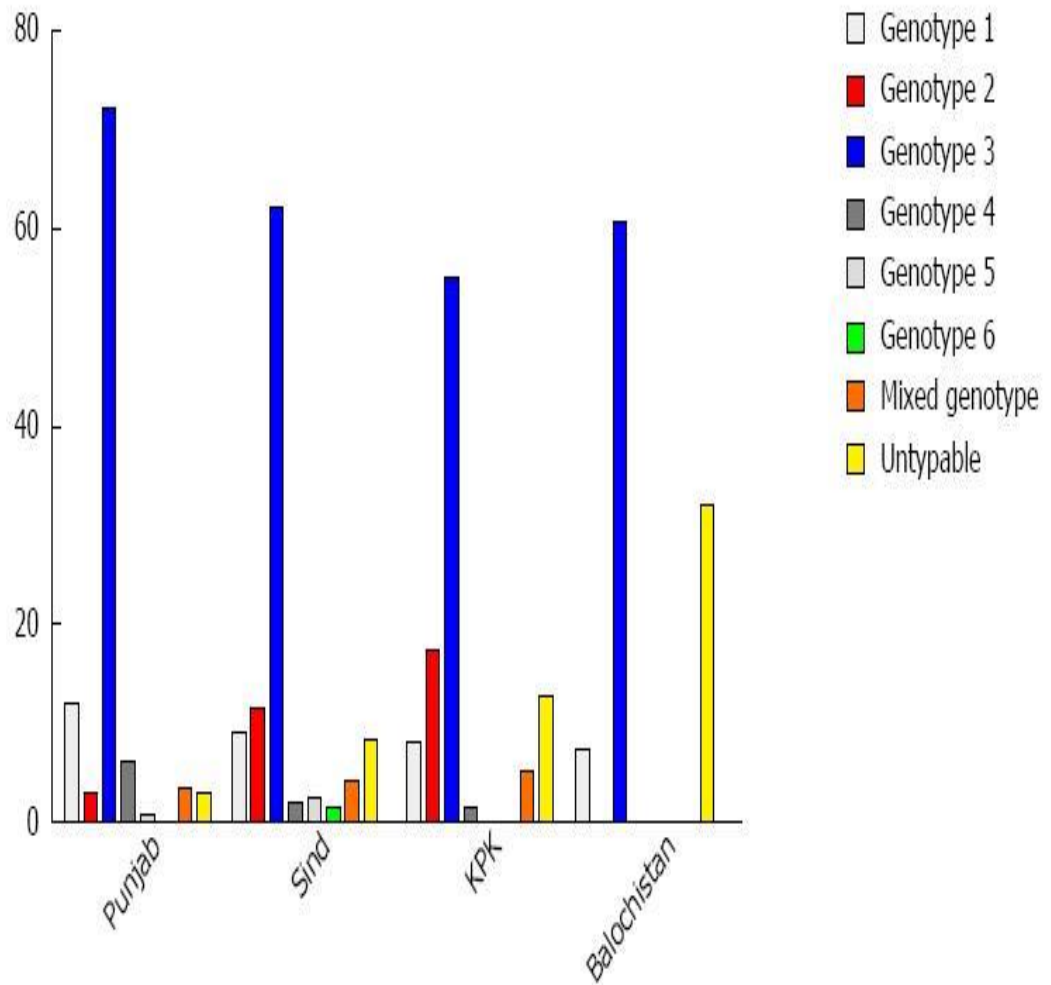
As discussed early HCV is asymptomatic virus so in acute phase immune system clear the infection. For chronic patients there is new intervention of treatment by WHO suggested DAA (Direct Acting Antiviral Treatment) for 8 to 12 weeks this regimen is more effective and less time consuming than interferon and other anti-viral treatment. Direct acting antiviral (DAA) cure results are more than 90% (54).

Treatment with peg interferon Alfa and ribavirin produces a sustained virology response (SVR) in approximately 60% of hepatitis C virus (HCV)-infected patients. Alternate options are needed for patients who relapse or do not respond to therapy.

#### **Side effect of treatment**

There are many side effects of the treatment especially with combine therapy interferon and ribavirin, hemolysis anemia, cough, pruritus, nasal congestion, dose can be adjusted to avoid side effect. Direct anti-viral have less side effects and more efficacy.

**Contraindication of treatment.** Treatment should not be given to the women who want to get pregnant during or after 6 months of the therapy other contraindications in both genders are coronary heart disease, bone marrow suppression, auto immune disease, active alcoholism



**Figure 7: Genotype distribution of HCV in Pakistan**



## CHAPTER III

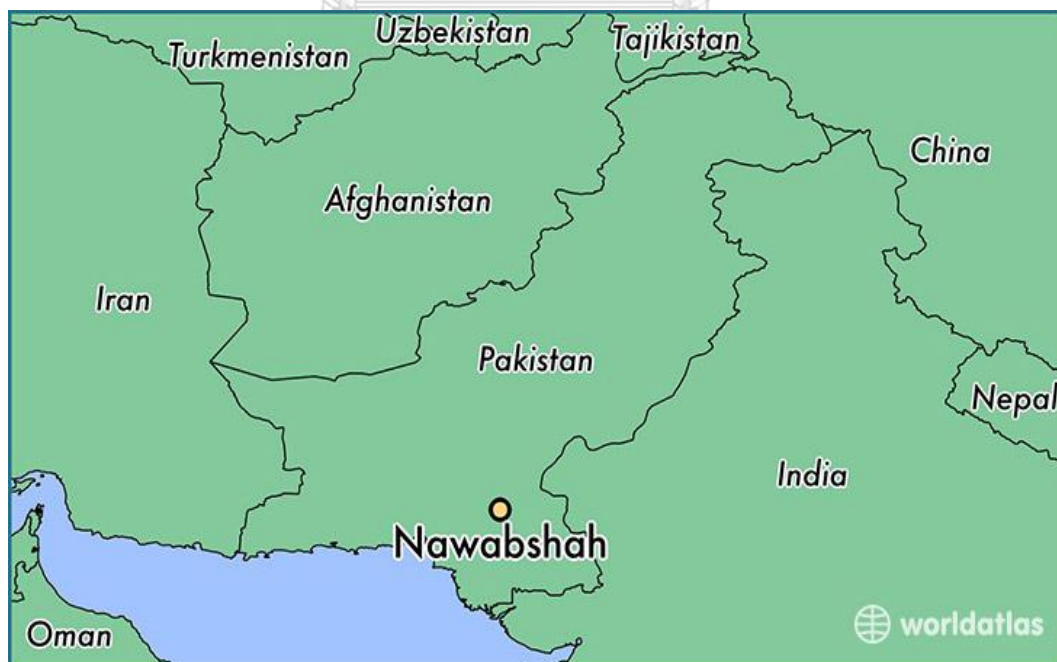
### RESEARCH METHODOLOGY

#### 3.1 Research design.

The research design was a descriptive cross sectional study to assess' the associated factors of hepatitis c among pregnant women.

#### 3.2 Site of study.

This study was conducted in people's medical university at outpatient Department of gynecology and obstetrics in district Shaheed Benazir Abad Sindh



*Figure 9: Study site*

### 3.3 Study population

The study population of district Shaheed Benazir Abad is 1.63 million and the study population was pregnant women living in district Shaheed Benazir Abad and suburbs age 16 -45.

### 3.4 Sample size.

The sample size will be calculated from the following formula (39)

$$n = \frac{Z^2_{\alpha/2} P (1-P)}{d^2}$$

$$\frac{(1.96)^2 (0.073) (0.927)}{(0.03)^2} = 289+29 = 318 \text{ (10\% of sample size for information error)}$$

$$= 318$$

n = estimated sample size

$Z^2_{\alpha/2}$  = level of significance it will be set 0.05 therefore  $Z = 1.96^2$

$\alpha = 0.05$  is type 1 error

P= proportion 0.073 (pregnant women in Hepatitis C in Pakistan: A Review of Available Data)

Antenatal screening of women for hepatitis B and C in an out-patient department. J Dow Univ Health Sci . 2008;2(1):32–5.

d = allowable error = 0.03

### **3.5 Sampling method**

All pregnant Patient age 16 -45years visiting in department of gynecology and obstetrics included irrespective of gestational age on the first visit of antenatal care. Convenient sampling method will be conducted. The respondents who were less than 18 years of age their guardian husband or father was signing consent form before interview

### **3.6 Inclusion criteria**

All pregnant women age group 16-45 years irrespective of gestational age was included in this study.

### **3.6 Exclusion criteria**

Pregnant women with dual or co infections diagnosed cases and pregnant women who cannot communicate easily will be excluded

### **3.7 Research instruments**

The instrument for data collection was standardized questionnaires was Developed and prepared after literature review, operational definitions and conceptual frame work. First it was prepared in English then translated into local language (sindhi) and then the interview was conducted.

### **3.8 Reliability**

The questionnaire was made a re-checked with references of other studies and recommendations of expert's pre-test reliability of the questionnaire was done among



assistant researches before actual data collection to test the reliability Cronbach's alpha coefficient was used to examine the reliability of the questionnaire.

### **3.9 Validity**

For validity of the tool, the questionnaire was reviewed by 3 expert adviser, senior faculty members and experts in field of hepatitis and public health to ensure the correctness of the questionnaire. Pretesting of 24 questions in Sindhi language was conducted in outpatient department of gynecology and obstetrics in some local hospitals they were far from the site of study area.

### **3.9 Data collection**

An excellent designed form was used for data collection. An informed consent taken from the patient. Data collection was started after approval of review committee faculty of public health sciences Chulalongkorn University.

1. Three research assistant was hired from a local health unit all lady health Workers selected to communicate easily with pregnant women. All assistant Researchers were trained and examine them before data collection.
2. Introduction was carried out by the researcher and three research assistant and then shared information about the research.
3. After that the researcher and 3 assistant researchers was doing data collection after signing the consent from the respondent.

### 3.10 Data analysis

All questionnaire was collected and checked on daily basis for errors and Completeness. the data was analyzed by statistics by SPSS version 23.the analysis illustrated with important data.

#### *Descriptive statistics*

Such as general characteristics and general information in frequencies and percentage for categorical data, mean median, minimum, maximum and for standard deviation.

#### *Inferential statistics*

To identify the associations between independent variables and dependent variables was tested by chi-square was used to find out associations between independent and dependent (hepatitis c).

### 3.11 Ethical considerations

The study proposal was submitted for approval from the ethical review committee, of people's medical university and hospital, province of Sindh Pakistan **Enrolled** patients provided voluntary signed informed consent, or a fingerprint if illiterate, prior to inclusion.

### 3.12 Limitations

To follow the respondents throughout their pregnancy to check hepatitis c infection may not be possible due to time limit to cover the time limitations study includes respondents from their last pregnancy and information from respondents from their recall memory. Resources limit also a big issue wants to conduct the study in 3 hospitals but resources was limited that is why the study conducted in 1 hospital. The antenatal

care coverage is low in Pakistan and respondents may not have their antenatal care visit record or antenatal card due to that reason the researcher again rely on recall memory of respondents to get information of past medical and surgical history,

## CHAPTER IV

### RESULTS

During the study period from 14 may 2018 to 2<sup>nd</sup> June, a total of 318 pregnant women were approached in the study. They were orally interviewed at district SBA in Peoples Medical University and Hospital Sindh Pakistan to determine the risk factors of Hepatitis C infection among pregnant women.

The result was presented in 4 categories

1. Socio demographics of respondents
2. Past medical history
3. Obstetrical history
4. Factors association between pregnant women and HCV

In this study, out of 318 pregnant women, 26(8.2%) were found positive infection with viral hepatitis C. The overall prevalence of hepatitis C infection was found to be 8.2% in the present study. **Table No. 1**

**Table 1: FREQUENCY OF HEPATITIS C INFECTION AMONG PREGNANT WOMEN IN  
DISRTRICT SHAHEED BENAZIR ABAD**

<b>Hepatitis C</b>	<b>Number</b>	<b>Percentage</b>
Positive	26	8.2%
Negative	292	91.8%
<b>Total</b>	<b>318</b>	<b>100%</b>



Table 2: **DISTRIBUTION OF PREGNANT WOMEN ACCORDING TO SOCIO-DEMOGRAPHIC PROFILE BETWEEN HCV POSITIVE AND NEGATIVE (n = 318)**

	<b>HCV Positive (n = 26)</b>	<b>HCV Negative (n = 292)</b>	<b>Total</b>	<b>P value</b>
Age in years, (Range)	28.0 ± 6.7 (18 to 40)	27.65 ± 6.2 (16 to 45)	27.68 ± 6.2 (16 to 45)	0.78
<b>Age in groups</b>				
16-25	13(50.0%)	135(46.2%)	148	0.75
26-35	10(38.5%)	132(45.2%)	142	
36-45	3(11.5%)	25(8.6%)	28	
<b>Residence</b>				
Rural	20(76.9%)	184(63.0%)	204	0.20 <sup>a</sup>
Urban	6(23.1%)	108(37.0%)	114	
<b>Education level</b>				
Uneducated	10(38.5%)	210(71.9%)	220	<0.001*
Primary to high school	8(30.8%)	73(25.0%)	81	
College or University	8(30.8%)	9(3.1%)	17	
<b>Occupation</b>				
Jobless	5(19.2%)	66(22.6%)	71	0.19
Government employee	10(38.5%)	66 (22.6%)	76	
Farmer & House wife	11(42.3%)	160(54.8%)	171	
<b>Monthly income</b>				
less than 20000 PKR	14(53.8%)	126(43.2%)	140	0.54
25000 PKR	4(15.4%)	76(26.0%)	80	
35000PKR	6(23.1%)	57(19.5%)	63	
more then 50000PKR	2(7.7%)	33(11.3%)	35	

\* p value is statistically significant

## SOCIO DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

### 4.1 Age distribution of respondents with HCV infection

In this study, the ages of the participants enrolled were between 16 years to 45 years. The mean age of the participants was  $27.68 \pm 6.2$  years. The HCV-infected participants (the study group) had a mean age of  $28.0 \pm 6.7$  years whereas the mean age of the HCV-negative participants was  $27.65 \pm 6.2$  years. (p value = 0.78). **Table No. 2**

The incidence of HCV infection showed that women between the ages of 36-45 years had less infection 3(11.5%) with while HCV infection was slightly higher 10(38.5%) in women in the ages 26-35 years. Respondents in the young age groups 16-25 years had the highest prevalence of Hepatitis C infection, 50.0%. The incidence of Hepatitis C among these age groups was insignificant having a P-value of (P=0.75) **Table No. 2**

### 4.2 Residence of respondents with HCV infection

There were 204(64.2%, n = 318) respondents who had come from rural areas. Of these, and 114(35.8% n=318) came from urban area of them the respondents who were positive from rural area 20(76.9%, n = 26) pregnant women were positive for HCV infection and respondents who had come from urban areas. Of these, 6 (23.1%, n = 26) pregnant women were positive for HCV infection. There was no statically significant difference of residential areas (Rural & urban) p.value = 0.20<sup>a</sup>). **Table No. 2**

### 4.3 Educational background of respondents with HCV infection

In the present study, 220 respondent never attend school among a total pregnant women positive for HCV infection, who never attend school were significantly high 10 (38.46 n = 26) the one who attend primary to high school were a total of 81 respondents,

positive for HCV 8 (30.7%, n = 26) a total of 17 women had education, college and university level also around 8 (30.7%) respectively while pregnant women who were illiterate had significantly highest infection with HCV though the p value was highly significant ( $P < 0.001$ ). **Table No. 2**

#### **4.4 Occupation of the respondents with HCV infection**

With regards to occupation, the highest frequency 11(42.3%, n = 26) of HCV infection was observed among women who were farmers and house wives while government servants had the infection 10(38.5%, n = 26) for HCV infection. And jobless count is 5(19.2% n=26) However, no significant association was observed between seropositivity and occupation of the study subjects ( $p=0.19$ ) for HCV. **Table No. 2**

#### **4.5 Monthly income of the respondents with HCV infection**

According to monthly income of women, the highest proportion 14(53.8%, n = 26) of HCV infection was observed among women who had monthly income < Rs. 20000/= PKR whereas 4(15.4%, n = 26) respondents had monthly income of Rs. 25000/= PKR. 6(23.1%, n = 26) women had monthly income of Rs. 35000/= and 2(7.7%, n = 26) respondent's had monthly income of Rs. >50000/=. However, no significant association was observed between seropositivity and monthly income of the study subjects ( $p=0.54^*$ ) for HCV. **Table No. 2**

Table 3: **DISTRIBUTION OF PREGNANT WOMEN ACCORDING TO PAST MEDICAL HISTORY BETWEEN HCV POSITIVE AND NEGATIVE (n = 318)**

	HCV Positive (n = 26)	HCV Negative (n = 292)	Total	P value
<b>Ever admitted in hospital</b>	14(53.8%) 12(46.2%)	122(41.8%) 170(58.2%)	136 182	0.30
<b>kind of hospital you admitted (n = 182)</b>				
Tertiary care	7(58.3%)	73(42.9%)	80	0.12
Secondary care	3(25.0%)	87(51.2%)	90	
Private hospital	2(16.7%)	10 (5.9%)	12	
<b>Total</b>	12	170	182	
<b>Injection during this whole pregnancy or last pregnancy?</b>				
No	2(7.7%)	77(26.4%)	79	0.002*
Yes	24(92.3%)	215(73.6%)	239	
<b>If yes, how many times in this year?</b>				
Never took injection	2(7.7%)	77(26.4%)	79	0.18
1-2times	10(38.5%)	97(33.2%)	107	
3-4 times	6(23.1%)	58(19.9%)	64	
5 and above times	8(30.8%)	60(20.5%)	68	
<b>If yes, how many times in last year?</b>	6(23.1%)	77(26.4%)	83	
No	13(50.0%)	135(46.2%)	148	
2-5 times	7(26.9%)	80(27.4%)	87	
More than 5 times				
<b>Place of taking injection</b>				
Govt hospital	14(53.8%)	137(64.0%)	151	0.06
Private hospital	9(34.6%)	42(19.6%)	51	
Dispensary, quakes, others	3(11.5%)	35(16.4%)	38	
<b>Had blood transfusion during this whole pregnancy or last pregnancy?</b>				
No	11(42.3%)	218(74.7%)	229	0.001 <sup>a</sup>
Yes	15(57.7%)	74(25.3%)	89	

\* p value is statistically significant



Continued Table 3

	HCV Positive (n = 26)	HCV Negative (n = 292)	Total	P value
<b>If yes, place of transfusion?</b>				
	12(46.2%)	61(20.9%)	73	
Government hospital	3(11.5%)	13(4.5%)	16	
Private hospital				
<b>Had any kind of surgery in last 2 years?</b>				
	11(42.3%)	132(45.2%)	143	0.83 <sup>a</sup>
No	15(57.7%)	160(54.8%)	175	
Yes				
<b>What kind of surgical procedure please give details? n=175</b>				
	12(80.0%)	140(87.5%)	152	
Gynae / Obs	3(20.0%)	20(12.5%)	23	
Others				
<b>Had dental treatment? Or dental surgery?</b>				
	24(84.6%)	249(85.3%)	273	0.61
No	2(7.7%)	43(14.7%)	45	
Yes				
<b>If yes, kind of dental treatment</b>				
Tooth extraction	2(7.7%)	43(14.7%)	45	0.43
<b>Sharp skin objects</b>				
	0(0%)	5(1.7%)	5	0.29
No	26(100%)	287(98.3%)	313	
Yes				
<b>Live with any close relative diagnosed positive hepatitis C?</b>				
	17(65.4%)	185(63.4%)	202	0.83
No	9(34.6%)	107(36.6%)	116	
Yes				

\* p value is statistically significant

## **PAST MEDICAL HISTORY**

### **4.6 Previous h/o hospital admission of the respondents**

In this study, most of the women 182(57.2%, n =318) respond to yes had hospital admission during this or last year. Of these, 12(46.2%, n = 26) women had HCV infection. Most of the pregnant women who had no admission in hospital was 136(42.8% n=318) of them positive for HCV were 12(46.1% n=26) with respect to admission in hospital during this or last pregnancy no association identified respectively. (p value = 0.23). **Table No. 3**

### **4.7 kind of hospital for admission**

Regarding what kind of hospital respondents choose 182(57.2% n=318) had history Of admission the one who choose tertiary care hospital of them 7(58.3% n=26) were Positive for HCV in primary and secondary care hospital positive respondents were 3(25.0% n=26) and the one who gone to private hospital were 2(16.7% n=26).in terms of kind of hospital there is no association identified (p value=0.12) **Table No. 3**

### **4.8 Previous h/o injection and number of times of the respondents in this year**

Regarding injections out of 318 pregnant women, 239(75.2%) were identified who had history of unsafe injections by traditional practitioners during their whole or last pregnancy. Of these, 24(92.3%, n = 26) women had HCV infection. The women who were positive but never took injection was 2(7.7% n=26) with respect to number of times of getting unsafe injection found strong association between injection and HCV (p value = 0.02\*). **Table No. 3**

#### 4.9 Injections in last year

Regarding injections in last year pregnancy out of 318 respondents 235(73.8% $n=318$ ) Had injections from them 13(50.0% $n=26$ ) were positive who had injections 2-5 times 7(26.9% $n=26$ ) were positive for HCV who took injections more than 5 time and 6(23.1% $n=26$ ) never had injections but they all were positive for HCV. there is no association between women who were positive or negative with HCV and injectable (p=value0.91)

#### 4.10 Place of taking injections of the respondents with HCV infection

With regards to place of taking injections, out of 318 pregnant women a total 240 took injections from government hospital of these, 14(53.8%,  $n = 26$ ) women had HCV infections in majority whereas 9(34.6%) women took injections from private hospitals with 3(11.5%,  $n = 26$ ) took injection from dispensaries and quakes. There was no statically significant difference between those women who had positive and those women who had negative to HCV with respect to place of taking injection during this or last pregnancy (p value = 0.20). **Table No. 3**

#### 4.11 History of blood transfusion with HCV infection

In this study, out of 318 pregnant women, 89(28.0% $n=318$ ) were having history of blood transfusion during their whole or last pregnancy. Of these, 15(57.7%,  $n = 26$ ) women had HCV infection. 11(42.3% $n=26$ ) positive respondents never had blood transfusions. Regarding place of transfusion most of the pregnant women 12(46.2%,  $n =26$ ) had blood transfusion at government hospital while 3(11.5%,  $n = 26$ ) women had blood transfusion at private hospitals. There was statically significant difference of

blood transfusion who had positive and those women who had negative to HCV blood transfusion during this or last pregnancy (p value = 0.001<sup>a</sup>),). **Table No. 3**

#### **4.12 Previous history of any surgery with HCV infection**

Among a total of 26 pregnant women who had positive for HCV infection, 15(57.7% $n=26$ ) had history of previous surgery in last 2 years and 11(42.3% $n=26$ ) were positive with HCV but never had surgery There was no associated significance difference between surgical procedure and HCV infection (p value = 0.83). **Table No.**

**3**

#### **4.13 Previous history of dental treatment or surgery**

In this study, out of 318 pregnant women, 45(14.2%) were identified who had history of previous dental treatment or dental surgery. Of these, only 2(7.7%,  $n = 26$ ) women had HCV infection and these two women were treated by tooth extraction and 2(7.7% $n=26$ ) had other dental treatment or surgery. Whereas there was no statistically significant difference between those women who had and those women who had negative infections to HCV with related to kind of dental treatment or dental surgery (p value = 0.55<sup>a</sup>). **Table No. 3**

#### **4.14 Ear and nose piercing with HCV infection**

Among a total of 26 pregnant women who were positive for HCV infection had history of nose/ear piercing showed no association between ear piercing and HCV infection (p value = 0.100<sup>a</sup>). **Table No. 3**

#### 4.15 History of living with close HCV person/relative with HCV infection

In this study, out of 318 pregnant women, 107(35.5%) were living with HCV infected person / relative. Of these, 9(34.6%, n = 26) women had HCV infection whereas 17(65.4% n=26) were positive for HCV but not having any relative positive there was no statistically significant difference between those women who were positive and those women who were negative to HCV infections regarding living with HCV infected relative/person. (p value = 0.100<sup>a</sup>). **Table No. 3**

*Table 4: DISTRIBUTION OF PREGNANT WOMEN ACCORDING TO PAST OBSTETRICAL HISTORY BETWEEN HCV POSITIVE AND NEGATIVE*

	(n = 318)			
	HCV Positive (n = 26)	HCV Negative (n = 292)	Total	P value
<b>Number of pregnancies:</b>				
1-2	14(53.8%)	112(38.4%)	126	0.28
3-4	6(23.1%)	80(27.4%)	86	
5 and above	6(23.1%)	100(34.2%)	106	
<b>Number of antenatal care visits:</b>				
1-2	16(61.5%)	185(63.4%)	201	0.98
3-4	7(26.9%)	74(25.3%)	81	
5 and above	3(11.5%)	33(11.3%)	36	
<b>Mode of delivery</b>				
NVD	13(50.0%)	164(56.2%)	177	0.54
C. section	7(26.9%)	53(18.2%)	60	
Delivered at home (Dai)	6(23.1%)	75(25.7%)	81	
<b>Place of delivery</b>				
Govt hospital	14(7.7%)	168(92.3%)	182	0.58
Private hospital	8(11.0%)	65(89.0%)	73	
At home (Dai)	4(6.3%)	59(93.7%)	63	
<b>Do you have abortion in last 2 years?</b>				
No	20(76.9%)	262(89.7%)	282	0.68
Yes	6(23.1%)	30(10.3%)	36	

**If you had abortion, please give details:**

Abortion	2(33.3%)	13(43.3%)		0.90 <sup>a</sup>
Others reasons	4(66.7%)	13(43.3%)		

**Do you ever have dilatation & curettage?**

	20(76.9%)	251(86.0%)	271	0.24 <sup>a</sup>
No	6(23.1%)	41(14.0%)	47	
Yes				

**If yes, please give details**

Never had DNC	20(76.9%)	257(86.0%)	277	0.12 <sup>a</sup>
abortion	6(23.0%)	35(14.1%)	41	

**Do you have diabetes?**

No	25(96.2%)	286(97.9%)	311	0.45 <sup>a</sup>
Yes	1(3.8%)	6(2.1%)	7	

**Is your patient of haemodialysis?**

No	25(96.2%)	289(99.0%)	314	0.29 <sup>a</sup>
Yes	1(3.8%)	3(1.0%)	4	

**Do you have any kind of blood diseases like haemophilia?**

No	25(96.2%)	289(99.0%)	314	0.29 <sup>a</sup>
Yes	1(3.8%)	3(1.0%)	4	

a = Fisher's Exact test

## PAST OBSTETRICAL HISTORY

### 4.16 History of previous number of pregnancies and antenatal

In this study, out of 318 pregnant women, most of the women i.e. 126(39.6%) were identified who had pregnancies 1 to 2 times. Of these, 14(53.8%, n = 26) women had HCV infection women who had 3-4 pregnancies was positive 6(23.1% n=26) and women who had 5 and above pregnancies was also 6(23.1% n=26) with no signification difference (p value = 0.28). Regarding antenatal care visits Most of the pregnant women who had HCV infection, 16(61.5%, n = 26) women visited 1 to 2 times for antenatal care. 7(26.9%, n = 26) visited 3-4 time for antenatal care and 3(11.5%, n = 26) visited > 5 times for antenatal care. Number of antenatal care visits were statistically associated with those women who got HCV infection.

(p value = 0.98) **Table No. 4**

### 4.17 Mode of delivery with HCV infection

Findings from this study showed that out of 318 pregnant women, mostly 177(55.7%) had normal vaginal delivery with HCV infection in 13(50.0%, n = 26). Sixty (18.9%) women delivered by caesarean section with HCV infection in 7(26.9%, n = 26) while 81(25.5%) women were delivered at home by Dai and HCV infection was observed in 6(23.1, n = 26) women. There was no association of mode of delivery among the pregnant women who had HCV infection. (p value = 0.54). **Table No. 4**

### 4.18 Place of delivery with HCV infection

In this study, out of 318 pregnant women, 182(57.2%) were delivered at Government hospital in majority. Of these, 14(53.8%, n = 26) women had HCV infection whereas 8(30.8%, n = 26) women delivered at private hospital 4(15.4%, n = 26) delivered at

home by Dai who had HCV infection respectively. There was no association of place of delivery among those women who were positive. (p value = 0.58). **Table No. 4**

#### **4.19 History of previous abortion with HCV infection**

In this study, out of 318 pregnant women, 36(11.3%) had history of abortion in their last 2 years. Of these,20(76.9% $n=26$ ) were never had abortion but they positive for HCV and from respondents 6(23.1%,  $n = 26$ ) women had abortion with HCV infection. There was no statically significant difference between those women who had positive and those women who had negative to HCV with respect to previous abortion in last 2 years (p value = 0.012<sup>a</sup>) in details of abortion 2 respondents had abortion and 4 stated others reasons. (P=value 0.39<sup>a</sup>) **Table No. 4**

#### **4.20 History of Dilation and curettage with HCV infection**

In this study, out of 318 pregnant women, 47(14.8%) were undergone D & C. Of these,20(76.9% $n=26$ ) never had D&C but positive for HCV 6(23.1%,  $n = 26$ ) women had D&C operation and were positive HCV infection. There was no association and statically significant difference between those women who were positive and those women who were negative to HCV related to Dilatation and curettage (p value = 0.24<sup>a</sup>)

**Table No. 4**

#### **4.21 Previous history of diabetes mellitus and HCV infection**

In this study, out of 318 pregnant women, 7(2.2%) were identified who had history of diabetes mellitus. from these, only 1(3.8%,  $n = 26$ ) women had HCV infection. There was no statically significant difference of diabetes mellitus between those women who



were positive and those women who were negative to HCV (p value = 0.45<sup>a</sup>). **Table No. 4**

#### **4.22 Previous history of hemodialysis and hemophilia and HCV infection**

Among a total of 26 pregnant women positive for HCV infection, only 1(3.8%, n = 26) had history of hemodialysis and hemophilia respectively and both diseased had no association with hepatitis C infection (p value = 0.29<sup>a</sup> respectively). **Table No. 4**



## CHAPTER V

### DISCUSSION

HCV infection increases during pregnancy. That is a matter of concern and requires caution. Studies from several studies in Pakistan show that HCV levels vary between 0.7% and 20%.<sup>(55)</sup> This hospital-based cross sectional study was conducted to determine the associated factors of Hepatitis C infection among pregnant women at district Shaheed Benazir Abad in Peoples Medical University and Hospital Sindh. The study revealed that out of 318 pregnant women that were included in the study, 26 women had positive HCV infection giving an incidence of 8.2% among the participants. In a similar way, the HCV's involvement of the world differs from different levels of population.<sup>(56)</sup> Clinical studies showed an increase of 5.31% in Islamabad, 2.45% in Rawalpindi, 4.06% in Multan, 20.89% in Faisalabad, 4-6% in Karachi, 9% in Mardan, 5% NWFP and 25.7% in Northern areas.<sup>(57)</sup> These results correlate well to this study. Moreover, in a study conducted by Akhtar AM et al. et al. in Lahore who revealed the The incidence rate of HCV for pregnant women was 11.68%, which was different from those reported by Shah and Shabbir.<sup>(58)</sup> In another study by Nawab Shah, the frequency of pregnant HCV women is 3.44%, which is lower than in current studies.<sup>(57)</sup>

## **SOCIO DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**

### **5.1 Age distribution of respondents with HCV infection**

Age of pregnant women is a risk of detecting the HCV problem. The high risk of HCV occurs among women. Up to 40 years will enhance and reduce it. The year argued as an integral part of HCV studies, and infections among adults (59, 60). In this study, the ages of the participants enrolled were between 16 years to 45 years. The mean age  $\pm$  SD of the participants was  $27.68 \pm 6.2$  years. Another study conducted by Goyal et al. who found Mean age was 25.97 in her study.(61) In this study, respondents in the young age groups 16-25 years had the highest prevalence of Hepatitis C infection, 50.0%. The incidence of Hepatitis C among these age groups was insignificant having a P-value of (P=0.75) Similarly in the study of Akhtar AM et al., in which the mean age for HCV positive women was  $27.55 \pm 3.43$  years with the range of 24 to 35 years which is similar to this study. (55) These results are in agreement with the findings of Kumar *et al.* (2007), (62) who reported that women in the age group of 21-30 years were HCV positive whereas Pyadala et al. recorded age range was 17- 45 years old and his results show that seroprevalence of HCV infection was higher 31% in the age group 21 – 30 years.(63) He also showed that in his study that majority of HCV - positive patients belonged to the age group of 21- 30 years, which is similar to the findings of Sied M et al.(64) Almost similar data showed by Parthiban et. al 2009 in their study.(65)

### **5.2 Residence of respondents with HCV infection**

There were 204(64.2%, n = 318) respondents who had come from rural areas. Of these, 20(76.9%, n = 26) pregnant women were positive for HCV infection. There were 114(35.8%) respondents who had come from urban areas. Of these, 6 (23.1%, n = 26)

pregnant women were positive for HCV. There was no association observed in residential areas (Rural & urban)  $p$ -value = 0.20). According to study of Pyadala et al (63) 44% patients affected by HCV infection belongs to the urban area which is similar to this study and 17% of affected by HCV patients related to rural areas which is higher to this study. (63) Similar findings are reported by Ahmad I et al. where prevalence is greater in rural than urban, due to lack of knowledge about precautions, poverty, less awareness regarding the transmission and causative agent. (66) A. Al-Kubaisy et al revealed in his study that mothers residing rural area had higher anti-HCV prevalence (43.2%), than those residing urban (23.4%). (67) However, this difference was not significant  $p=0.09$  which correlates well to this study. The findings from this study showed that inhabitants at rural areas be at greater risk of exposure to HCV infection; most probably attributed to folk medication, use of undisputable, syringes, needles and medical equipment's. However, Khatoon Razia et al found that majority of seropositive pregnant women belonged to rural areas (79.2%) as compared to those from urban areas (20.8%). (68) This is in agreement with another study which also reported that majority of seropositive belonged to rural areas as compared to those from urban areas. (63)

### **5.3 Educational background of respondents with HCV infection**

All HCV-reactive females were observed to have low education levels. In the present study, among a total of 26 pregnant women positive for HCV infection, 8(30.7%,  $n = 26$ ) were educated from primary, to high school 8(30.8%,  $n = 26$ ) women had education at college level, this study shows that level of educational had HCV infection whiles pregnant women who were illiterate had significantly highest infection with HCV 10(38.5%,  $n = 26$ ) though the  $p$  value was highly significant ( $P < 0.001$ ). Same

observation by A.Al-Kubaisy et al who reported an inverse relationship between level of maternal education and seropositive rate of anti-HCV was detected.(67) Illiterate mothers showed significantly higher rate of positive anti-HCV serum,  $p=0.049$ .

Kumar et al. (2007) found similar results that women with positive HCV infection showed low educational level.(62) In a study by Akhtar AM et al. in Lahore the who showed same observations in his study.(55) Another study conducted by Khamis et al in Egypt(69) who also reported similar findings in his study. In agreement to this, a research carried out by Murad *et al.* (2013) found out that women with less than secondary school level of education are at a higher risk (70)whiles Saleh Doa'a *et al.* (2010) also suggested that low level of maternal education is a risk factor for HCV infection in women.(71)

#### **5.4 Occupation of the respondents with HCV infection**

With regards to occupation, the highest frequency 11(42.3%,  $n = 26$ ) of HCV infection was observed among women who were farmers and house wives whiles jobless and had the least infection 5(19.2%,  $n = 26$ ) for HCV infection. And government service holder 10(38.5% $n=26$ ) However, no association was observed between seropositivity and occupation of the study subjects ( $p=0.19$ ) for HCV.

The results are consistent with reports from Benin where no statistically significance association was found between gestational and the acquisition of HCV (Ugbebor *et al.*, 2011).(72) No significant association between HCV-RNA seropositivity and occupation was observed in the study of A.Al-Kubaisy et al.(67) and he also revealed that house wives were most commonly infected to HCV in his study which is similar to this study. House wives were more infected to HCV in the study of Sied M et al. with insignificant difference

(p value > 0.05). Similarly, Khamis et al. who showed that most women surveyed (96.4%) were women and only 3.6% were employed. (69) No significant difference in the nature of work between seropositive and seronegative women (P = 0.56). Finding from the study of Jeremiah et al. who found that various occupations of the subjects, had the highest HCV rate 40% was observed in housewives.(73) These findings are similar to this study.

### **5.5 Monthly income of the respondents with HCV infection**

According to monthly income of women, the highest proportion 14(53.8%, n = 26) of HCV infection was observed among women who had monthly income < Rs. 20000/= PKR whereas 4(15.4%, n = 26) respondents had monthly income of Rs. 25000/= PKR. the respondents had monthly income 6(23.1% n=26) > Rs.35000/= PKR who had HCV positive infection. Only 2(7.7% n=26) had income >50000/=PKR. However, no association was observed between seropositivity and monthly income of the study subjects (p=0.54) for HCV. Similarly, Khatoun Razia depicted that majority of seropositivity was seen in women belonging to lower socio-economic class, followed by those belonging to middle class. (68) This is in agreement to another study which also reported highest frequency of seropositive belonging to lower class (76.47%), followed by middle class (14.70%).(66) According to Khan et al 2008, approximately half of study subjects had an income >3000 Rs.(74) However, most of anti-HCV-seropositive pregnant women (71.5%) in the study of Tangsathapornpong, A et al. who had low incomes, compared to seronegative pregnant women (41.7%).(75) Low socioeconomic status may be a potential factor for HCV infection in Thailand. Further

studies should be performed to identify the correlation between low socioeconomic status and HCV infection.

## **PAST MEDICAL HISTORY**

### **5.6 Previous history of hospital admission of the respondents**

In this study, most of the women 182(57.2%, n =318) had hospital admission during this or last year. Of these, 12(46.2%, n = 26) women had HCV infection. Most of the pregnant women had the admission in tertiary care hospital followed by primary and secondary care hospital (58.3%, 16.7%, 25.0%, n = 26) respectively. There was no association between those women who had positive HCV infection with respect to admission in hospital during this or last pregnancy. (p value = 0.30). This was similar to study of Goyal et al. who investigated increased risk because of their past pregnancies, hospital admissions, past surgeries.(61) Khan Uzma also determined same observation history of hospitalization was 61% in her study which is similar finding to this study. (74)The median length of hospital stay was four days (2 to 7) and was not significantly associated with maternal HCV RNA status (P = 0.653).(76)

### **5.7 Previous history of injection and its number of times of the respondents**

Regarding injections out of 318 pregnant women, 239(75.2%) were identified who had history of unsafe injections by traditional practitioners during their whole or last pregnancy. Of these, 215(73.6%, n = 26) women had HCV infection. There was statically significant difference between those women who were positive and those women who were negative to HCV with respect to getting unsafe injections during this or last pregnancy (p value = 0.03). Similarly, Umumarungu et al. found that unsafe injections by traditional practitioners were of significant exposure risk of contracting

HCV infection in his study. (77) A survey conducted at Aga Khan University Hospital Clinics Karachi revealed that about half of the patients gave history of injection use at their last visit to health care providers and 3.5% of them had received 10 or more injections in the last year.(78) Janjua & colleagues in their study from Sindh province reported an alarmingly high frequency of therapeutic injection use as 13.6 injections per person per year.(79) Most of injections used were of uncertain sterility. It has been reported that many drug stores sell reused and repackaged unsterilized syringes, which could not be differentiated from sterilized syringes.(78) Researchers are of the view that unsafe injection use is a major contributing factor for high HCV prevalence.(80). Whereas Use of injection was seen as major risk factor which was present in 21 (77%) patients in the study of Jilani et al. in 2017.(81) However, previous history of frequent injections was reported as risk factors for HCV infection in a study conducted in Egypt. (64) This study findings strongly support this view.

### **5.8 History of blood transfusion with HCV infection**

Pregnant women in Pakistan often require blood transfusion for the treatment of severe anaemia and life threatening complications like post-partum hemorrhage. However, it may endanger their later life by transmitting blood borne infection like HCV as evidenced by many researchers. (20, 82) Blood transfusion is not at part with standard international guidelines in Pakistan, due to lack of proper screening and voluntary donors. Scarcity of organized infrastructure, standard operating procedures, lack of trained staff and non-affordability of people to pay for screening particularly in rural areas are the main contributors for the spread of disease.(83)

In this study, out of 318 pregnant women, 89(28.0%) were having history of blood transfusion during their whole or last pregnancy. Of these, 15(57.7%, n = 26) women



had HCV infection. Most of the pregnant women 11(42.3%, n =26) had blood transfusion at government hospital while 4(15.4%, n = 26) women had blood transfusion at private hospitals. There was statically significant difference of blood transfusion and place of blood transfusion between those women who had positive and those women who had negative to HCV blood transfusion during this or last pregnancy (p value = 0.001, p value = 0.002) respectively.

Bibi S et al revealed HCV positive women were more likely to have history of (H/O) blood transfusion (p value = 0.004). (78) Blood transfusion was a significant risk factor for the acquisition of Hepatitis C infection in study of Anaedobe et al.(84) Another study by Atsbaha et al. also determined same observation in Ethiopia where history of blood transfusion was identified as major risk factors HCV infection.(85). These results correlate well to this study. According to Khamis et al. blood transfusion had a respectable association with HCV infection as 13.6% of the seropositive women had previous blood transfusion (3/22) but it did not reach a significant value as pregnant women who previously received blood transfusion and have HCV-Ab were only 0.83% of all screened women, while those who received blood but did not have HCV-Ab were 3.33% of all screened women. (69) These findings closely coincide with that of Kumar A et al. 2007 (4.8% of HCV-Ab had blood transfusion versus 3.1% among HCV-Ab negative). (62)

In contrast, Zahran et al. reported a history of blood transfusion in 6.6% of HCV-Ab positive versus 2.2% in those who were negative.(86) AbdulQawi et al. also found blood transfusion as a risk factor for infection (15% of HCV-Ab positive women had transfusion versus 3.9% among HCV-Ab negative women). (87)

From this study, a history of previous blood transfusion showed a significant association ( $p=0.001$ ) with HCV infection. This is in consonance with earlier studies by Candotti *et al.*, 2007; and Ephraim *et al.*, 2015 who observed a significant association between blood transfusion and HCV infection. (88, 89)

### **5.9 Previous history of surgery with HCV infection**

Previous surgery blood transfusion and were the most significant risk factor in the present study. Among a total of 26 pregnant women who had positive for HCV infection, 15(57.7%) had history of previous surgery in last 2 years; 11(42.3,  $n = 26$ ) had history of previous surgical procedures but they all were negative HCV There was no association between previous surgical history and HCV infection ( $p$  value = 0.83). Same results were seen in the study of Goyal *et al.*(61) who reported history of previous major surgery in 16 cases versus 4 controls and was statistically significant ( $p$  value 0.002) at  $p<0.05$ .

In a study from Pakistan, previous surgery was taken as independent variables, only past history of surgical procedures was found to be the most important factor for transmission of hepatitis C virus infection. (61)

Khatoon Razia *et al.* showed that amongst various risk factors for HCV, highest frequency was found to be history of previous surgery in her study whereas another study reported history of previous delivery as highest risk factor.(90) Another study also showed high frequency of seropositivity among pregnant women with history of obstetrics and gynaecology surgeries, followed by nose, ear piercing and tattooing.(66) Bibi S *et al.* also reported history of surgery including Caesarean section, laparotomy and D&C was highest risk factor identified in her research.(78) In this study, history of previous delivery were found to be the risk factors for transmission of HCV infection.

### **5.10 Previous history of dental treatment or surgery**

People who visit regularly for any kind of dental procedure had more prevalence rate of HCV as compared to those who do not visit for any kind of dental procedure.(90) Surgical operations, dental procedure with inadequately sterilized instruments, and reused syringes have been well-known risk factors for HCV transmission. (61)

In this study, out of 318 pregnant women, 45(14.2%) were identified who had history of previous dental treatment or dental surgery. Of these, only 2(7.7%, n = 26) women had HCV infection and these two women were treated by tooth extraction 1(50.0%) and dental carries 1(50.0%) respectively. There was no statically significant difference between those women who had positive and those women who had negative infections to HCV with respect to previous dental surgery (p value = 0.55) whereas there was no statistically significant difference between those women who had and those women who had negative infections to HCV with related to kind of dental treatment or dental surgery (p value = 0.78). According to the results of Akhtar AM et al. in Lahore history of dental procedure was insignificantly associated with occurrence of HCV infection which is similar observation to this study.(55) While in contrast to International studies have found that practices such as dental surgery has been reported as major risk factors associated with HCV infection (91, 92)

### **5.11 Ear and nose piercing with HCV infection**

Among a total of 26 pregnant women who all (100%) were positive for HCV infection had history of nose/ear piercing showed no association between ear piercing and HCV infection (p value = 0.99). According to Abdul Waheed et al. in case of HCV, positive individuals had history of ear nose piercing (100%).(93) Similarly, Yousfani et al.

reported that ear nose piercing is insignificantly present in all HCV positive cases. (94) These findings are similar to this study.

## **PAST OBSTETRICAL HISTORY**

### **5.12 History of pervious number of pregnancies and antenatal visits**

In this study, out of 318 pregnant women, most of the women i.e. 126(39.6%) were identified who had pregnancies 1 to 2 times. Of these, 14(53.8%, n = 26) women had HCV infection with no signification difference (p value = 0.28). Most of the pregnant women who had HCV infection, 16(61.5%, n = 26) women visited 1 to 2 times for antenatal care. 7(26.9%, n = 26) visited 1<sup>st</sup> time for antenatal care and 3(11.5%, n = 26) visited > 5 times for antenatal care. Antenatal care visits were statistically not associated with those women who had HCV infection (p value = 0.98). Results of Tehniyat et al study also show significantly the history of previous delivery as risk factors with history of previous delivery and abortions as the highest risk factors.(90) Seid M et al. reported in his study that all of the three anti-HCV antibody positive pregnant women were pregnant for two and more times. In relation to parity about 66.7% anti-HCV antibody positive study subjects have two and above previous delivery.(64) In comparison of Manoj et al. the high estimated seroprevalence rates observed among pregnant women in rural Egypt (16%) probably results from poor or nonsterile practices employed during previous deliveries.(95) Sheikh Saba et al. also found Risk factors that 59.83% women had previous delivery, of which 415 (26.7%) had a history of caesarean section.(96) Of the 1588 women i.e. women with previous delivery. These results correlate well to this study.

### 5.13 Mode of delivery with HCV infection

Findings from this study showed that out of 318 pregnant women, mostly 177(55.7%) had normal vaginal delivery with HCV infection in 13(50.0%, n = 26). Sixty (18.9%) women delivered by caesarean section with HCV infection in 7(26.9%, n = 26) while 81(25.5%) women were delivered at home by Dai and HCV infection was observed in 6(23.1, n = 26) women. There was no association between mode of delivery and among the pregnant women who had HCV infection. (p value = 0.54). This was almost similar to study of Conte et al. who showed delivery was vaginal in 259 cases (71%) and by means of Caesarean section in 106 (29%).(97) However, the epidemiological risk factors explaining this high prevalence include previous delivery attended by a traditional birth assistant; circumcision by a traditional birth assistant.(98). The rate of vertical transmission was lower in women delivered by caesarean section than in those who had a vaginal delivery, although this was not associated.(99)

Previous studies which addressed the effect of mode of delivery and breastfeeding on hepatitis C virus transmission often lacked the power to detect an effect due to the small number of mother-child pairs involved. (99)

The data of this study do not provide evidence of an association between mode of delivery and the risk of hepatitis C virus among women with hepatitis C virus infection only. Whereas some studies have shown a protective benefit from caesarean delivery, many have not. Thus, the majority of the published literature would suggest that mode of delivery is not a key factor influencing hepatitis C vertical transmission.(100)

#### **5.14 History of previous abortion with HCV infection**

In this study, out of 318 pregnant women, 36(11.3%) had history of abortion in their last 2 years. Of these, 6(33.1%, n = 26) women had HCV infection. There was no association difference between those women who had positive and those women who had negative to HCV with respect to previous abortion in last 2 years (p value = 0.68). This finding is in agreement with studies reported from Sudan (101) and Benin City of Nigeria. (102) In comparison, Khan Uzma et al revealed history of abortion was also associated with HCV seropositivity at the 20% level.(74) Similar results were observed in the study of Kumar Ashok; known risk factors for HCV infection, 15.8% had history of previous abortion.(62) In contrast to Akhtar et al. and Goyal et al in Lahore and Goyal et al. history of abortion was insignificantly associated with anti-HCV status in their study (55, 61). Another study reported history of previous abortion 10.93% as highest risk factor followed by history of dilatation and curettage and tattooing.(90) These results are similar to this study.

#### **5.15 History of Dilation and curettage with HCV infection**

In this study, out of 318 pregnant women, 47(14.8%) were undergone D & C. Of these, 6(23.1%, n = 26) women had HCV infection. Most of the pregnant women 5(19.2%, n =26) had abortion and only 1(3.8%, n = 26) women got D&C by other method. There was no associated difference between those women who were positive and those women who were negative to HCV related to Dilatation and curettage (p value = 0.24). Similar association was also reported by Bibi S et al. (78) In Goyal study, D&C was found to be the risk factors for transmission of HCV infection. Whereas in opposite results by Hashmi et al. Dilatation and curettage was significantly associated with HCV

seropositivity while he also mentioned previous studies have not shown dilation and curettage to be a significant factor associated with HCV. (103) The most important finding of study by Marwah et al. dilation and curettage (53.2%) was found to be statistically associated with HCV positive pregnant women.(104) while Tehniyat et al. also reported same results in his study.(90)



## CHAPTER VI

### CONCLUSION AND RECOMMENDATIONS

It is concluded from this study that HCV is a common infection in pregnant women. It was also found out that the prevalence of HCV was associated with socio demographic factors like poor literacy rate, low socioeconomic status; past medical history including unsafe injection by traditional practitioners, and blood transfusion, were found to be strongly associated with increased HCV infection among the pregnant women.

#### RECOMMENDATIONS

- The pregnant women should be educated on the risk factors and preventive measures of these viral infections since there is no vaccine for the infection.
- Concrete and comprehensive efforts are urgently needed by Pakistani government at all levels to control the spread of HCV infection.
- Besides promoting awareness in general public as well as health care providers, implementing preventing strategies in health facilities like use of screened blood transfusion, proper sterilization technique and use of disposable syringes will likely improve the worsening situation
- Further investigation into the prevalence of HCV infection among pregnant women should be carried out in a larger population.



- For women of reproductive age with known HCV infection, antiviral therapy is recommended before considering pregnancy, whenever practical and feasible, to reduce the risk of HCV transmission to future offspring.
- All pregnant women should be tested for HCV infection, ideally at the initiation of prenatal care.
- All pregnant women with HCV infection should receive prenatal and intrapartum care that is appropriate for their individual obstetric risk(s) as there is no currently known intervention to reduce MTCT.
- Breastfeeding is not contraindicated in women with HCV infection, except when the mother has cracked, damaged, or bleeding nipples, or in the context of HIV coinfection.
- Preventive measures include adequate sterilization of surgical instruments and intensive screening of blood and component for transfusion and mass campaign creating awareness in the public, and health workers can reduce the incidence of this infection. Universal screening of all pregnant women should be done for HCV as many patients may not have any risk factor.
- Preventing exposure to infected blood or blood products, safe sexual practices, the use of condom during sexual contact, adequate sterilization of hospital equipment and materials, needle-exchange programs for injecting drug users may help to limit the spread of HCV infection.

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## APPENDIX

### Appendix A: Information Sheet in English

1. **Title of the study:** associated factors of hepatitis c in pregnant women in outpatient department of people's medical university and hospital Sindh Pakistan

2. **principal investigator name.** Dr Akhlaque hussain magsi

3. **advisor.** prof dr sathirakorn pongpanich

4. **contact details**

Ministry of health sectratriat Karachi Sindh

College of public health science Chulalongkorn university

Institute building 2-3 soi Chulalongkorn 62 phayathai road

Pathumwan Bangkok 10330 THAILAND

Office telephone 006622188152/3

Mobile Pakistan 00923331277767

**Objectives** to determine the associated factors of hepatitis c infection in pregnant women at outpatient department people's medical university and hospital in district Shaheed Benazir Abad

**Study area outpatient** department people's medical university and hospital in Shaheed Benazir Abad district

**Brief back ground and rationale:** Hepatitis C infection is one of the major health issue worldwide caused by HCV virus. Infection with HCV is major public health concern it is increasing disease burden on health care system especially in low income countries

(4). In Pakistan about 13 million people are infected with HCV within estimated population of 207 million in 2017. Being a vulnerable group, pregnant women are likely to be more infected. Prevalence of hepatitis C in pregnancy has been studied across Pakistan and is reported with the range of 3.27%-8.9%(5). HCV is transmitted readily by blood to blood Contact as it is hepatotropic virus(6). Viral hepatitis has increased risk of maternal complications during pregnancy and it is a notable reason of maternal mortality(7). In low resource countries, like Pakistan where there is lack awareness and research orientation, during pregnancy patient can go through different kind of complication, abortions, caesarean, section low hemoglobin, low iron levels, inadequate food intake that can cause vertigo and nausea patient need blood transfusion that is main cause source of infection because in rural areas of Pakistan there many paramedics and local laboratories transfuse blood without screening(8). The epidemiology and risk factors of HCV Are poorly understood. The prevalence of HCV in population can be predicted by the risk factors associated with transmission of infection.

#### **Research method**

This study will perform face to face interview with the help of already prepare questionnaire

**Confidentiality** the research team will do everything in their capacity to maintain confidentiality of the information provided by the participants. the information provided during this interview will only be use by the the researcher for analysis purposes. No names or dates will be disclosed so given information will remain confidential. the data will be kept confidentially during the process of analysis. all collected data will be destroyed after final study report.

### **Rights of participants**

You have the right to give an informed consent before participating in this study. Please know that wither you decide to allow this interview or not is completely voluntary and will not affect the services you receive today or during future visit. You may refuse to answer any question and may withdraw from the study at any time after the consent even. You can also ask any you want to know before the face to face interview before, during and after the interview. You can contact principal investigator using the address provided above or can report or complain or question to the Research Ethics Review Committee Chulalongkorn University (RECCU) jamjuree building 1, 2<sup>nd</sup> floor 254 phayathai road pathumwan Bangkok 10330 thailand.

Telephone/fax: 006622183202

Email.eccu@chula .ac.th

**Thank you the time to read this information.**

.....

**Principal investigator**

จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

## Appendix B: Consent Form

**Code number of the participant .....**

**Date.....**

**I, whose signature or right thumb print appears below voluntarily agree to participate in this research project**

**Title:** Associated factors of hepatitis c in pregnant women in outpatient department of people's medical university and hospital Shaheed Benazir Abad district Sindh Pakistan.

**Principal investigator : Dr Akhlaque hussain magsi**

**Advisor : Prof Sathirakorn Pongpanich**

**Contact address :**

**1. Ministry of health government of Sindh province Pakistan**

**2. Institute building 2-3 soi Chulalongkorn 62, phayathai road pathumwan Bangkok**

**10330 Thailand.**

**Office telephone:+ 662 218 8152/3 (Thailand)**

**Mobile 0092 333 1277767 (Pakistan) 0066825063407 (Thailand)**

I have (read or been informed) about the rationale and objective of the project, the method involved in details, Risk/Harm and benefit of this project. The researcher has provided detailed information about the study, has given me the chance to ask any questions that I may have and am satisfied with all explanations.

I willingly agree to participate in this project and consent the researcher to use data from response to researcher questionnaire.

I have the right to withdraw to withdraw from this study at any time as without mentioning the reason. If I choose to withdraw my participation from the study, this will not cause any negative effect on me (e.g. I will still be able to receive the usual services under usual conditions without any hurdle.

Researcher has guaranteed to stick to the study methods as they appear in the information sheet. The researcher has also assured me that strict confidentiality will be observed for every detail of personal and identification information I provide during

the study. result of the study will be reported as representative picture to further guarantee the privacy of the study participants.

If there is any deviation from the methods, I am not treated as indicated in the information sheet, I can report to health department government of Sindh 6<sup>th</sup> floor Sindh secretariat building # 1 Karachi Pakistan

**Fax: 0092 21 99202000**

I confirm that I have received one copy of each information sheet and informed consent form.

**Sign**.....

(.....)

(.....)

**Researcher**

**Sign**.....

(.....)

**Witness**

**who can Write.**

**Sign**.....

**participant**

Empty rectangular box for thumb impression.

**thumb impression**

## Appendix C: Questionnaire

### 3.12 Questionnaire

1. Name: نام \_\_\_\_\_ Age: عمر \_\_\_\_\_

3. Address: پتہ \_\_\_\_\_

4. Living place: a. رہائش Urban  شہری b. Rural  دیہاتی

### 2. Educational level: معیار تعلیمی

- Not gone to school or madrasa (religious school)  ← اسکول اور مدرسے نہیں گیا
- Primary School  ← پرائمری اسکول
- Secondary School  ← سیکنڈری اسکول
- High School  ← ہائی اسکول
- College/ University  ← کالج / یونیورسٹی
- Other please specify  ← دوسری کوئی چیز براہ مہربانی بیان کریں

### 3. Occupation پیشہ

- Government employee:  ← سرکاری ملازم
- Business:  ← کاروبار
- Farmer:  ← کسان
- House Wife:  ← گھریلو عورت
- Other please specify  ← دوسری کوئی چیز براہ مہربانی بیان کریں

### 4. What is average income of the family Monthly/ Yearly: گھر کی اوسط آمدنی ماہانہ/سالانہ

- 25000 rupees:  ← 25 ہزار روپے
- 35000 rupees:  ← 35 ہزار روپے
- More than 50000 rupees:  ← 50 ہزار سے زیادہ روپے

### 5. Number of Family members: put numbers in front of boxes گھر میں افراد کی تعداد بتائیں

- Adults:  ← بالغ
- Kids:  ← بچے

### 6. Past Medical History: پہلے کبھی بیمار ہونے

Have you ever admitted in hospital during this or last pregnancy?

کیا آپ کبھی ہسپتال داخل ہوئے اس دفعہ یا پہلے کبھی حاملہ حالت کے دوران؟

#### 6.1. If yes, what kind of hospital you admitted اگر ہاں تو کس قسم کے ہسپتال میں داخل ہوئے

- A. Tertiary Care Hospital  بڑے بیمار نے کے ہسپتال میں
- B. Secondary Hospital  درجہ دوم ہسپتال میں
- C. Primary Hospital  ابتدائی ہسپتال میں
- D. Private Hospital  نجی ہسپتال میں

6.2 Reason of admission in Hospital please give details \_\_\_\_\_

براہ مہربانی بیان کریں ہسپتال میں داخل ہونے کی وجہ \_\_\_\_\_

#### 7. Have you ever had injection during this whole pregnancy or last pregnancy? And How many times? کیا آپ کو حاملہ حالت کے دوران کبھی بھی خون یا ٹیکے لگے؟ اور کتنی بار لگے؟

Yes ہاں  No نہیں

During this Pregnancy: اس حمل کے دوران

2 دو  3 تین  0 صفر

During last Pregnancy: پچھلے سال کے دوران

10 دس  10-5 پانچ سے دس  دوسرے پانچ 2-5  0 صفر

7.1 Do you ever had intravenous transfusion in this whole pregnancy or last pregnancy?

Yes ہاں  No نہیں

During this Pregnancy: اس حمل کے دوران

2 دو  3 تین  0 صفر

During last Pregnancy: پچھلے سال کے دوران

10 دس  10-5 پانچ سے  دوسرے پانچ 2-5  0 صفر

**8. Place of taking injection:** انجیکشن لگوانے کی جگہ

Government hospital سرکاری ہسپتال  Pvt. Hospital نجی ہسپتال  Dispensary ڈسپنسری

Unregistered practitioner: غیر رجسٹرڈ کام کرنے والا  Others دوسری کوئی

**9. Have you ever had any kind of surgery in last 2 years ? what kind of surgical procedure ?**

کیا آپکا بچھلے دو سالوں میں کوئی آپریشن ہوا؟ اگر ہاں تو تفصیلات بیان کریں؟

Please give details

---



---

**10. Have you ever had dental treatment ? or dental Surgery ?**

کیا آپکو کبھی دانتوں کا علاج کرانا پڑا؟ یا آپریشن؟

Tooth extraction: دانت نکلوا یا  Cleaning of Oral Cavity: دانتوں کی اور منہ کی صفائی کی

Dental Carries: دانتوں کی احتیاط کی  Others: دوسرے \_\_\_\_\_

**11. Have you ever had blood transfusion during this whole pregnancy? کیا اس حمل کے دوران آپ نے کسی کو خون دیا؟**

If yes, how many times? اگر ہاں، تو تعداد بتائیں؟

Yes ہاں  No نہیں   
 2 دو  3 تین  0 صفر

During last year or last pregnancy : بچھلے سال یا آخری حمل کے دوران :

2 دو  3 تین  0 صفر

11.1 If yes, please specify the reason: اگر دیا تو وجہ بتائیں: \_\_\_\_\_

11.2 place of transfusion : خون کی تبدیلی کی جگہ: \_\_\_\_\_



12. Ear piercing ? اندر تک سونی ڈالی گئی؟	Yes ہاں <input type="checkbox"/>
	No نہیں <input type="checkbox"/>
13. Nose piercing? ناک میں سوراخ کیا گیا	Yes ہاں <input type="checkbox"/>
	No نہیں <input type="checkbox"/>
14. Do you live with any close relative who diagnosed positive hepatitis C? کیا آپ کسی ایسے رشتے دار کے ساتھ رہتے ہیں جسے ہیپاٹائٹس C کی بیماری ہو؟	Yes ہاں <input type="checkbox"/>
	No نہیں <input type="checkbox"/>
15. Have you ever been diagnosed for hepatitis C? کیا آپ کو کبھی ہیپاٹائٹس C ہوا؟	Yes ہاں <input type="checkbox"/>
	No نہیں <input type="checkbox"/>
16. Past obstetrical history : ماضی میں رکاوٹ کی تاریخ	

Number of pregnancies: کتنی بار حاملہ ہوئی →

Parity: کتنے بچے پیدا ہوئے →

17. Antenatal Care Visits During Pregnancy. حمل کے دوران بچے اور اپنی حفاظت کیلئے ہسپتال گئے	Yes ہاں <input type="checkbox"/>
	No نہیں <input type="checkbox"/>

17.1 If yes, how many times in last pregnancy? \_\_\_\_\_

اگر گئے تو کتنی بار گئے \_\_\_\_\_

حمل کی تعداد Gravidity

18. Types of delivery

زچگی کی اقسام

- Normal Vaginal Delivery بغير آیریشن کے
- C.Section آیریشن کے ذریعے
- Forceps delivery اوزار کے ذریعے

19. Place of delivery

زچگی کی جگہ

- Government Hospital سرکاری ہسپتال
- Maternity Home زچہ خانہ
- Others Please Specify کوئی اور وضاحت کریں

20. Do you have abortion in last 2 years ?

کیا آپکا بچھلے دو برسوں میں بچہ ضائع ہوا ہے

Yes ہاں

No نہیں

20.1 If yes, please give detail: اگر ہاں تو وضاحت کریں

21. Do you ever have dilatation & Curettage?

کیا آپ نے اندرونی (بچہ دانی) کی صفائی کروانی ہے؟

Yes ہاں

No نہیں

21.1 If yes, please give detail: اگر ہاں تو وضاحت کریں

22. Do you have diabetes?

کیا آپ کو شوگر کی بیماری ہے؟

Yes ہاں

No نہیں

23. Are you patient of Haemodialysis ?

کیا آپکو کوئی ایسی بیماری ہے جس میں خون تبدیل یا صاف کیا گیا ہو؟

Yes ہاں

No نہیں

24. Do you have any kind of blood disease like haemophilia?

کیا آپکو کسی قسم کی خون کی بیماری ہے متلاخون کی کمی؟

Yes ہاں

No نہیں

### Appendix D: Time line

Time line												
2017						2018						
Item description	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Develop proposal	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Grey	Grey	Grey	Grey	Grey
Ethical clearance	Grey	Grey	Grey	Grey	Grey	Grey	Orange	Orange	Grey	Grey	Grey	Grey
Pre-test questionnaire	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Orange	Grey	Grey	Grey
Train data collector's	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Orange	Grey	Grey
Data collection	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Orange	Grey	Grey
Data process & analysis	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Orange	Grey	Grey
Writing report	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Orange	Orange

### Appendix E: Budget

#	Line Item	Qty	Days	Amount(PKR)
1	Plane Ticket (round trip)	1	1	75,000
2	Recruitment and training of RAs	6	2	15,000
3	Facilitators	3	2	15,000
4	Daily subsistence allowance for RAs during data collection	6	9	15,000
5	Statistician	1	9	25,000
6	Drivers	2	9	25,000
7	Stationery (printing & photocopy)	1	1	15,000
8	Transportation (fuel for 2 vehicles for data collection)	2	5	20,000
	<b>Total in PKR</b>			<b>215,000 PKR</b>
	<b>Total in USD</b>			<b>1768.82 USD</b>

## Appendix F: Certificate of Ethical Approval



### ETHICAL REVIEW COMMITTEE

Peoples University of Medical & Health Sciences for Women  
Nawabshah

Hospital Road, 67450- Nawabshah, Pakistan

Ph: +92-2449370050- (Ext: 2224)

Ref.No. PUMHSW/ERC/ .....

Dated: 1-05-2018

#### CERTIFICATE OF APPROVAL

Members of the Ethical Review Committee PUMHSW Nawabshah have evaluated the research proposal entitled "Risk Factors of Hepatitis C Infection in Pregnant Women in Outpatient Department at Peoples Medical University and Hospital District Shaheed Benazir Abad Sindh Province Pakistan" submitted by Dr Akhlaque Hussain Magsi, PG student of Master of Public Health, College of Public Health Sciences Chulalongkorn University Thailand.

The study has been approved by ethical review committee for a period of six months. The investigators will follow the tenets of declaration of Helsinki. If any change is registered in the protocols of study or any extension in the period of the study; it should be notified to the Ethical Review Board for approval.

**Dr. Sham Uddin Sheikh**  
Pro Vice Chancellor

Co-Chair Ethical Review Committee  
Peoples University of Medical & Health  
Sciences for women Nawabshah

## VITA

### VITAE

#### Personal details

Name : Dr Akhlaque hussain magsi  
 Date of birth: February 28,1975  
 Nationality: Pakistan  
 Place of birth: Karachi Pakistan  
 Marital status: Married  
 Address : Bungalow # 34/2 eleventh commercial street  
 phase 4  
 d.h.a Karachi Pakistan  
 Telephone (mobile) +92-333-1277767

#### EDUCATION AND QULIFICATION

M.B.B.S liaquat university of medical and health sciences (LUMHS)

#### WORK EXPERIENCE

- One year house job in Jinnah post graduate hospital
- Worked as emergency medical officer in afif general hospital Saudi arabia
- Worked as zonal supervisor in epi programme in district Kasur pakistan



จุฬาลงกรณ์มหาวิทยาลัย  
**CHULALONGKORN UNIVERSITY**