

# The Prevalence and Incidence of Hepatitis C in the Anguillan Prison Population

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**Citation:** Kamel A, Candido K, Frias D, Sioufi H (2017) The Prevalence and Incidence of Hepatitis C in the Anguillan Prison Population. J Clin Epigenet. Vol.3 No.4:39

## Abstract

**Background:** The purpose of this project was to determine the prevalence of Hepatitis C among the inmates of Her Majesty's Prison in Anguilla, British West Indies, as well as the rate of transmission whilst incarcerated. Participation was voluntarily by 24 participants and confidentiality was maintained by replacing the inmate's names with numbers.

**Methods:** A validated questionnaire was given and guided towards lifestyle, behaviors while incarcerated and knowledge of the disease and safety precautions. Following the survey, Hepatitis C testing was performed via an immunoassay for the presence of antibodies in the samples serum.

**Findings:** There was one inmate who tested positive for Hepatitis C as a part of his initial work up upon incarceration, and the same inmate was found to be positive for HCV after our testing; concluding, there was no increase in the number of affected inmates.

**Conclusion:** This research was beneficial in educating the inmates of Anguilla about hepatitis C and its associated risk factors; however, language barriers, and small population size were some of the limitations the researchers came across. Results for Hepatitis C in this Anguillan prison population is significantly lower than results seen in the United States, and Canada.

**Keywords:** Hepatitis C Virus; Anguilla; Prison; Prevalence; Risk factors

**Received:** September 12, 2017; **Accepted:** September 26, 2017; **Published:** September 28, 2017

Hepatitis C virus is often referred to as a silent epidemic since it may be asymptomatic for years [1,2]. Hepatitis C virus (HCV) is a blood-borne viral infection spread through bodily fluids; it causes inflammation of the liver, affecting its ability to properly function that can lead to cirrhosis and end-stage liver disease [3-5]. HCV infection represents the leading indication for liver transplantation in the United States and has caused more deaths annually than human immunodeficiency virus (HIV) since 2007 [6,2]. HCV is disproportionately concentrated among the most marginalized groups in society, including people who are drug users, homeless or incarcerated [7]. There are 2.2 million people in jail in the United States, being the most common hepatitis in prisons [8,4]. About 1 in 3 people have HCV (2:5). The most common way HCV is spread among inmates is by sharing equipment used for injecting drugs, tattooing, and piercings with other people who are already infected [4].

Screening for the Hepatitis C virus is highly recommended in

populations who have or currently do inject drugs, long-term hemodialysis patients, children born to infected mothers, HIV-infected patients and persons with known exposures to the virus, such as inmates in prison [9,4]. Adult correctional facilities are at a high risk for the transmission of Hepatitis C because many people in jails already have Hepatitis C [10]. Another high risk behavior that predisposes inmates to transmitting HCV is by having unprotected sex with other inmates. Research shows that gay and bisexual men are at a higher risk for the Hepatitis C virus, especially if they are HIV-positive, have multiple sex partners and have unprotected sex [11,4].

The purpose of this study is to assess the prevalence of HCV in the incarcerated male population of Her Majesty's prison in Anguilla, as well as the rate of transmission whilst incarcerated. This paper will help future researchers evaluate if HCV is also higher among the incarcerated population in the Caribbean.

## Methods

Inmates voluntarily participated in this research project and the ones who consented were given a survey to aid in assessing their health status focusing on HCV. The questions were guided towards lifestyle, behaviors while incarcerated, knowledge of the disease and safety precautions (Index B). In order to prevent inconsistencies when responding to the questionnaire, it was first reviewed by research coordinators. The questions were then asked to students as a pilot to see what their responses would be. We refined our questions based on the responses received by these subjects so as to be more direct.

The guards brought the inmates to the outside open area and then the questionnaires were read to the inmates privately in a one on one setting distant from the guards. Each survey and correspondent test were privately assigned a number to ensure inmate confidentiality. Following the survey, each inmate was brought into the nursing station alone without the guards (they stood outside) for safety precautions. The senior laboratory technician from the Anguilla's Princess Alexandra Hospital then performed the Hepatitis testing with us present. Inmates are tested for Hepatitis C upon incarceration, as per the prison regulations; therefore, the same testing methods were used to re-verify the serum levels. Serum analysis was done via immunoassay testing for the presence of hepatitis C antibodies.

The screening immunoassay process involved taking a blood sample from every consenting inmate at the prison. These samples were taken by the laboratory technician from the Princess Alexandra Hospital in Anguilla. The method of testing used was a qualitative determination of the human antibody directed against Hepatitis C virus (anti-HCV) present in the serum. The detection of this antibody in the inmate's serum was analyzed using a direct solid-phase enzyme immunoassay [12].

In the hospital laboratory, the samples were then diluted and incubated on a microwell coated with recombinant Hepatitis C virus antigen. A peroxidase-conjugated antibody directed against human Immunoglobulin G (IgG) was added to each well on the micro well plate. After incubation, the wells were washed to remove particles and a substrate solution consisting of hydrogen peroxide and o-phenylenediamine (OPD) in a citrate buffer. After another incubation, Sulfuric acid is added to stop the reaction. Anti-HCV antibodies bind to the HCV antigen and the conjugate then binds to that antibody. This reaction will result in an orange color; absence of orange color indicates no reaction and therefore no anti-HCV in the serum [12]. Non-reactive samples can be considered negative for the HCV antibody, meaning the virus is not present in the tested serum [13]. An active sample is consistent with a positive HCV infection. This could indicate one of two things; either a current HCV infection or a past HCV infection that has resolved [14]. A positive sample will need to be tested for HCV RNA to assess for current infection. Detection of HCV RNA indicates a current infection and the patient should be guided toward proper care [14].

## Results

Out of 56 inmates, 24 participated in this study. 1 out of the 24 participants who were tested with the immunoassay tested

positive for Hepatitis C; however, this participant also tested positive for hepatitis C upon his incarceration at Her Majesty's prison. With the help of the qualitative questionnaire, the average age of the consenting inmates were 27 years old. The length of stay is evidently dependent on the crime; however, of the participants, the least amount of incarceration time is 1 month and the longest time is 8 years. There were no new inmates who tested positive for HCV after our testing; therefore, there was not an increase in number of affected inmates. Out of the 24 inmates, 18 people are from Anguilla, 2 people are from Santo Domingo, 2 people from St. Kitts and 2 people from St. Martin. Of the 24 inmates, 16 have been incarcerated at least once in the past, besides their current stay, and 8/24 people is the first time they are incarcerated. The average level of education among the inmates is high school with the exceptions of one inmate who completed a college degree and one person with a grade 6 level of education. All of the inmates questioned stated they were heterosexual, except for one inmate who expressed that he was bisexual. All 24 inmates deny ever having sexual intercourse in prison and no one considers inmates having sex while being incarcerated as a frequent occurrence. In the questionnaire, 8/24 people reported they are single, 5/24 are married, 7/24 have multiple partners and 4/24 have one partner. Moreover, 12/24 people never use a condom, whereas 10/24 use condoms often. There were 14/24 inmates who have had sex with a commercial worker and 10/24 have never had sex with a commercial worker. All inmates that participated in the questionnaire denied ever doing intravenous (IV) drugs in the past or while they were incarcerated. Of the 24 inmates, 16 have tattoos; 9/16 obtained tattoos from a licensed professional, 7/16 tattoos were obtained from a source other than a licensed professional. Additionally, there were 8/24 inmates who have heard of Hepatitis C virus and 16/24 who have never heard of HCV before. Likewise, 3/24 inmates are aware of how HCV is transmitted. Out of the 24 inmates, 13 believe that a person with HCV can look normal and 11/24 believe individuals with HCV would not look normal. None of the 24 inmates believe that they have a family member with HCV. Of the 24 inmates, 4 people have been tested for HCV in the past before being tested upon incarceration; out of the 4 inmates, 2 say the results were negative, 1 says he was not sure and 1 was positive. Of the 3 people who stated that the results were negative, 1 person says the last test was done between 1-5 years ago and 3 people expressed that the test was done under a year ago. No one is currently undergoing any kind of treatment for HCV. Surprisingly, 1/24 inmates is aware of prevention programs available to people in Anguilla to help prevent the spread of HCV.

## Discussion

Anguilla is a small island located in the Lesser Antilles; it has a population of 13 500 people. Her Majesty's prison is the only male prison on the island. The prisoners in Her Majesty's prison are kept in individual cells and even separate buildings based on which gang they belong to or what their crime was. The prison is not a maximum security prison and the inmates do have the opportunity to have social contact with each other at certain times of the day. The population of Anguilla is very religious and practices their faith strictly, they do not condone the use

of injection drugs, as well as homosexual behaviors. We suspect that the rate of transmission and spread of viruses such as Hepatitis C are low due to the population's beliefs. Our results demonstrated, there were no prisoners that admitted to using injection drugs. This comes as no surprise since the most common illicit drugs in Anguilla are cannabis and cocaine. Homosexuality in Anguilla is not highly regarded upon and an admission of any male sexual preference could lead to fights and threats amongst the inmates. The only inmate who admitted to being bisexual was placed in a separate building from the rest of the inmates for safety precautions. Of the 16 inmates who have tattoos, over half of them admitted to obtaining them from unlicensed professionals. This is a high risk of transmission, especially if the tattoos or scarring are being done in the prison.

The individual who tested positive admitted to having unprotected sex with multiple partners, as well as commercial sexual workers during his questionnaire. At 19 years of age, this was his first incarceration. The inmate who tested positive was covered in tattoos and stated that his tattoos are from an unlicensed professional, having them all done by his cousin. These factors are key at determining what put this inmate at risk for transmission. Not only did the inmate admit to not knowing he has Hepatitis C, but he also admitted to not knowing what the disease was or how it is transmitted. This indicates that once he tested positive in the past he was either not informed or was not properly educated as to the seriousness of this illness. This is a serious health hazard for the other inmates, and workers of Her Majesty's prison that are being put at risk by a person who does not know his HCV status.

## Strengths and Limitations

During the course of this research project, the biggest strength was reaching out to the inmates and educating them while performing the questionnaires. Most of the inmates that were questioned have heard about hepatitis C but did not know anything about the virus. We were able to educate the inmates about different risk factors and ways to contract the virus. The majority of the inmates had tattoos and virtually all of them have obtained them from a source other than a licensed professional. It is unknown the amount of people who get HCV from tattooing, though people who have tattoos are four times more likely to have HCV [15]. Moreover, throughout this research study there were a few limitations in our methodology. The population of the Anguillan inmates is small and only 48% of the inmates consented to participate. Out of the inmates who consented almost half of them did not have initial work up. Luckily, the inmate who tested

positive had initial work up; therefore, it is possible that there are other inmates in the prison who are affected.

## Recommendations

This study was beneficial in assessing the prevalence of HCV and the inmate's knowledge about the virus. Throughout our research we discovered various areas that require improvement to ensure the prevalence of HCV remains low at Her Majesty's Prison. The prison's regulations are to assess inmate's health conditions upon incarceration. Though, in the 24 people that were tested, there were 11 people who had no initial work up. This could become detrimental to the other inmates, guards and workers at the prison. Moreover, it would also be beneficial for the inmates to be tested for HCV when they are released from prison. This will assess if there is an increase HCV in the prison.

## Conclusion

This study was beneficial in raising awareness with the inmates at Her Majesty's prison. There was 1 positive result obtained within this prison population of the 24 consenting inmates. This value is the same as the number of inmates who tested positive at the start of their incarceration. Although the population is small, results for Hepatitis C in this Anguillan prison population is significantly lower than results seen in the United States and Canada.

## Declarations

This study was independently conducted by the authors of this article; Dr. Hammoudi gave the students unrestricted rights. The other articles involved in this study were independently prepared by the authors, with no input from Dr. Hammoudi. The research committee at St. James Anguilla Campus funded this research.

## Acknowledgments

We would like to thank Her Majesty prison of Anguilla for allowing us to work with their staff and inmates to conduct this research. We would also like to thank the senior laboratory technician from Anguilla's Princess Alexandra Hospital for sampling the inmate's blood for us. Lastly, we would like to acknowledge Dr. Hammoudi, the research committee of St. James School of Medicine for allowing us to do this research, and the students who participated in our pilot questionnaire.

N.B. To our knowledge, both the research conducted and information gathered by this team, at Her Majesty's Prison and Princess Alexandra Hospital, were conducted without bias and with the highest scientific and ethical standards.

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