*Vol. 1 No. 2, 2015*
*ISSN 2412-303X*



International Interdisciplinary Journal of Scholarly Research (IIJSR)



# Risk Estimation of Hepatitis (B and C) among provinces of Pakistan using only Descriptive Stats from PMRC Houses Hold Survey Report

**Syed Adnan Ali**
Lecturer & Scholar MPhil Leading to PhD Statistics
Department of Statistics, University of Karachi , Pakistan
**Maria Rahim**
Senior Lecturer
Ziauddin Hospital University, Karachi , Pakistan

**Abstract**

As it is known viral hepatitis, including hepatitis A, hepatitis B, and hepatitis C, are different diseases that affect the liver and have different hepatitis symptoms and treatments. Hepatitis type is determined by costly laboratory tests like HBsAg and Anti HCV.It is the beauty of this article that we focused on application and techniques of statistics in biostatistics, Objective was to estimate the risk of Hepatitis among provinces of Pakistan by application of logistic regression model, checked the association of Hepatitis among provinces, and to associate the quantity of injection the provinces of Pakistan by using only descriptive statistics results were reported in the survey report of PMRC of 47043 surveyed participants available at their website. We worked on secondary data. Results revealed that, out of 47043 patients, 7.5% (3547) cases diagnosed as Hepatitis (B , C or Both) this prevalence was exactly match that was reported in survey report of PMRC. Logistic regression analysis showed that, Hepatitis 1.36 times more in Sind and 1.65 times more in Punjab as compare to Baluchistan, however KPK founded 0.412 times less affected with Hepatitis as compare to Baluchistan. It was found that, Number of injections was also associated with the provinces, with $p<0.01$, in NWFP 10% (764) patients found with more than ten injections. This study showed with the help of only descriptive results, we can apply logistic regression to estimate the odds of outcome with the help of single variable, can also estimate 95% confidence interval, and can see the significance of results using chi square test of association, without holding the whole data set.

**Key words:** Hepatitis, Risk Estimation, Logistic Regression, Survey, PMRC, Karachi ,Pakistan

## Introduction

Hepatitis B is a vaccine-preventable disease.1,2 Worldwide, the rate of Hepatitis B infection ranges from 0.1%-20% 2. . Globally the prevalence of hepatitis B is divided into three categories i.e. high (>8%), intermediate (2-7%) and low (<2%).3,4

In countries having low prevalence of hepatitis unprotected sex and the use of intravenous drug are the leading causes of transmission 4-5 While the countries having high and intermediate endemicity of hepatitis infection, prenatal infection is the predominant cause .

Considering Hepatitis B 'e' antigen (HBeAg) prevalence as a major indicator of mother-to-child-transmission (MTCT), the highest rates were detected among young females from East Asia, like China, where the prenatal transmission is the most common route of infection, and the lowest in Sub-Saharan Africa.5

Worldwide HCV infection is also an important cause of chronic liver disease and the third-leading cause of all death from cirrhosis and hepatocellular carcinoma (HCC). Approximately 3% of the world's populations (160 million people) are currently infected with HCV, which in most cases establishes a lifelong chronic infection8. However, 25%-30% of infected individuals spontaneously clear the virus during acute infection9.

The risk of developing the infection is inversely related to the age at which infection acquire and among the newly infected, approximately 90% of prenatal infections, 25-50% of infections amongst toddlers and 5% Virus become chronic when occurs at adult life infections .5, 7, 10

Literature shows that, most of the studies are on risk factors of Hepatitis infection focus mainly on the individual level. Few studies have used spatial regression techniques to analyze risk

*Vol. 1 No. 2, 2015*
*ISSN 2412-303X*



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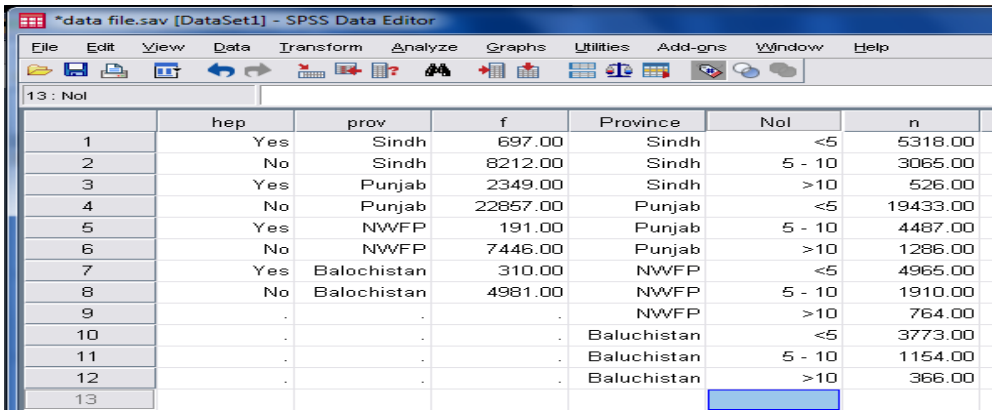
factors Hepatitis infection at the population level11,13. Hepatitis type is determined by costly laboratory tests like HBsAg and Anti HCV.It is the beauty of this article that we focused on application and techniques of statistics in biostatistics. Estimate the risk of Hepatitis among provinces of Pakistan by application of logistic regression model, checked the association of Hepatitis among provinces, and to associate the quantity of injection the provinces of Pakistan.

**Research Methodology**

This Survey was conducted by Pakistan Medical Research Council (PMRC) and we are using their secondary information was available on their website14. Cluster sampling was performed at primary stage to collect the Samples from all provinces of Pakistan. It was the beauty of this research that we focused on application and techniques of statistics and biostatistics. We extracted reported percentages for Hepatitis Prevalence, HBsAg and Anti HCV Test outcome, total used of injection in provinces reported in the survey report of PMRC on "survey on Prevalence of Hepatitis B and C in Pakistan". Using these percentages we find actual totals of each category with respect to the total cases of 47043,

$$\text{Actual Total} = \frac{\text{Reported Percentage}}{100} \times 47043$$

In statistical software SPSS, we did give the weights of these actual totals against the variable category by defining variables in our data file. We applied Pearson chi square test to see the association and logistic regression model to estimate the odds of Hepatitis among provinces. The SPSS overview for the data setting can be seen in the following diagram.




| | hep | prov | f | Province | Nol | n |
|---|---|---|---|---|---|---|
| 1 | Yes | Sindh | 697.00 | Sindh | <5 | 5318.00 |
| 2 | No | Sindh | 8212.00 | Sindh | 5 - 10 | 3065.00 |
| 3 | Yes | Punjab | 2349.00 | Sindh | >10 | 526.00 |
| 4 | No | Punjab | 22857.00 | Punjab | <5 | 19433.00 |
| 5 | Yes | NWFP | 191.00 | Punjab | 5 - 10 | 4487.00 |
| 6 | No | NWFP | 7446.00 | Punjab | >10 | 1286.00 |
| 7 | Yes | Balochistan | 310.00 | NWFP | <5 | 4965.00 |
| 8 | No | Balochistan | 4981.00 | NWFP | 5 - 10 | 1910.00 |
| 9 | . | . | . | NWFP | >10 | 764.00 |
| 10 | . | . | . | Baluchistan | <5 | 3773.00 |
| 11 | . | . | . | Baluchistan | 5 - 10 | 1154.00 |
| 12 | . | . | . | Baluchistan | >10 | 366.00 |
| 13 | | | | | | |

**Objective of the Study**

Objective was to estimate the risk of Hepatitis among provinces of Pakistan by application of logistic regression model, to see the association of Hepatitis among provinces. To See the Association of Hepatitis to the quantity of injection in the provinces of Pakistan and to accomplish all above objectives using only secondary information reported in survey report of PMRC without the primary data on each subject.

**Results and Discussion**

This study revealed that, out of 47043 patients, 7.5% (3547) cases diagnosed as Hepatitis (B , C or Both) this prevalence was exactly matched that was reported in survey report of PMRC [14]. Punjab was the most affected province with 2349 (9.3%) of cases several studies are a sign of that, the rate of positivity for HCV is much higher in rural areas than the urban areas of Pakistan[15]. Chi square test gives the significant association between provinces and cases with hepatitis, with $p<0.001$, test of significance was not applied in the survey report[14].

Logistic regression analysis showed that, Hepatitis risk 1.36 times more in Sind and 1.65 times more in Punjab as compare to Baluchistan, with 95% confidence intervals' (1.56, 1.18) and

Vol. 1 No.2, 2015
ISSN 2412-303X



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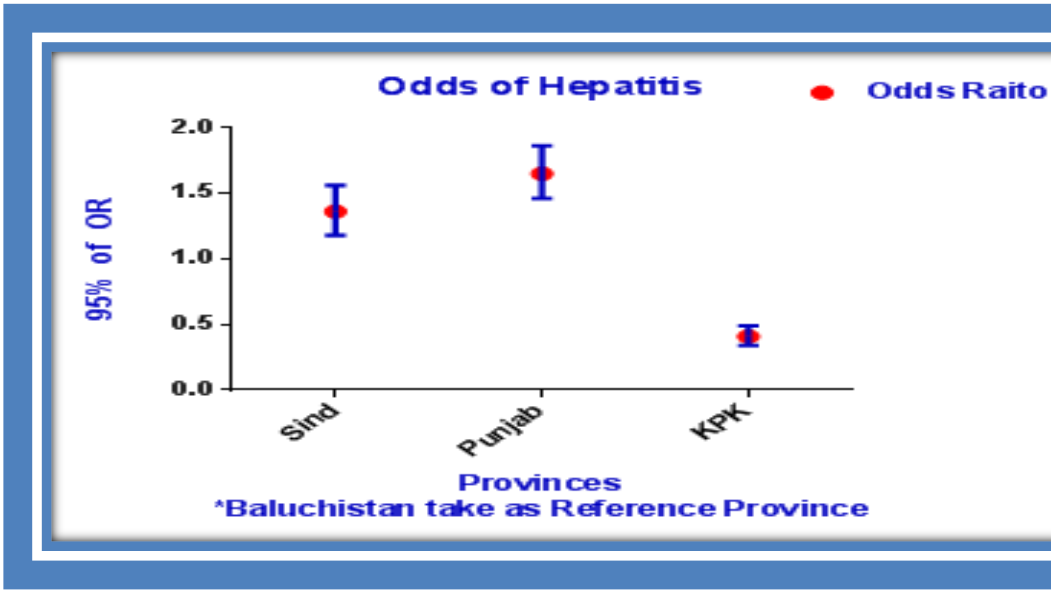
(1.86, 1.46) in sindh and Punjab respectively, KPK founded 0.412 times less affected with Hepatitis as compare to Baluchistan, 95% C.I was (0.49, 0.34) all odds were found significant with p<0.001. It was found that, Number of injections was also associated. [4-5] present study showed the association between injections and provinces, with p<0.01, in NWFP 10% (764) patients found with more than ten injections.

**Table 1**
**Figure : 1**

| Province | Hepatitis B or C or Both | | Total |
|---|---|---|---|
| | No | Yes | |
| Sind | 8212 | 697 | 8909 |
| | 92.2% | 7.8% | |
| Punjab | 22857 | 2349 | 25206 |
| | 90.7% | 9.3% | |
| KPK | 7446 | 191 | 7637 |
| | 97.5% | 2.5% | |
| Baluchistan | 4981 | 310 | 5291 |
| | 94.1% | 5.9% | |
| Total | 43496 | 3547 | 47043 |
| | 92.5% | 7.5% | |
| Chi Square test :p-value<0.01* | | | |



Vol. 1 No. 2, 2015
ISSN 2412-303X



International Interdisciplinary Journal of Scholarly Research (IIJSR)



**Table 2:**

| Province | Number of Injections | | | Total |
|---|---|---|---|---|
| | <5 | 5 - 10 | >10 | |
| Sind | 5318 | 3065 | 526 | 8909 |
| | 59.7% | 34.4% | 5.9% | |
| Punjab | 19433 | 4487 | 1286 | 25206 |
| | 77.1% | 17.8% | 5.1% | |
| KPK | 4965 | 1910 | 764 | 7639 |
| | 65.0% | 25.0% | 10.0% | |
| Baluchistan | 3773 | 1154 | 366 | 5293 |
| | 71.3% | 21.8% | 6.9% | |
| Total | 33489 | 10616 | 2942 | 47047 |
| | 71.2% | 22.6% | 6.3% | |
| Chi Square test :p-value<0.01* | | | | |

## Conclusion

Odds of Hepatitis found higher in Punjab and Sind as compare to Baluchistan, and there was significant association of provinces with Hepatitis and quantity of injections. This study showed with the help of only descriptive results, we can apply logistic regression to estimate the odds of outcome with the help of single variable, can estimate 95% confidence intervals, and can see the significance of results using chi square test of association, without holding the whole data set.

## Recommendation

Government of Pakistan, conducted large scales surveys by investing million rupees funds, so, they should utilized these data by publishing to help the health sector in policy making, reporting only descriptive are not enough.

## Acknowledgment

Thanks to PMRC for conducting survey and shared descriptive results on his website.

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