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Awareness about Hepatitis B and/or C Viruses among Residents of Adama and Asella Cities

ABSTRACT

Background: The word Hepatitis means an inflammation of the liver, and one of many things, including a liver or bacterial infection, liver injury caused by a toxin (poison) or even an attack to the liver by the body's own immune system, can cause it.

Objective: The study has been undertaken with the aim to investigate level of awareness of hepatitis B and/or C viruses and factors that may affect the awareness level among residents of Adama and Asella cities.

Methods: Two stages stratified random sampling technique with stratifications formed by sub city applied to this study. Classical Logistic Regression Model has been employed to predict the probability of awareness (dependent variable), on the base of a set of predictor variables.

Results: Educational level, age, monthly income, total family size, reading habit and use of media had shown statistically significant association for both Adama and Assela cities.

Conclusions: It is recommended that the public should be aware of the potential risk when getting use of blades of barber/ body piercing in place where adequate disinfection procedures might not be available or practiced. To increase awareness of infectious diseases mainly Hepatitis B and C, adoption of collaborative care where government health agencies, physicians, heath workers and mass Medias should work together to educate the masses about Hepatitis B and C and its vaccination.

Key words: *Hepatitis B and/or C Viruses, Logistic regression*

1. INTRODUCTION

The liver is one of the body's powerhouses. It helps process nutrients and metabolizes medication. The liver also helps clear to the body from toxic waste products. Although there are several forms of Hepatitis, the disease is usually caused by one of three viruses: Hepatitis A, Hepatitis B, and Hepatitis C Viruses**.** Both hepatitis B virus (HBV) and C virus (HCV) are spread mainly through contaminated blood and blood products, sexual contact and contaminated needles **[1].**

Viral hepatitis is a major health problem worldwide and cause acute and/or chronic hepatitis, which can leads to the development of extensive liver scarring (cirrhosis), liver failure, liver cancer and death. Viral hepatitis is the tenth leading cause of death and the leading cause of

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liver cancer worldwide **[2, 3].**HBV and HCV can be ended with development of cirrhosis and liver cancer **[4].** More than 500 million people worldwide are persistently infected with either of these two viruses thus presenting a major global health problem.

Both HBV and HCV are an important occupational hazard for medical waste handlers and chronically infected HBV and HCV carriers are able to transmit through contact with their blood and body fluids, which includes occupational exposure to their blood and body secretions. The current treatment for hepatitis B virus infection is not curable after the infection progress to chronic stage and very expensive for individuals in developing countries like Ethiopia. Thus, early screening of People who are at risk including medical waste handlers is mandatory **[5].**

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Concepts and Definitions of Awareness

Awareness is the state or ability to perceive, to feel, or to be conscious of events, objects, or sensory patterns. More broadly, it is the state or quality of being aware of something. In biological psychology, awareness is defined as a human's or an animal's perception and cognitive reaction to a condition or event.

Viral Hepatitis: Hepatitis is an inflammation of the liver, most commonly caused by a viral infection **[6].** Viral liver diseases are among the most important communicable disease worldwide different species of viruses, including Cytomegalovirus, Epstein-Barr, Herpes simplex, Adenovirus, Coxsackie virus, Mumps, Yellow fever, and other cause parenchymal hepatic inflammation, but the term viral hepatitis generally implies the five hepatotropic viruses: Hepatitis A, B, C, D and E virus**[7].**

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Sign and Symptoms Hepatitis Virus: malaise, joint aches, abdominal pain, vomiting 2-3 times per day for the first 5 days, defecation, loss of appetite, dark urine, fever, hepatomegaly (enlarged liver) and jaundice (citrus,yellowing of the eyes and skin) are some of the symptoms of hepatitis. Some chronic forms of Hepatitis show very few of these signs and are only present when the longstanding inflammation has led to the replacement of liver cells by connective tissue; this disease processes is referred to as cirrhosis of the liver.

Chronic Liver Disease: Chronic liver disease (CLD) is a disease of the liver resulting from an inflammatory, infiltrative, immunologic, mechanical or metabolic injury to the liver, which has persisted for six or more months without complete resolution [4].

Hepatitis B Virus: Hepatitis B virus (HBV) is a small DNA virus and belongs to a group of hepatotropic DNA viruses (hepadnaviruses). The virus consists of a nucleocapsid and an outer envelope composed mainly of three hepatitis B surface antigens (HBsAgs) that play a central role in the diagnosis of HBV infection. The nucleocapsid contains hepatitis B core antigen (HBcAg), a DNA polymerase reverse transcriptase, the viral genome as well as cellular proteins **[6].**

Transmission: Transmission of hepatitis B virus results from exposure to infectious blood or body fluids containing blood such as saliva, nasopharyngeal washings, semen, menstrual fluid and vaginal secretions.

Prevention of hepatitis B: Several vaccines have been developed for the prevention of HBV infection. These rely on the use of one of the viral envelope proteins (hepatitis B surface antigen or HBV).

Treatment of hepatitis B: Acute hepatitis B infection does not usually require treatment because most adults clear the infection spontaneously **[8].** Early antiviral treatment may only be required in less than 1% of patients, whose infection takes a very aggressive course (fulminant hepatitis) or who are immune compromised.

2. DATA AND METHODOLOGY

2.1 Study Design: A cross-sectional study was conducted into Adama and Asella towns among residents.

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2.2 Sampling Design: The Sampling technique used for this data collection was two stage stratified random sampling technique, which involves the division of a population into smaller groups, known as strata in such a way that individuals in the same strata are assumed to be homogenous with respect to some characteristics, and simple random sampling method (SRSM) would be adopted as an appropriate sampling design for selecting a representative sample of the strata.

2.3 Data Collection: Primary data was collected using a questionnaire developed in such a way that the incorporated questions (statements) try to address the main objectives of the study. Randomly selected respondents of the city from each stratum enumerated door to door or face to face, responded to the questions.

2.4 Sample Size Determination

The appropriate sample size used for this study is obtained using the following formula**[9]**:

$$n = \frac{\sum_{i=1}^{k} \frac{N_i^2 P(1-P)}{W}}{\frac{N^2 d^2}{Z^2} + NP(1-P)} \qquad (1)$$

Where:

n = the required total sample size

N = the total number of households (targeted residents)

Z = the inverse of the standard normal cumulative distribution that corresponds to the 5 percent level of confidence (Z=1.96)

k = the total number of kebeles (strata).

N_i = the number of households in each kebeles.

W_i = the estimated proportion of Ni to N (each kebels households to total number of households)

p = the success probability

d = the level of precision (sampling error)

The desired sample size from the target population was 589 and 533 households for Adama and Assela cities respectively. With additional assumption of 10 percent non response rate, the total sample size becomes 648 and 586 households for Adama and Assela cities respectively. Using proportional allocation, the sub-sample size from each kebele is given in table 1 and 2 below.

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Table 1.Sample size by kebele. (For Adama City)

S.N	Kebels	Total Number of households in each kebeles (N_i)	W_i	n_i
1	01	5358	0.17	105
2	03	5554	0.18	107
3	04	6506	0.21	126
4	06	1873	0.06	37
5	08	2800	0.09	54
6	13	3210	0.11	58
7	14	5419	0.18	102
Total		30,720	1	589
Required total sample size				589

Table 2.Sample size by kebele. (For Assela City)

S.N	Kebels	Total Number of households in each kebeles (N_i)	W_i	n_i
1	01	1307	0.27	145
2	02	1711	0.36	186
3	03	1807	0.37	202
Total		4825	1	533
Required total sample size				533

2.5 Variables Considered under the Study

The response variable in this study awareness categorized as aware and not aware. Explanatory Variables including Age (in year), Gender (Male, Female), marital status (Single, Not single), Religion (Orthodox, Catholic, Protestant, Muslim, Other), Accommodation (Alone, Not alone), Total family size in numbers (1-2, 3-4, >= 5), Participation in social forms, Reading Habit (Frequently, Sometimes, Rarely), Use of Media (Frequently, Sometimes, Rarely), Educational level (Elementary and less, High school, Higher education), Monthly income in Birr, Employment Status.

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2.6 Method of Data Analysis

In order to meet the objective set up on this study binary logistic regression model and tests related are employed as a general methodology.

2.7 Classical Logistic Regression Model

Logistic regression is a statistical technique for predicting the probability of an event, given a set of predictor variables. It describes the relationship between a dichotomous response variable and a set of explanatory variables. The explanatory variables may be continuous or discrete.

Logistic regression can be used to predict the probability of the outcome of a response variable on the basis of continuous and/or categorical explanatory variables and to determine the magnitude of the effect of the explanatory variables on the response variable; to rank the relative importance of explanatory variables; to assess interaction effects; and to understand the impact of covariate control variables. The impact of predictor variables is usually explained in terms of odds ratios.

2.8 Model Description

Let Y_{nx1} be a dichotomous outcome random variable with categories 1 (aware) and 0 (not aware).

Let $X_{nx(p+1)}$ denote the collection of p predicator variables of Y. Then, the conditional probability that respondents aware given that X set of predictor variables is denoted by $P(Y_i = 1/X_i) = P_i$

The expression P_i has the form:

$$P(Y_i = 1/X_i) = P_i = \frac{\exp^{(\beta_0 + \beta_1 x_{i1} + ,\ldots + \beta_p x_{ip})}}{1 + \exp^{(\beta_0 + \beta_1 X_{i1} + \ldots + \beta_p x_{ip})}} \quad (2)$$

Where $P(Y_i = 1/X_i)$ is the probability that the respondent i is aware given set of predictors X and $\beta_0, \ldots, \beta_k$ are vector of unknown coefficients.

However, the relationship between the probability of ith respondent is aware and set of predictor variables are non-linear. In order to give meaningful interpretation, the probability of ith respondent is aware should be written as linear combination of predictors. This is computed using the link function of logit transformation of the probability of ith respondent

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aware is given by:

$$Logit\ (P_i) = \text{Log}\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 x_{i1} + \ldots + \beta_p x_{ip} \quad (3)$$

i= 1, 2. . .n where β_0 is the constant of the equation and $\beta 1, \beta 2, \ldots, \beta p$ are the coefficients of the predictor variables.

2.9 Method of Estimation

Maximum likelihood estimation technique was used to estimate the parameters of the model. Consider the logistic model $P(y_i = 1 / X_i) = e^{X_i\beta} / (1 + e^{X_i\beta})$. Since the observed values of Y are independently distributed as Bernoulli random variables, the probability mass function is given by:

$$P(y_i / P_i) = \mathrm{P}_i^{y_i} (1 - P_i)^{1-y_i}, where\ \mathrm{i} = 1, 2, \ldots, \mathrm{n} \quad (4)$$

Because of independency assumption in the observations, the maximum likelihood function of Y is the joint density function given by:

$$L(\beta / Y) = \prod_{i=1}^{n} \left[\frac{e^{X_i\beta}}{1 + e^{X_i\beta}}\right]^{y_i} \left[\frac{1}{1 + e^{X_i\beta}}\right]^{1-y_i} \quad (5)$$

The maximum likelihood estimates of the parameters are obtained by maximizing the log-likelihood function which is given by:

$$\log L(\beta / Y) = \sum \left\{ y_i \log\left[\frac{e^{X_i\beta}}{1 + e^{X_i\beta}}\right] + (1 - y_i) \log\left[\frac{1}{1 + e^{X_i\beta}}\right] \right\} \quad (6)$$

This is the kernel of the likelihood function to maximize. However, it is clumsy to differentiate and so that can be simplified by taking its log. As a result, the logarithm is monotonic function; any maximum of the likelihood function will also bea maximum of the log-likelihood function and vice-versa. Accordingly, the natural log to L, $\log L(\beta / Y) yields$ the log-likelihood function l which is:

$$l = \sum_{i=1}^{n} \left\{ y_i (X_i \beta) - \log\left(1 + e^{X_i\beta}\right) \right\} = \sum_{i=1}^{n} \left\{ y_i \left(\sum_{j=1}^{k} \beta_j x_{ij} \right) - \log\left(1 + \log\left(1 + e^{\sum_{j=0}^{k} \beta_j x_{ij}} \right) \right) \right\} \quad (7)$$

To get the critical points of the log-likelihood function l, set the first derivative with respect to each β_j equal to zero where $j = 0, 1, \ldots, k$ that is,

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$$l'(\beta) = \frac{\partial l(\beta)}{\partial \beta_j} = \sum_{i=1}^{n} \left\{ y_i x_{ij} - x_{ij} e^{\sum \frac{\beta_j x_{ij}}{1+e^{\sum_{j=0}^{k} \beta_j x_{ij}}}} \right\} \tag{8}$$

2.10 Goodness of the Fit of the Model

Assessing goodness of fit of the model involves investigating how the values of predicted by the model close with that of observed values [**10].**The comparison of observed to predicted values using the likelihood function is based on the statistic called deviance.

Deviance

$$D = -2\sum_{i=2}^{n} \left(y_i \log\left(\frac{\hat{p}}{y_i}\right) + (1-y_i)\log\left(\frac{1-\hat{p}}{1-y_i}\right)\right) \tag{9}$$

The purpose of assessing the significant of an independent variable, with the value of D is composed with and without the independent variable in the equation which as D= $M_O - M_L$ where, M_O deviance of model without explanatory variable and M_L deviance of the model with explanatory variable.

Likelihood-Ratio Test

$$G^2 = -2\log\left(\frac{L_0}{L_1}\right) = -2\{\log(L_0) - \log(L_1)\} \tag{10}$$

Where, L_0 is the likelihood function of the null model and L_1 the likelihood function of the full model evaluated at the MLEs. This natural log transformation of the likelihood function yields an asymptotically chi-square statistic. Then, G^2 is distributed with degree of freedom equal to the difference between the numbers of parameters estimated in the two models **[11].**

The Hosmer and Lemeshow Test Statistic

The Hosmer and Lemeshowstatistic is given by:

$$\hat{C} = \sum_{k=1}^{g} \frac{(O_k - E_k)^2}{V_k}, \; E_k = nP_k \text{ and } V_k = nP_k(1-P_k) \tag{11}$$

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R^2 for Logistic Regression

$$R^2_{logistic} = \frac{-2LL_{Null} - 2LL_k}{-2LL_{Null}} \quad (12)$$

Where the null model is the logistic model with just the constant and the k model contains all the predictors in the model.

The Cox and Snell R square is computed as follows:

$$Cox \text{ and Snell Pseudo } R^2 = 1 - \left[\frac{-2LL_{null}}{-2LL_K}\right]^{\frac{2}{n}} \quad (13)$$

Because this R-squared value cannot reach 1.0, Nagelkerke modified it. The correction increases the Cox and Snell version to make 1.0 a possible value for R squared **[12].**

$$Nagelkerke \text{ Psendo } R^2 = \frac{1 - \left[\frac{-2LL_{null}}{-2LL_k}\right]^{\frac{2}{n}}}{1 - \left[-2LL_{null}\right]^{\frac{2}{n}}} \quad (14)$$

The Wald test

A Wald test is used to test the statistical significance of each coefficient (β) in the model.

The statistic is defined as:

$$Z^2 = \left(\frac{\hat{\beta}_j}{SE\left(\hat{\beta}_j\right)}\right)^2 \rightarrow \chi_1^2, \text{ where } j = 1,2, \ldots, k \quad (15)$$

The square of Z, Z^2, yields the Wald statistic with a chi-square distribution.

2.11 Logistic Regression Diagnostics

Leverage Values: Detecting outliers is common practice and it is important to distinguish between two types of outliers. Outliers in the response variable represent model failure. Such observations are called outliers. Leverages values are given by:

$$H = \hat{W}^{\frac{1}{2}} X\left(X'\hat{W}X\right)^{-1} X'\hat{W}^{\frac{1}{2}} \quad (16)$$

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Where h_{ii} is the ith diagonal element of the nxn estimated hat matrix H, whereby in logistic regression it is called hat diagonal or Pregibon leverage and measures the lever-age of an observation.

2.12 Influential Statistics

Cooks Distance

Cooks distance is designed to measure the shift in when a particular observation is omitted. It is a combined measure of the impact of that observation on all regression coefficients.

Cook's D_i statistic is defined as:

$$D_i = \frac{\left(\hat{\beta}_i - \hat{\beta}\right)'\left(X'X\right)\left(\hat{\beta}_i - \hat{\beta}\right)}{P_s^{\,2}} \qquad (17)$$

Computationally, D_i is more easily obtained as:

$$D_i = \frac{r_i^{\,2}}{P}\left(\frac{h_{ii}}{1-h_{ii}}\right) \qquad (18)$$

Where r_i is the studentized residual and h_{ii} is the ith diagonal element of H computed from the full regression and p is the number of unknown parameters.

DFBETAS

The influential observations for the individual regression coefficients are identified by $DFBETAS_{j(i)}$, j=0, 1, … , P. where each $DFBETAS_{j(i)}$ is the standardized change in β_j when the ith observation is deleted from the analysis.

$$DEBETAS_{j(i)} = \frac{\hat{\beta}_j - \hat{\beta}_{j(i)}}{S_i\sqrt{C_{jj}}} \qquad (19)$$

Where C_{jj} is the $(j+1)^{st}$ diagonal element from $(X'X)^{-1}$. $DFBETAS_{j(i)}$ measures the change in $\hat{\beta}_j$ in multiples of its standard error.

3. RESULTS OF THE STUDY

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The main objective of the study was to identify and analyze awareness about Hepatitis B and/or C Viruses among residents of Adama and Asella Cities. The analysis has been performed for 589 individuals from Adama city and533 individuals fromAssela city. Statistical computations were carried with SPSS software.

3.1 Descriptive Statistics Results

Table3. Summary of respondents' sources of information regarding Hepatitis, Hepatitis B and/or C for Adama and Assela cities

Source of information	Frequency		Percent	
	Adama	**Assela**	**Adama**	**Assela**
Radio	112	101	17.3	17.2
TV	104	92	16.0	15.7
Pamphlets ,flyers ,magazines …	140	125	21.6	21.3
from individuals	105	94	16.2	16
Other	78	69	12.0	11.8

The major source of information regarding Hepatitis, Hepatitis B and Hepatitis C was pamphlet, flyer, posters and magazines (21.6% and 21.3%) followed by radio (17.3% and 17.2%).

Table 4. Summary of respondents' awareness regarding Hepatitis, Hepatitis B and/or Hepatitis C of Adama and Assela

Questions	Category	Frequency		Percent	
		Adama	**Assela**	**Adama**	**Assela**
Have you ever heard about Hepatitis or "yewefbesheta"?	No	114	107	17.6	18.3
	Yes	534	479	82.4	81.7
Have you ever heard about Hepatitis B or C virus?	No	337	314	52.0	53.6
	Yes	311	272	48.0	46.4
IsHepatitis viral disease	No	214	197	33.0	33.6
	Yes	326	286	50.3	48.8
Can Hepatitis B and C affect any age	No	76	65	11.7	11.1

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group?	Yes	237	209	36.6	35.7
Are loss of appetite and dark urine the common symptoms of hepatitis B & C	No	111	95	17.1	16.2
	Yes	202	179	31.2	30.5
Are nausea, jaundice,vomiting,joint pain common symptoms of Hepatitis B or C?	No	95	79	14.7	13.5
	Yes	218	195	33.6	33.3
Do you think it is possible to be infected by Hepatitis B or C and show no symptoms	No	125	108	19.3	18.4
	Yes	188	166	29.0	28.3
Can Hepatitis B and C be transmitted by close personal contact?	No	182	117	20.1	20
	Yes	130	156	28.1	26.6
Can Hepatitis B and C be transmitted by unsterilized syringes, needles and surgical instrument?	No	71	58	11.0	9.9
	Yes	242	216	37.3	36.9
Can Hepatitis B and C transmitted by contaminated blood?	No	73	67	11.3	11.4
	Yes	240	207	37.0	35.3
Can Hepatitis B and C be transmitted by means blades of barber/ear and nose piercing?	No	177	156	27.3	26.6
	Yes	136	118	21.0	20.1
Can Hepatitis B and C be transmitted by unsafe sex?	No	153	131	23.6	22.4
	Yes	160	143	24.7	24.4
Can Hepatitis B and C be transmitted from mother to child during delivery?	No	148	127	22.8	21.7
	Yes	165	147	25.5	25.1
Are Hepatitis B and C curable/treatable?	No	65	53	10.0	9
	Yes	248	221	38.3	37.7
Can Hepatitis B and C self-cured by body own immune system?	No	251	54	9.6	9.2
	Yes	62	220	38.7	37.5
Do you share use of blades, tooth brusshes, tweezers, or razors?	No	303	267	46.8	45.6
	Yes	8	5	1.2	9
Are you aware that vaccination is	No	94	77	14.5	13.1

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available for Hepatitis B?	Yes	217	195	33.5	33.3
Are you aware that there is no vaccination for Hepatitis C?	No	160	137	24.7	23.4
	Yes	150	134	23.1	22.9
Whom do you think shoud get Hepatitis B vacinated?	Adult & child	58	48	9.0	8.2
	All at any stage	251	224	38.7	38.2

Out of 648 and 586 participants in Adama and Assela cities respectively, 82.4% and 81.7% heard about Hepatitis and 48.0% and 46.4% heard about Hepatitis B and C.

About 33.6% and 33.3% of the respondents in Adama and Assela cities respectively knew that Nausea, Jaundice, Vomiting, joint pain and abdominal pain are symptoms of Hepatitis B and/or C viruses.

Table 5.Summary of vaccination and testing experience of Adama and Assela cities residents

Questions	**Category**	**Frequency**		**Percent**	
		Adama	**Assela**	**Adama**	**Assela**
Have you ever been vaccinated against Hepatitis B?	No	212	187	32.7	31.9
	Yes	43	40	6.6	6.8
	Not Remember	51	40	7.9	6.8
Have you ever been tested for Hepatitis B or C?	No	194	164	29.9	28
	Yes	97	91	15.0	15.5
	Not Remember	15	12	2.3	2
If Yes, reason for testing	General heath check	10	10	1.5	1.7
	Feeling sick	79	73	12.2	12.5
	Pregnancy	2	2	0.3	0.3
	By chance	5	5	0.8	0.9
What do you recommend if you or someone is infected by Hepatitis B or C?	Go to health institution	297	261	45.8	44.5
	Go to traditional healer	13	10	2.0	1.7

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3.2 Analysis of Binary Logistic Regression

Table 6. Omnibus Tests of Model Coefficients for Adama and Assela cities

	Chi-square		df		Sig.	
	Adama	Assela	Adama	Assela	Adama	Assela
Step	295.949	312.519	19	19	.000	.000
Block	295.949	312.519	19	19	.000	.000
Model	295.949	312.519	19	19	.000	.000

The result of omnibus tests of the model coefficients had a chi-square value of 295.949 for Adama city and 312.519 for Assela city at 19 degree of freedom for both cities , which was significant at level of significance, α= 0.05. This indicates that the independent variables predict the dependent variable, awareness of residents at Adama and Assela cities towards Hepatitis B and/or C, well and the model was good fit.

Table 7. Model Summary for Adama and Assela cities

Step	-2 Log likelihood		Cox & Snell R Square		Nagelkerke R Square	
	Adama	Assela	Adama	Assela	Adama	Assela
1	597.864	493.695	.367	.413	.490	.553

In this study, Cox and Snell R-square indicate that 36.7 % and 41.3% of the variation in response variable, awareness of residents at Adama and Assela cities towards Hepatitis B and/or C, explained by its predictor variables in both cities respectively. Negelkerke R-square in the model summary Table 7 is 49.0% for Adama and 55.3% for Assela city, indicating there is a relationship of 49.0% and 55.3% between the predictors and the dependent variable for Adama and Assela cities respectively. That is 49.0% and 55.3% of awareness of residents at Adama and Assela cities respectively towards Hepatitis B and/or C, was explained by the explanatory variables.

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	B	S.E	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Ag			3.526	3	.317			
Ag(1)	-.188	.250	.566	1	.452	.828	.507	1.353
Ag(2)	.375	.303	1.533	1	.216	1.456	.803	2.637
Ag(3)	.215	.535	.161	1	.688	1.240	.434	3.540
Gender(1)	-.251	.216	1.350	1	.245	.778	.509	1.188
Edulv			11.254	2	.004*			
Edulv(1)	.141	.263	.288	1	.592	1.151	.688	1.928
Edulv(2)	.973	.314	9.576	1	.002	2.646	1.429	4.900
Empl			2.118	2	.347			
Empl(1)	-.339	.478	.504	1	.478	.712	.279	1.818
Empl(2)	.078	.490	.026	1	.873	1.082	.414	2.826
Montlyincome			7.444	3	.049*			
Montlyincome(1)	.728	.408	3.178	1	.035	2.070	.930	4.608
Montlyincome(2)	.919	.438	4.408	1	.036	2.508	1.063	5.917
Montlyincome(3)	1.305	.486	7.194	1	.007	3.686	1.421	9.562
Marilstu(1)	.038	.255	.022	1	.883	1.038	.630	1.712
Accom(1)	.466	.292	2.535	1	.111	1.593	.898	2.825
Totalf			6.077	2	.048*			
Totalf(1)	.458	.309	2.202	1	.138	1.581	.863	2.894
Totalf(2)	.797	.327	5.934	1	.015	2.219	1.169	4.215
Read			35.971	2	.000*			
Read(1)	-.679	.239	8.083	1	.004	.507	.317	.810
Read(2)	-2.145	.358	35.968	1	.000	.117	.058	.236
usemedi			25.805	2	.000*			
usemedi(1)	-1.040	.225	21.291	1	.000	.353	.227	.550
usemedi(2)	-1.204	.379	10.077	1	.002	.300	.143	.631
Constant	-.448	.447	1.006	1	.316	.639		

Table 8: Variables in the final logistic regression equation for Adama city.

We see that only five predictor variables were selected by the model, that is educational level, monthly income, total family size, reading habit and use of media. All the variables selected by the model have significant effect on the outcome variable.Educational level, monthly

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income, total family size, reading habit and use of media contributed significantly to the prediction with P-value .004, .049,0.048, 0.000, 0.000 which are less than 0.05 level of significance, respectively (Result not shown).

The results indicate that, for instance, odds of awareness for respondents with high school level of education increased by the factor 1.151 as compared with respondents with elementary and less level of education. The value 0.141 shows an increase in log odds of respondents with high school educational level. The value 0.973 indicates an increase in log odds of respondents with higher educational level; the odds ratio $e^{0.973}$= 2.646 means that the odds of awareness increases by a factor 2.646 for respondents with higher educational level compared to the reference category.

Table 9. Summary of the results of multiple logistic regression model for Assela city.

	B	S.E.	Wald	df	Sig.	Exp(B)	95%C.I.for EXP(B)	
							Lower	Upper
Ag			8.350	3	.039*			
Ag(1)	-.296	.284	1.083	1	.298	.744	.426	1.299
Ag(2)	.624	.337	3.428	1	.064	1.866	.964	3.611
Ag(3)	.706	.631	1.252	1	.263	2.026	.588	6.982
Gender(1)	-.219	.242	.820	1	.365	.803	.500	1.290
Edulv			13.894	2	.001*			
Edulv(1)	.368	.297	1.540	1	.215	1.446	.808	2.587
Edulv(2)	1.252	.347	12.990	1	.000	3.498	1.770	6.911
Empl			3.704	2	.157			
Empl(1)	-.817	.545	2.249	1	.134	.442	.152	1.285
Empl(2)	-.276	.550	.251	1	.617	.759	.258	2.233
Montlyincome			6.988	3	.042*			
Montlyincome(1)	.902	.463	3.795	1	.051	2.464	.995	6.103
Montlyincome(2)	1.066	.492	4.685	1	.030	2.903	1.106	7.618
Montlyincome(3)	1.411	.542	6.786	1	.009	4.102	1.418	11.860
Marilstu(1)	.234	.286	.668	1	.414	1.264	.721	2.215
Accom(1)	.248	.328	.571	1	.450	1.282	.673	2.439
Totalf			3.304	2	.049*			
Totalf(1)	.457	.345	1.748	1	.042	1.579	.802	3.108
Totalf(2)	.657	.361	3.303	1	.039	1.929	.950	3.917
Read			37.754	2	.000*			

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Read(1)	-.931	.263	12.544	1	.000	.394	.235	.660
Read(2)	-2.46	.403	37.286	1	.000	.086	.039	.188
usemedi			22.322	2	.000*			
usemedi(1)	-.999	.248	16.284	1	.000	.368	.227	.598
usemedi(2)	-1.48	.451	10.842	1	.001	.227	.094	.549
Constant	-.139	.511	.074	1	.786	.871		

From table 9, we see that only sex predictor variables were selected by the model, that are Age, Educational level, monthly income, total family size, reading habit and use of media. All the variables selected by the model have significant effect on the outcome variable.age, educational level, monthly income, total family size, reading habit and use of media contributed significantly to the prediction with P-value 0.039, 0.001, 0.042, 0.049, 0.000, 0.000 which are less than 0.05 level of significance, respectively (Table 9). Odds ratio of age group obtained in table 9 using the reference category of age group 18-30. The value -0.296 shows a decrease in log odds of age group 31-40; the odds ratio $e^{-0.296}$= 0.744 means that the odds of awareness decreases by a factor 0.744 for respondents with age group 31-40 compared to the reference category.

4. DISCUSSION

The study has tried to assess awareness of residents of Adama and Assela cities towards Hepatitis B and/or C. Hepatitis B and C viruses' infections are a serious health problem worldwide. It has significant burden on the health services especially in developing countries with limited resources.

Awareness about the disease and vaccination among the respondents were 45.8% and 6.6% for Adama city residents and 44.9% and 6.8% for Assela city residents respectively. Educated individuals were more aware about availability of vaccine for Hepatitis B virus. Those individuals who read newspaper, magazines, pamphlet, and follows mass media were more aware about Hepatitis B and/or C and its vaccination. Some of these finding were in line with other studies done in Coastal eastern India (Misra et al, 2012). Educational level and uses of media had shown statistically significant variables in this study, and this finding is comparable with the results of the study done in Coastal eastern India. In this study, sources of information regarding the disease were TV, radio, pamphlet, flyers, and magazines. This finding is comparable with the results of the study done in Coastal eastern India. In this study,

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age, educational level, monthly income, total family size, reading habit and use of media had shown statistically significant association; however the study done in Quetta, Pakistan, the only variable significantly associated with knowledge of the respondents was area of residents. Poor knowledge was apparent in response to questions relating symptoms and transitions of the diseases. This finding is consistent with studies in Qutta, Pakistan.

5. CONCLUSIONS AND IMPLICATIONS OF THE STUDY

The study revealed that only 45.8% and 44.9% of the sampled residents at Adama and Assela cities respectively had awareness about Hepatitis B and/or C indicating that 54.2% and 55.1% not aware about the diseases. Although 33.5% and 33.3% of the respondents on Adama and Assela cities respectively were aware about availability of vaccine for Hepatitis B, only 6.6% and 6.8% of the respondents are vaccinated for Hepatitis B. Knowledge regarding Hepatitis B and/or C transmission, prevention, symptoms and occurrence among the respondent was low. The educated especially those who read Newspaper, Magazines, pamphlet, flayers and use Media were found to be more aware about the diseases and availability of vaccine. The results indicate lack of understanding of the basis of infection, control and prevention of transmission of Hepatitis B and/or C.

The classical logistic regression results shows that the variables significantly influencing awareness of residents at Adama and Assela cities towards Hepatitis B and/or C were educational level, monthly income, reading habit, uses of media and age is obtained as a significant variable at Assela city.

Only about 45.8% and 44.9% of the respondents at Adama and Assela cities respectively are aware about the infectious disease while the rest are not aware. Thus, awareness campaigns should be enhanced to increases the knowledge of the public on Hepatitis B and/or C infections with emphasis on its mode of transition and measures to reduce the risk of controlling the viruses (practicing safe sex and avoiding of sharing infection needles, toothbrushes, or shaving razors). The public should be aware of the potential risk when getting use of blades of barber/ body piercing in place where adequate disinfection procedures might not be available or practiced. The most effective means of preventing Hepatitis B infection is through vaccination, thus educational interventions are need to promote Hepatitis B and/or C screening and increase vaccination coverage. It is important to develop educational strategies, seminars and public talks with special attention to person of lower educational levels, since they may not be aware of the importance of Hepatitis B and C

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screening and vaccination. To increase awareness of infectious diseases mainly Hepatitis B and C, adoption of collaborative care where government health agencies, physicians, heath workers and mass Medias should work together to educate the masses about Hepatitis B and C and its vaccination. Awareness on that Hepatitis B and C can affect any age group is low. Thus the government health agencies, mass Medias, physicians and health workers, should inform the community that Hepatitis B and C infections can affect any age group and can persists for one's whole life despite the best available therapies and that the infected person may remain asymptomatic and undiagnosed for long periods, and the diseased person may develop chronic complication like liver failure and liver cancer.

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